U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1437
Supplement 39

Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Supplement 39

Regarding Prairie Island Nuclear Generating Plant, Units 1 and 2

Draft Report for Comment

Office of Nuclear Reactor Regulation

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Proposed Action	Issuance of renewed operating licenses DPR-42 and DPR-60 for Prairie Island Nuclear Generating Plant, Units 1 and 2, in the city of Red Wing, Dakota County, Minnesota.
Type of Statement	Draft Supplemental Environmental Impact Statement
Agency Contact	Elaine Keegan U.S. Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Mail Stop O-11F1 Washington, D.C. 20555-0001 Phone: 301-415-8517 Email: Elaine.keegan@nrc.gov
Comments	Any interested party may submit comments on this supplemental environmental impact statement. Please specify NUREG-1437, Supplement 39, draft, in your comments. Comments must be received by January 30, 2010. Comments received after the expiration of the comment period will be considered if it is practical to do so, but assurance of consideration of late comments will not be given. Comments may be emailed to PrairieIslandEIS@nrc.gov or mailed to: Chief, Rulemaking, Directives, and Editing Branch U.S. Nuclear Regulatory Commission Mail Stop T6-D59 Washington, D.C. 20555-0001

ABSTRACT

This draft supplemental environmental impact statement has been prepared in response to an application submitted by Northern State Power Co. to renew the operating license for Prairie Island Nuclear Generating Plant, Units 1 and 2 for an additional 20 years.

This draft supplemental environmental impact statement includes the preliminary analysis that evaluates the environmental impacts of the proposed action and alternatives to the proposed action. Alternatives considered include replacement power from new natural-gas-fired-combination cycle; combination including natural gas, wind, wood-fired generation; combination including one PINGP 1 and 2 unit, natural gas, and wind; and not renewing the license (the no-action alternative).

The preliminary recommendation is that the Commission determine that the adverse environmental impacts of license renewal for Prairie Island Nuclear Generating Plant, Units 1 and 2, are not so great that preserving the option of license renewal for energy-planning decision makers would be unreasonable.

Table of Contents

FIGURES

TABLES

EXECUTIVE SUMMARY

Background

By letter dated April 11, 2008, Northern States Power Co. (NSP) [formerly Nuclear Management Company, LLC (NMC)] submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to issue renewed operating licenses for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2), for an additional 20-year period.

The following document and the review it encompasses are requirements of NRC regulations implementing Section 102 of the National Environmental Policy Act of 1969 (NEPA; 42 USC 4321) in Title 10 of the *Code of Federal Regulations* (CFR), Part 51 (10 CFR Part 51). In 10 CFR 51.20(b)(2), the Commission indicates that issuing a renewed power reactor operating license requires preparation of an Environmental Impact Statement (EIS) or a supplement to an existing EIS. In addition, 10 CFR 51.95(c) States that the EIS prepared at the operating license renewal stage will be a supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes and 2 (NRC 1996; 1999).

Upon acceptance of NSP's application, the NRC staff began the environmental review process described in 10 CFR Part 51 by publishing a Notice of Intent to prepare an EIS and conduct scoping. We conducted a site audit at the plant in August 2008 and held public scoping meetings on July 30, 2008, in Red Wing, Minnesota. In the preparation of this supplemental environmental impact statement (SEIS) for PINGP 1 and 2, we reviewed NSP's environmental report (ER) and compared it to the GEIS, consulted with other agencies, conducted a review of the issues following the guidance set forth in NUREG-1555, Supplement 1, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal* (NRC 2000), and considered the public comments received during the scoping process.

Proposed Action

NSP initiated the proposed Federal action – requesting a renewed power reactor operating licenses – by submitting an application for license renewal of PINGP 1 and 2, for which the existing licenses (DPR-42 and DPR-60) expire on August 9, 2013 and October 29, 2014, respectively. NRC's Federal action is the decision whether to renew the license for an additional 20 years.

Purpose and Need for Action

The purpose and need for the proposed action (issuance of a renewed license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and, where authorized, Federal (other than NRC) decisionmakers. This definition of purpose and need reflects the Commission's recognition that, unless there are findings in the safety review required by the Atomic Energy Act of 1954 or findings in the NEPA environmental analysis that would lead the NRC to reject a license renewal application, the NRC does not have a role in the energy-planning decisions of State regulators and utility officials as to whether a particular nuclear power plant should continue to operate.

If the renewed license is issued, State regulatory agencies and NSP will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the operating license is not renewed, then the facility must be shut down on or before the expiration dates of the current operating licenses: August 9, 2013, for Unit 1 and October 29, 2014, for Unit 2.

Environmental Impacts of License Renewal

The SEIS evaluates the potential environmental impacts of the proposed action. The environmental impacts from the proposed action can be SMALL, MODERATE, or LARGE. NSP and the NRC staff established separate processes for identifying and evaluating the significance of any new and significant information on the environmental impacts of license renewal of PINGP 1 and 2. Neither NSP nor the NRC identified information that is both new and significant related to Category 1 issues that would call into question the conclusions in the GEIS. Similarly, neither the scoping process nor the NRC has identified any new issue applicable to PINGP 1 and 2 that has a significant environmental impact. Therefore, the NRC staff relies upon the conclusions of the GEIS for all the Category 1 issues applicable to PINGP 1 and 2.

Land Use

SMALL. The NRC did not identify any Category 2 impact issues for land use, nor did the staff identify any new and significant information during the environmental review. Therefore, there would be no impacts beyond those discussed in the GEIS.

Air Quality

SMALL. The NRC did not identify any Category 2 issues for the impact of transmission lines on air quality, nor did the staff identify any new or significant information during the environmental review. Therefore, for plant operation during the license renewal term, there are no impacts beyond those discussed in the GEIS.

However, air quality during refurbishment and maintenance areas is a Category 2 issue. The NRC staff concludes that the impact of vehicle exhaust emissions resulting from refurbishment activities would be SMALL. Potential mitigation measures include implementation of a dust control plan and the use of vans and workforce shift changes to reduce the number of vehicles on the road at any one given time.

Ground Water Use and Quality

SMALL. Ground water use conflicts: potable and service water—plants using greater than 100 gallons per minute; and plants using cooling towers withdrawing make-up water from a small river) are Category 2 issues related to license renewal at PINGP 1 and 2. Information provided by NSP, including drawdown calculations and consumptive use calculations, was reviewed by the NRC staff, and determined that the impact of water withdrawal at PINGP 1 and 2 is SMALL.

Surface Water Use and Quality

SMALL. Water use conflicts—plants with cooling ponds or cooling towers using make-up water from a small river with low flow—is a Category 2 issue related to license renewal at PINGP 1 and 2. Withdrawals of MIssissippi River water by PINGP 1 and 2 are less than 11 percent of the lowest annual mean flow and approximately 4.6 percent of the average river flow. Relative to the total flow of the Mississippi River, PINGP 1 and 2's consumptive use and related impact to the river is SMALL.

Aquatic Resources

SMALL. Aquatic Resources conflicts: impingement, entrainment, and heat shock are Category 2 issues related to license renewal at PINGP 1 and 2. Information provided by NSP, as well as the conclusions drawn by NRC staff, shows that the impacts of aquatic resources at PINGP 1 and 2 are small.

For refurbishment, regarding the transportation route of the new steam generators to the PINGP unit 2 site, NSP will need to consult with the appropriate State and Federal agencies regarding potential impacts of the transportation plan on aquatic resources and threatened and endangered aquatic species.

Terrestrial Resources

SMALL. With regard to operation of PINGP 1 and 2 during the license renewal term, the NRC did not identify any Category 2 issues for terrestrial resources, nor did the staff identify any new or significant information during the environmental review. Therefore, there are no impacts beyond those discussed in the GEIS.

However, impacts to terrestrial resources during refurbishment activities is a Category 2 issue. The majority of refurbishment activities will take place on existing facility grounds at PINGP 1 and 2, and use of existing structures will minimize new construction. All new, temporary structures will be constructed on previously disturbed land. No road improvements would be required for delivery of the steam generators to PINGP 1 and 2 as the new steam generators would be offloaded from a barge to a nuclear transporter directly onto the PINGP 1 and 2 site. Potential mitigation measures to minimize impacts to terrestrial resources include installing silt fences to minimize sediment transport, the use of best management practices, and the restoration of cleared land upon completion of construction activities.

Threatened and Endangered Species

SMALL. Impacts to threatened and endangered species during the period of extended operation and during refurbishment activities are Category 2 issues. The U.S. Fish and Wildlife Service indicated that the Higgins eye pearly mussel (*Lampsilis higginsii*) is present in Upper Mississippi River within the vicinity of PINGP 1 and 2, though no designated critical habitat is present for the species in Goodhue County. The staff concluded that the impact to this species is SMALL. The Minnesota Department of Natural Resources indicated that although several State-listed species of concern are known to occur in the vicinity of the PINGP 1 and 2 project site, no impact to these species is anticipated.

Refurbishment activities will take place on existing facility grounds at the PINGP 1 and 2 site, and all new, permanent structures will be constructed on previously disturbed land; therefore, no impact to threatened or endangered species is anticipated. While steam generators will travel to the PINGP 1 and 2 site via barge, though no changes to the river or dams are anticipated.

Human Health

SMALL. With regard to Category 1 human health issues during the license renewal term—microbiological organisms (occupational health), noise, radiation exposures to public, occupational radiation exposures, and electromagnetic fields (chronic effects)—the NRC staff did not identify any new or significant information during the environmental review. Therefore, there are no impacts beyond those discussed in the GEIS. Slightly higher radiation doses to members of the public are expected from PINGP 1 and 2 during the refurbishment period. However, based on past regulatory compliance, the dose to a maximally exposed individual in the vicinity of PINGP 1 and 2 for the refurbishment period is expected to continue to be a small fraction of the limits and standards specified in 10 CFR Part 20, Appendix I to 10 CFR Part 50, and 40 CFR Part 190.

Microbiological organisms (public health) and electromagnetic fields— acute effects (electric shock) are Category 2 human health issues. Between 2000 and 2005, the highest ambient river water temperature upstream of the discharge canal was 86.0 °F (30 °C), and the highest temperature downstream of the discharge canal was 86.4 °F (30.2 °C), both measured in August 2001. The highest temperature measured at the PINGP 1 and 2 discharge canal was 99 °F (37.2 °C), in August 2003. Maximum temperature conditions could allow for the presence of thermophilic microbiological organisms; however, given the growth rate of these organisms, it is not expected that the period of time in which the heated discharge water moves through the discharge canal would allow for any noticeable impact on growth rates of microbiological organisms. Additionally, potential thermophilic microbiological organisms present in the discharge canal would likely be in limited numbers and would not be expected to cause a significant risk to public health. Additionally, the PINGP 1 and 2 discharge canal and adjacent portions of the Mississippi River do not allow for public access; therefore, the impact is SMALL.

NRC staff reviewed NSP's analysis of electromagnetic fields—acute shock resulting from induced charges in metallic structures, and verified that none of PINGP 1 and 2's in-scope transmission lines have the capability to induce shock greater than 5 milliamperes in a vehicle parked beneath the lines. This finding conforms with National Electric Safety Code provisions for preventing electric shock from induced current. Potential mitigation measures include limiting public access to transmission line structures, installing signs at road crossings, and increasing transmission line clearances. The NRC staff considers the GEIS finding of "uncertain" for electromagnetic fields—chronic effects still appropriate and will continue to follow developments on this issue.

Socioeconomics

SMALL to MODERATE. The NRC did not identify any Category 1 public services and aesthetic impacts, or new and significant information during the environmental review. Therefore, there would be no impacts beyond those discussed in the GEIS. Category 2 socioeconomic impacts include housing impacts, public services (public utilities), offsite land use, public services (public transportation), historic and archaeological resources, and environmental justice. Since PINGP 1 and 2 is located in a high-density population area, and growth control measures are not in effect, any changes in PINGP 1 and 2 employment would have little noticeable effect on housing availability in the surrounding area. NSP has indicated that the steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days, which would create an additional demand for temporary (rental) housing in the immediate vicinity of PINGP 1 and 2. This also applies to offsite land use and transportation issues – because non-outage employment levels at PINGP 1 and 2 would remain relatively unchanged during the license renewal period, there would be no land use impacts related to population or tax revenues, and no transportation impacts. Category 2 socioeconomic impacts related to refurbishment at PINGP 1 and 2 would be SMALL, as the PINGP unit 2 steam generator project is expected to require a one-time increase of outage workers for up to 70 days—a short duration of time.

Impacts to known historical and archeological resources are MODERATE from continued operation of PINGP 1 and 2 during the license renewal term. These impacts are potentially mitigated with the implementation of new commitments proposed by NPS. These commitments are described in chapter 4 of this draft SEIS. Since PINGP 1 and 2 is situated in an archaeologically sensitive area, continuing to develop cultural resources management plans in addition to NPS's review procedures would serve to integrate cultural resource considerations with ongoing PINGP 1 and 2 activities. Additionally, training of PINGP 1 and 2 staff in the Section 106 process would ensure that informed decisions are made when considering the effects of future projects on historic and archaeological resources. Lands that have not been surveyed should be investigated by a professional archaeologist prior to any ground disturbance. Because refurbishment activities will occur on previously disturbed land, the impacts associated with refurbishment are not expected to adversely affect historic or archaeological sites in the area of PINGP unit 2.

Regarding environmental justice, an analysis of minority and low-income populations residing within a 50-mile (80-kilometer) radius of PINGP 1 and 2 indicated there would be no disproportionately high and adverse impacts to these populations from the continued operation of PINGP 1 and 2 during the license renewal period. Additionally, based on recent monitoring results, concentrations of contaminants in native leafy vegetation, soils and sediments, surface water, and fish in areas surrounding PINGP 1 and 2 have been low (at or near the threshold of detection) and seldom above background levels. Consequently, no disproportionately high and adverse human health impacts would be expected in special pathway receptor populations in the region as a result of subsistence consumption of fish and wildlife.

Severe Accident Mitigation Alternatives

Since PINGP 1 and 2 had not previously considered alternatives to reduce the likelihood or potential consequences of a variety of highly uncommon but potentially severe accidents, NRC regulation 10 CFR 51.53(c)(3)(ii)(L) requires that PINGP 1 and 2 evaluate Severe Accident Mitigation Alternatives (SAMAs) in the course of license renewal review. SAMAs are potential ways to reduce the risk or potential impacts of uncommon but potentially severe accidents, and may include changes to plant components, systems, procedures, and training.

Based on our review of potential SAMAs, we conclude that PINGP 1 and 2 made a reasonable, comprehensive effort to identify and evaluate SAMAs. Based on the review of the SAMAs for PINGP 1 and 2, and the plant improvements already made, we conclude that none of the potentially cost-beneficial SAMAs relate to adequately managing the effects of aging during the period of extended operation; therefore, they need not be implemented as part of the license renewal pursuant to 10 CFR Part 54.

Alternatives

We considered the environmental impacts associated with alternatives to license renewal. These alternatives include other methods of power generation and not renewing the PINGP 1 and 2 operating license (the no-action alternative). Replacement power options considered were 1) gas-fired combined-cycle plant at the PINGP 1 and 2 site and an undetermined alternate site; 2) a combination including a gas-fired unit, wind power, conservation, and wood-waste biomass; and 3) a combination including continued operation of one of the two PINGP 1 and 2 unit, wind power, and conservation. Wherever possible, we evaluated potential environmental impacts for these alternatives located both at the PINGP 1 and 2 site and at some other unspecified alternate location. We evaluated each alternative using the same impact areas that we used in evaluating impacts from license renewal. The results of this evaluation are summarized in the table on the following page.

All alternatives capable of meeting the needs currently served by PINGP 1 and 2 entail potentially equal or greater impacts than the proposed action of license renewal of PINGP 1 and 2. The no-action alternative does not meet the purpose and need of this draft SEIS, though if it triggers either combination alternative 1 or 2 to replace the capacity currently supplied by PINGP 1 and 2, it could result in an overall SMALL impact, as well.

Impact Area

Alternative	Air Quality	Ground Water	Surface Water	Aquatic and Terrestrial Resources	Human Health	Socioeconomics	Waste Management
PINGP 1 and 2 License Renewal	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL
Gas-fired at PINGP 1 and 2 site	MODERATE	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL
Gas-fired at Alternative Site	MODERATE	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL
Combination Alternative 1[(a)]	MODERATE	SMALL	SMALL to MODERATE	MODERATE	MODERATE	SMALL to MODERATE	SMALL
Combination Alternative 2[(b)]	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL
No Action Alternative	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL

[(a)]Combination Atlernative 1 consists of gas-fired generation, wood-fired generation, wind power, and conservation

[(b)]Combination Alternative 2 consists of continued operation of one of the two PINGP 1 and 2 units, wind power, and conservation

Recommendation

Our preliminary recommendation is that the Commission determine that the adverse environmental impacts of license renewal for PINGP 1 and 2 are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS; (2) information submitted in the NSP's ER; (3) consultation with other Federal, State, and local agencies; (4) a review of other pertinent studies and reports; and (5) a consideration of public comments received during the scoping process.

ABBREVIATIONS AND ACRONYMS

AEA	Atomic Energy Act of 1954
AEC	U.S. Atomic Energy Commission
AEO	Annual Energy Outlook
ALARA	as low as is reasonably achievable
APE	area of potential effect
APP	Avian Protection Plan
BTU/kWh	British thermal units per kilowatt hour
BO	Biological Opinion
°C	degrees Celsius
CAA	Clean Air Act
CDC	U.S. Center for Disease Control and Prevention
CDF	Core Damage Frequency
CDM	Clean Development Mechanism
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
C_{eq}/kWh	carbon equivalent per kilowatt-hour
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
DBA	design-basis accident
DOE	U.S. Department of Energy
DPR	demonstration power reactor
EHA	essential habitat area
EIA	Energy Information Administration (of DOE)
EIS	environmental impact statement
ELF-EMF	extremely low frequency-electromagnetic field
EMS	environmental management system
ER	environmental report
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act of 1973
°F	degrees Fahrenheit
FES	Final Environmental Statement
fps	feet per second
FR	Federal Register
FSAR	Final Safety Analysis Report
ft	feet
ft/s	feet per second
FWS	U.S. Fish and Wildlife Service

GE	General Electric Company
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
GHG	greenhouse gas
gpm	gallons per minute
HID	high intensity discharge
in.	inch
Inc.	Incorporated
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
ISFSI	independent spent fuel storage installation
ISLOCA	interfacing system loss-of-coolant accidents
kg/cm^2	kilograms per square centimeter
LLC	limited liability corporation
LOCA	loss of coolant accident
m	meter
MACCS2	MELCOR Accident Consequence Code System 2
MDH	Minnesota Department of Health
mgd	million gallons per day
mGy	milligray (unit of absorbed radiation dose)
MNDNR	Minnesota Department of Natural Resources
MOU	memorandum of understanding
MPCA	Minnesota Pollution Control Agency
mrad	millirad (unit of absorbed radiation dose)
m/s	meters per second
m^3/s	cubic meters per second
mSy	millisievert
MT	metric tonne
MTU	metric tonne uranium
MW	megawatt
MWd	megawatt days
MWe	megawatt-electric
MWt	megawatt-thermal
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAS	National Academy of Sciences
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMC	Nuclear Management Company, LLC
NO_x	nitrogen oxide(s)
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NSP	Northern States Power Co.

NUREG	NRC Regulatory Guide
O_3	ozone
PAM	primary amoebic meningoencephalitis
PCB	polychlorinated biphenol
pCi/L	picocuries per liter
PFOS	perfluorooctanesulfonic acid
PIIC	Prairie Island Indian Community
PINGP 1 and 2	Prairie Island Nuclear Generating Plant, Units 1 and 2
$PM_{2.5}$	particulate matter, 2.5 microns or less in diameter
PM_{10}	particulate matter, 10 microns or less in diameter
PRA	Probabilistic Risk Assessment
psi	pound per square inch
PWR	pressurized water reactor
RCRA	*Resource Conservation and Recovery Act*
rem	Röntgen equivalent
REMP	radiological environmental monitoring program
RM	river mile
ROW(s)	right-of-way(s)
RWST	refueling water storage tank
SAMA	Severe Accident Mitigation Alternative
SAR	Safety Analysis Report
SD	surface discharge
SEIS	supplemental environmental impact statement
SER	Safety Evaluation Report
SGTR	steam generator tube rupture
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
Sv	sievert
TCLP	toxic characteristic leaching procedure
U	Uranium
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USGS	U.S. Geological Survey
WDNR	Wisconsin Department of Natural Resources
WIDHS	Wisconsin Department of Health Services
WS	waste streams

1.0 PURPOSE AND NEED FOR ACTION

Under the U.S. Nuclear Regulatory Commission's (NRC's) environmental protection regulations in Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR 51), which implement the National Environmental Policy Act of 1969 (NEPA), issuance of a new nuclear power plant operating license requires the preparation of an environmental impact statement (EIS).

The Atomic Energy Act of 1954 (AEA) originally specified that licenses for commercial power reactors be granted for up to 40 years with an option to renew for up to another 20 years. The 40-year licensing period was based primarily on economic and antitrust considerations rather than on technical limitations of the nuclear facility.

The decision to seek a license renewal rests entirely with nuclear power facility owners and typically is based on the facility's economic viability and the investment necessary to continue to meet NRC safety and environmental requirements. The NRC makes the decision to grant or deny a license renewal, based on whether the applicant has demonstrated that the environmental and safety requirements in the NRC's regulations can be met during the period of extended operation.

1.1 Proposed Federal Action

Northern States Power Co. (NSP) [formerly Nuclear Management Company, LLC. (NMC)] initialized the proposed Federal action by submitting an application for license renewal of Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2), for which the existing licenses DPR-42 (Unit 1) and DPR-60 (Unit 2) expire August 9, 2013, and October 29, 2014, respectively. NRC's Federal action is the decision whether to renew the licenses for an additional 20 years.

1.2 Purpose and Need for the Proposed Federal Action

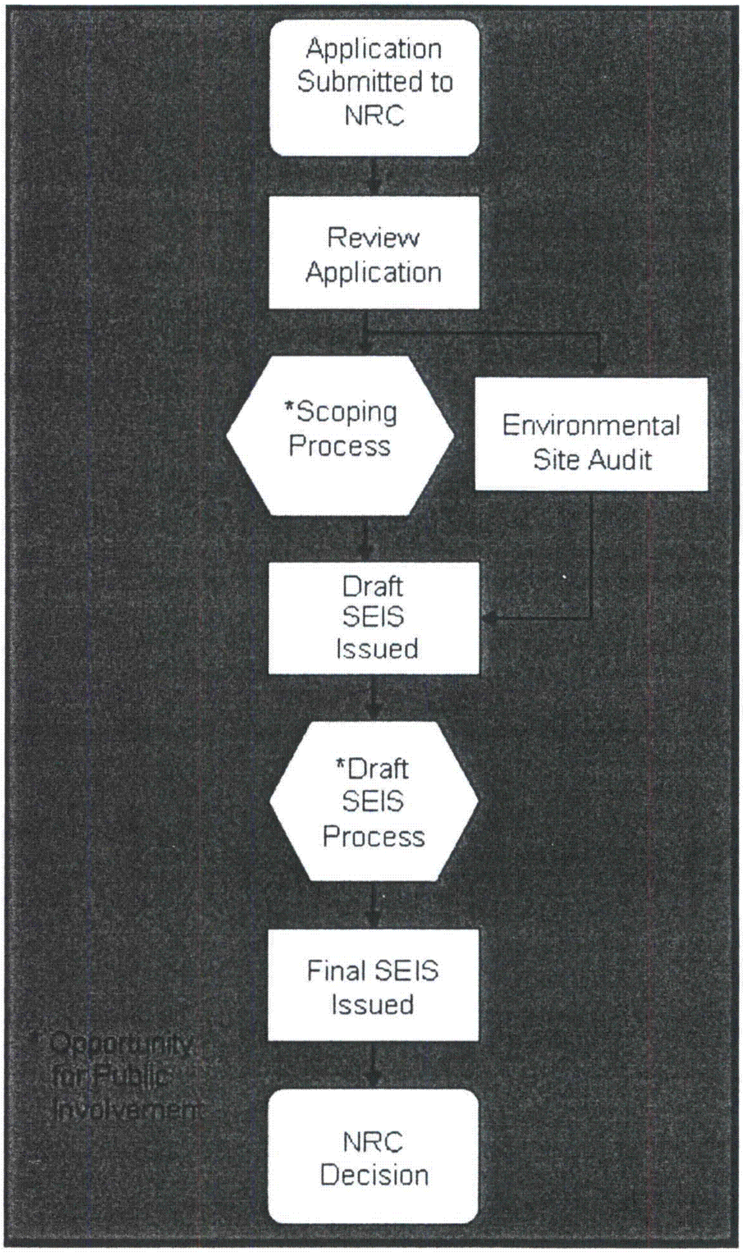
The purpose and need for the proposed action (issuance of a renewed license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and, where authorized, Federal (other than NRC) decision makers. This definition of purpose and need reflects the Commission's recognition that, unless there are findings in the safety review required by the AEA or findings in the NEPA environmental analysis that would lead the NRC to reject a license renewal application, the NRC does not have a role in the energy-planning decisions of State regulators and utility officials as to whether a particular nuclear power plant should continue to operate.

If the renewed license is issued, State regulatory agencies and NSP will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the operating license is not renewed, then the facility must be shut down on or before the expiration date of the current operating license, August 9, 2013, for Unit 1 and October 29, 2014, for Unit 2.

1.3 Major Environmental Review Milestones

NSP submitted an environmental report (NMC 2008) as part of its license renewal application (NMC 2008b) in January 2008. After reviewing the application and the environmental report (ER) for sufficiency, the NRC staff published a Notice of Acceptability and Opportunity for Hearing on June 17, 2008, in the *Federal Register* (Volume 73, p. 34335, (73 FR 34335)). Then, on July 22, 2008, the NRC published another notice in the *Federal Register* (73 FR 42628) on its intent to conduct scoping, thereby beginning the 60-day scoping period.

Figure 1-1. Environmental Review Process.
The environmental review provides opportunities for public involvement.



The NRC held two public scoping meetings on July 30, 2008, in Red Wing, Minnesota. The NRC report entitled, "Environmental Impact Statement Scoping Process Summary Report for Prairie Island Nuclear Generating Plant, Units 1 and 2," dated May 1, 2009, presents the comments received during the scoping process in their entirety (NRC 2009). Appendix A to this supplemental environmental impact statement (SEIS) presents the comments considered to be within the scope of the environmental license renewal review and the associated NRC responses.

In order to independently verify information provided in the ER, the NRC staff conducted a site audit at the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2), site in August of 2008. During the site audit, the NRC staff met with plant personnel, reviewed specific documentation, toured the facility, and met with interested Federal, State, and local agencies. A summary of that site audit and a list of the attendees is contained in the Summary of site audit related to the review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 published January 27, 2009 (NRC 2009a).

Upon completion of the scoping period and site audit, the NRC staff compiled its findings in this draft SEIS (Figure 1-1). This document is being made available for public comment for 75 days. During this time, NRC staff will host public meetings and collect public comments. Based on the information gathered, the NRC staff will amend the draft SEIS findings as necessary, and publish the final SEIS.

The NRC has established a license renewal process that can be completed in a reasonable period of time with clear requirements to assure safe plant operation for up to an additional 20 years of plant life. The safety review, which documents its finding in a Safety Evaluation Report, is conducted simultaneously with the environmental review. The findings in both the SEIS and the Safety Evaluation Report (SER) are both factors in the Commission's decision to either grant or deny the issuance of a renewed license.

1.4 Generic Environmental Impact Statement

The NRC performed a generic assessment of the environmental impacts associated with license renewal to improve the efficiency of the license renewal process. NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (referred to as the GEIS), documents the results of the NRC staff's systematic approach to evaluating the environmental consequences of renewing the licenses of individual nuclear power plants and operating them for an additional 20 years (NRC 1996, 1999).[1] The NRC staff analyzed in detail and resolved those environmental issues that could be resolved generically in the GEIS.

The GEIS establishes 92 separate issues for the NRC staff to independently verify. Of these, the staff determined that 69 are generic to all plants (Category 1), while 21 issues do not lend themselves to generic consideration (Category 2). Two other issues remained uncategorized; environmental justice and the chronic effects of electromagnetic fields must be evaluated on a site-specific basis. Appendix B to this report lists all 92 issues.

For each potential environmental issue, the GEIS (1) describes the activity that affects the environment, (2) identifies the population or resource that is affected, (3) assesses the nature and magnitude of the impact on the affected population or resource, (4) characterizes the significance of the effect for both beneficial and adverse effects, (5) determines whether the results of the analysis apply to all plants, and (6) considers whether additional mitigation measures would be warranted for impacts that would have the same significance level for all plants.

The NRC's standard of significance for impacts was established using the Council on Environmental Quality (CEQ) terminology for "significant." The NRC established three levels of significance for potential impacts—SMALL, MODERATE, and LARGE, as defined below.

[1] The NRC originally issued the GEIS in 1996 and issued Addendum 1 to the GEIS in 1999. Hereafter, all references to the "GEIS" include the GEIS and Addendum 1.

SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

Significance indicates the importance of likely environmental impacts and is determined by considering two variables: **context** and **intensity**.

Context is the geographic, biophysical, and social context in which the effects will occur.

Intensity refers to the severity of the impact, in whatever context it occurs.

The GEIS includes a determination whether the analysis of the environmental issue can be applied to all plants and whether additional mitigation measures would be warranted (Figure 1-2). Issues are assigned a Category 1 or a Category 2 designation. As set forth in the GEIS, Category 1 issues are those that meet all of the following criteria:

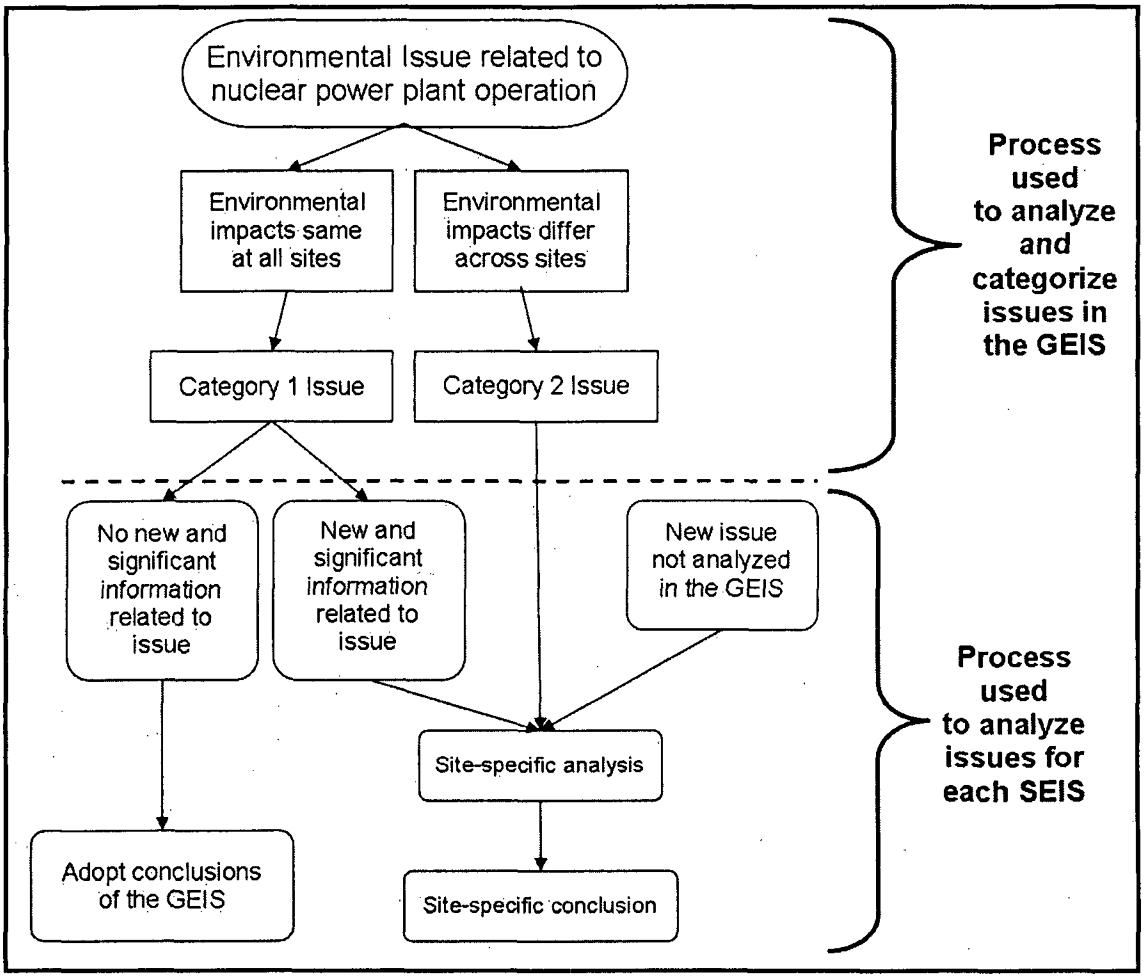
1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics;

2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal); and

3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

For generic issues (Category 1), no additional site-specific analysis is required in the SEIS unless new and significant information is identified. Chapter 4 of this report presents the process for identifying new and significant information. Site-specific issues (Category 2) are those that do not meet one or more of the criterion for Category 1 issues, and therefore, additional site-specific review for these issues is required. The SEIS documents the results of that site-specific review.

Figure 1-2. Environmental Issues Evaluated During License Renewal. *92 issues were initially evaluated in the GEIS. A site-specific analysis is required for 23 of those 92 issues.*



1.5 Supplemental Environmental Impact Statement

The SEIS presents an analysis that considers the environmental effects of the continued operation of PINGP 1 and 2, alternatives to license renewal, and mitigation measures for minimizing adverse environmental impacts. Chapter 8 contains analysis and comparison of the potential environmental impacts from alternatives while Chapter 9 presents the preliminary recommendation to the Commission on whether or not the environmental impacts of license renewal are so great that preserving the option of license renewal would be unreasonable. The recommendation will be made after consideration of comments received during the public scoping period on the draft SEIS.

In the preparation of this SEIS for PINPG 1 and 2, the NRC staff undertook the following activities:

- reviewed the information provided in the NSP ER,
- consulted with other Federal, State, and local agencies,
- conducted an independent review of the issues during the site audit, and

- considered the public comments received during the scoping process.

New information can be identified from a number of sources, including the applicant, NRC, other agencies, and public comments. If a new issue is revealed, then it is first analyzed to determine whether it is within the scope of the license renewal evaluation. If it is not addressed in the GEIS, the NRC then determines its significance and documents its analysis in the SEIS.

> **New and significant information** either: (1) identifies a significant environmental issue not covered in the GEIS, or (2) was not considered in the analysis in the GEIS and leads to an impact finding that is different from the finding presented in the GEIS.

1.6 Cooperating Agencies

Trust Responsibility:

The federal government owes a general trust responsibility to federally recognized Indian Tribes. In the absence of a specific duty placed on the government with respect to Indians, an independent regulatory agency, such as the NRC, discharges its obligations under the trust responsibility by complying with regulations and statutes designed to protect the public at large, in this case, the Atomic Energy Act (AEA) and the National Environmental Policy Act (NEPA).

The Memorandum of Understanding:

In June 2008, the NRC and the Prairie Island Indian Community (PIIC) entered into a Memorandum of Understanding (MOU). The MOU acknowledges the PIIC's special expertise in the areas of historic and archaeological resources, socioeconomics, land use, and environmental justice as they relate to license renewal for PINGP 1 and 2. The MOU provides a mechanism by which the PIIC can assist the NRC in preparing the Supplemental Environmental Impact Statement (SEIS). The MOU establishes a Cooperating Agency relationship between the NRC and the PIIC and describes the responsibilities of the two entities and the process they will use to produce a SEIS that incorporates and reflects the PIIC's views in the areas of its special expertise. The MOU can be found in ADAMS at accession number ML081610273.

<u>The PIIC Tribal Government</u>

The PIIC is a Federally-recognized Indian tribe organized under the Indian Reorganization Act of 1934. The PIIC's Constitution and By-Laws, adopted by tribal members on May 23, 1936, and subsequently approved by the Secretary of the Interior on June 20, 1936, provide the terms and conditions under which the tribe is governed. The Constitution and By-laws provide that the Community Council (also known as the Tribal Council) shall be the governing body for the PIIC. The five-member Tribal Council consists of a President, Vice-President, Secretary, Treasurer, and Assistant Secretary/Treasurer, each of whom is elected to a two-year term. (PIIC 2008)

1.7 Consultations

The Endangered Species Act of 1973, as amended; the Magnuson-Stevens Fisheries Conservation and Management Act of 1996, as amended; and the National Historic Preservation Act of 1966 require that Federal agencies consult with applicable State and Federal agencies and groups before taking action that may affect endangered species, fisheries, or historic and archaeological resources, respectively. Below are the agencies and groups with whom the NRC consulted; Appendix D to this report includes copies of consultation documents.

Advisory Council on Historic Preservation, Washington, D.C.

Bureau of Indian Affairs, Fort Snelling, Minnesota

Minnesota Department of Natural Resources, St. Paul, Minnesota

Prairie Island Indian Community, Welch, Minnesota

State Historic Preservation Office, St. Paul, Minnesota

Wisconsin Department of Natural Resources, Madison, Wisconsin

U.S. Fish and Wildlife Service, Bloomington, Minnesota

1.8 Correspondence

During the course of the environmental review, the NRC staff contacted the following Federal, State, regional, local, and tribal agencies. Appendix E to this report contains a chronological list of all documents sent and received during the environmental review.

Advisory Council on Historic Preservation, Washington, D.C.

Bois Forte Reservation, Nett Lake, Minnesota

Bureau of Indian Affairs, Fort Snelling, Minnesota

Cheyenne River Sioux Tribe, Eagle Battle, South Dakota

Crow Creek Sioux Tribe, Fort Thompson, South Dakota

Dakota County Offices, Hastings, Minnesota

Flandreau Santee Sioux Tribe, Flandreau, South Dakota

Florence Township Commission, Frontenac, Minnesota

Fond du Lac Reservation, Cloquet, Minnesota

Goodhue County Courthouse, Red Wing, Minnesota

Goodhue County Offices, Red Wing, Minnesota

Goodhue County Land Use Management, Red Wing, Minnesota

Grand Portage Reservation, Grand Portage, Minnesota

Ho-Chunk Nation, Black River Falls, Wisconsin

Leech Lake Reservation, Cass Lake, Minnesota

Lower Brule Sioux Tribe, Lower Brule, South Dakota

Lower Sioux Indian Community of Minnesota, Morton, Minnesota

Mayor, City of Lake City, Minnesota

Mille Lacs Band of Ojibwe Indians, Onamia, Minnesota

Minnesota Chippewa Tribe, Cass Lake, Minnesota

Minnesota Department of Commerce, St. Paul, Minnesota

Minnesota Department of Health, St. Paul, Minnesota

Minnesota Department of Natural Resources, St. Paul, Minnesota
Minnesota Pollution Control Agency, St. Paul, Minnesota
Oglala Sioux Tribe, Pine Ridge, South Dakota
Prairie Island Indian Community, Welch, Minnesota
Red Lake Band of Chippewa Indians of Minnesota, Red Lake, Minnesota
Red Wing City Council, Red Wing, Minnesota
Rosebud Sioux Tribe, Rosebud, South Dakota
Santee Sioux Nation, Niobrara, Nebraska
Sisseton-Wahpeton Oyate of the Lake, Agency Village, South Dakota
Shakopee Mdewakanton Sioux Community, Prior Lake, Minnesota
Spirit Lake Tribe, Fort Totten, North Dakota
State Historic Preservation Office, St. Paul, Minnesota
Standing Rock Sioux Tribe, Fort Yates, North Dakota
St. Croix Chippewa Indians of Wisconsin, Webster, Wisconsin
Turtle Mountain Band of Chippewa, Belcourt North Dakota
Upper Sioux Community of Minnesota, Granite Falls, Minnesota
U.S. Fish and Wildlife Service, Bloomington, Minnesota
White Earth Reservation, White Earth, Minnesota
Winnebego Tribe, Winnebego, North Dakota
Wisconsin Department of Natural Resources, Madison, Wisconsin
Yankton Sioux Tribe, Marty, South Dakota

A list of persons who received a copy of this draft SEIS is provided below:

Peter M. Glass, Xcel Energy Services, Inc.	Manager, Regulatory Affairs, Northern States Power Co.	Manager, Minnesota Attorney General=s Office
Resident Inspector's Office, NRC	Philip R. Mahowald, Prairie Island Indian Community	Gene Eckholt, Northern States Power Co.
Heather Westra, Prairie Island Indian Community	Administrator, Goodhue County Courthouse	Jim Holthaus, Northern States Power Co.
Katie Himanga, City of Lake City	Commissioner, Minnesota Department of Commerce	Tribal Council, Prairie Island Indian Community
Nuclear Asset Manager, Xcel Energy, Inc.	Dennis L. Koehl, Northern States Power Co.	Joel P. Sorenson, Northern States Power Co.
Kay Kuhlmann, Red Wing City Council	Joan Marshman	Deanna Sheely, Red Wing City Council

Kristen Eide-Toffefson, Florence Township Commission	Lisa Hanni, Goodhue County Land Use Management	Nancy Shouweiller, Dakota County, Fourth District
Carolyn Homsten, CPA, Goodhue County	Mr. Don L. Klima, Director, Advisory Council on Historic Preservation	Terrance Virden, U.S. Bureau of Indian Affairs
Stanley Crooks, Shakopee Mdewakanton Sioux Community	John L. Stine, Minnesota Department of Health	Ms. Lisa A. Joyal, Minnesota Department of Natural Resources
Stan Ellison, Shakopee Mdewakanton Sioux Community	Leonard Wabasha, Shakopee Mdewakanton Sioux Community	Emily Rusch, Wisconsin Department of Natural Resources
John Wurst	Joe Ellingson	Michael McKay, Wacouta Township
Elaine and Arlen Diercks, Hay Creek Township	Doub Lansing, Maiden Rock Village	Matrix Energy Solutions
Mr. Ronald Johnson, Prairie Island Indian Community	Mr. Kevin Jensvold, Upper Sioux Community of Minnesota	Jean Stacy, Lower Sioux Indian Community of Minnesota
Joseph Brings Plenty, Cheyenne River Sioux Tribe	Lester Thompson, Crow Creek Sioux Tribal Council	Joshua Weston, Flandreau Santee Sioux Executive Committee
Michael Jandreau, Lower Brule Sioux Tribal Council	John Yellow Bird Steele, Oglala Sioux Tribal Council	Rodney Bordeaux, Rosebud Sioux Tribal Council
Roger Trudell, Santee Sioux Nation	Michael Selvage, Sr., Sisseton-Wahpeton Oyate of the Lake	Myra Pearson, Spirit Lake Tribal Council
Ron His Horse Is Thunder, Standing Rock Sioux Tribal Council	Marcus D. Wells, Jr., Three Affiliated Tribes Business Council	David Brien, Turtle Mountain Band of Chippewa
Matthew Pilcher, Winnebago Tribal Council	Robert Cournoyer, Yankton Sioux Tribal Business & Claims Committee	Wilfrid Cleveland, Ho-Chunk Nation
Norman Deschampe, Minnesota Chippewa Tribe	Tony Sullins, U.S. Fish & Wildlife Service	Thomas A. Lovejoy, Wisconsin Department of Natural Resources
Kevin Leecy, Bois Forte Reservation Business	Karen R. Diver, Fond du Lac Reservation Business Committee	Norman Deschampe, Grand Portage Reservation Business Committee
George Goggleye, Leech Lake Reservation Business Committee	Melanie A. Benjamin, Mille Lacs Band of Ojibwe Indians	Erma Vizenor, White Earth Reservation Business Committee

Floyd Jourdain, Red Lake Band of Chippewa Indians of Minnesota	Hazel Hindsley, St. Croix Chipewa Indians of Wisconsin	Mr. Dennis A. Gimmestad, Minnesota Historical Society
Katrina Kessler, Minnesota Pollution Control Agency	Carol A. Overland, Overland Law Office	Lea Foushee, NAWO
Gary Wege, U.S. Fish and Wildlife Service	Nick Schaff, Wisconsin Department of Natural Resources	

1.9 Status of Compliance

NSP is responsible for complying with all NRC regulations and other applicable Federal, State, and local requirements; Appendix H to the GEIS describes some of the major Federal statutes. Table 1-1 lists the numerous permits and licenses issued by Federal, State, and local authorities for activities at PINGP 1 and 2.

Table 1-1. Licenses and Permits. *Existing environmental authorizations for PINGP 1 and 2, Operations.*

Permit	Number	Responsible Agency
Operating Licenses	DPR-42 and DPR-60	U.S. NRC
Certification of the Environmental Lab	027-049-218	Minnesota Department of Health
Construction of intake canal system	Docket 050-282 and 050-306	Minnesota Department of Natural Resources
Construction of discharge canal system	Docket 050-282 and 050-306	Minnesota Department of Natural Resources
National Pollutant Discharge Elimination System Permit	MN0004006	Minnesota Pollution Control Agency
Fish, mussels, and icthyoplankton collection Permit	MN State rules 14658, 14567, and 159	Minnesota Department of Natural Resources
Surface Water Appropriation Permit	690172	Minnesota Department of Natural Resources
Groundwater Appropriation Permit	Permit Nos. 690171, 785153, 865114, and 965042	Minnesota Department of Natural Resources
Hazardous materials shipments	UPR-211635-MN	Minnesota Department of Transportation
Industrial wastewater discharge to Mississippi River Permit	MN0004006	Minnesota Pollution Control Agency, Industrial Division
Operation of air emissions system for an electric utility power generation system Permit	00000001-003	Minnesota Pollution Control Agency
Operation of oil-fired boiler and diesel-fired engines for emergency power, pump cooling water, and fire fighting system Permit	04900030-003	Minnesota Pollution Control Agency
Above ground storage tank registration	MPCA 51557	Minnesota Pollution Control Agency

Permit	Number	Responsible Agency
Hazardous Waste Generator License, Small Quantity	MND049537780	Minnesota Pollution Control Agency
Transportation of radioactive waste into the State of South Carolina Permit	0051-22-08-X	South Carolina Department of Health and Environmental Control – Division of Waste Management
Transportation of radioactive waste into the State of Tennessee Permit	T-MN003-L08	State of Tennessee Department of Environmental and Conservation Division of Radiological Health
Transportation of radioactive waste into the State of Utah Permit	0402 002 748	State of Utah Department of Environmental Quality Division of Radiation Control
Collect fish and ichthyoplankton for radiological and biological monitoring	SCP-WCR-20-C-08	Wisconsin Department of Natural Resources
Maintenance dredging and erosion control discharge canal General Permit	GP/LOP-98-MN	U.S. Army Corps of Engineers
Air quality monitoring station at Lock and Dam Number 3 License	DACW37-3-06-0071	U.S. Army Corps of Engineers
Maintenance dredging in front of the River Intake Structure Dredging Permit	GP-01-MN	U.S. Army Corps of Engineers
Hazardous materials shipments Registration	062706 552 0090	U.S. Department of Transportation
Retrieve, transport, and temporarily possess carcasses of migratory birds as well as collect, stabilize, and transport sick/injured migratory birds Wildlife Permit	MB074020-0	U.S. Fish and Wildlife Service

1.10 References

10 CFR Part 51. Code of Federal Regulations, *Title 10, Energy,* Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

73 FR 34335. U.S. Nuclear Regulatory Commission. Washington D.C. "Nuclear Management Company, LLC, Prairie Island Nuclear Generating Plant, Units 1 and 2; Notice of Acceptance for Docketing of the Application and Notice of Opportunity for Hearing Regarding Renewal of

Facility Operating License Nos. DPR- 42 and DPR-60 for an Additional 20- Year Period." Federal Register. Vol. 73, No. 117, pp34335-34337. June 17, 2008.

73 FR 42628. U.S. Nuclear Regulatory Commission. Washington D.C. "Nuclear Management Company, LLC.; Prairie Island Nuclear Generating Plant, Units 1 and 2; Notice of Intent To Prepare an Environmental Impact Statement and Conduct Scoping Process." Federal Register: Vol. 73, No. 141, pp42628-42630. July 22, 2008.

Atomic Energy Act of 1954. 42 U.S.C. 2011, et seq.

Endangered Species Act of 1973. 16 U.S.C. 1531, et seq.

Magnuson-Stevens Fishery Conservation and Management Act, as amended by the *Sustainable Fisheries Act of 1996*. 16 U.S.C. 1855, et seq.

National Environmental Policy Act of 1969. 42 U.S.C. 4321, et seq.

National Historic Preservation Act. 16 U.S.C. 470, et seq.

NMC (Nuclear Management Company, LLC). 2008. Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application, Appendix E – Applicant's Environmental Report, License Renewal Operating Stage. Redwing, Minnesota. April 2008. ADAMS Nos. ML081130677, ML081130681, and ML081130684.

NRC (U.S. Nuclear Regulatory Commission). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Volumes 1 and 2, Washington, D.C. ADAMS Nos. ML040690705 and ML040690738.

NRC (U.S. Nuclear Regulatory Commission). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report*, "Section 6.3 – Transportation, Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants, Final Report." NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

NRC (U.S. Nuclear Regulatory Commission). 2009. Environmental Impact Statement Scoping Process Summary Report, Prairie Island Nuclear Generating Station, Units 1 and 2. ADAMS Nos. ML090270154 and ML090270418.

NRC (U.S. Nuclear Regulatory Commission). 2009a. Summary of site audit related to the review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2. ADAMS No. ML083440479.

2.0 AFFECTED ENVIRONMENT

Prairie Island Nuclear Generating Plant (PINGP 1 and 2) is located on the west bank of the Mississippi River in Goodhue County within the city limits of Red Wing, Minnesota (Figure 2-1). The City of Hastings is located approximately 13 mi (21 km) northwest (upstream) of the plant. Minneapolis and St. Paul are located approximately 39 mi (63 km) and 32 mi (51 km), respectively, to the northwest of the plant. For purposes of the evaluation in this report, the "affected environment" is the environment that currently exists at and around PINGP 1 and 2. Because existing conditions are at least partially the result of past construction and operation at the plant, the impacts of these past and ongoing actions and how they have shaped the environment are presented here. Section 2.1 of this report describes the facility and its operation, and Section 2.2 discusses the affected environment.

2.1 Facility Description

This assessment of the affected environment begins with a description of PINGP 1 and 2, the source of potential environmental effects. PINGP 1 and 2 is a two-unit pressurized water reactor (PWR) plant that utilizes a hybrid cooling system, which consists of three modes of operation: open cycle (once-through cooling, with no cooling towers in operation), helper cycle (once-through cooling, with mechanical draft cooling towers in operation), and closed cycle (using cooling towers to recirculate up to 95 percent of the cooling water). The plant is licensed to operate at 1650 megawatt-thermal (MWt) per unit, or 575 megawatts-electrical (MWe) of gross electrical output per unit.

The most conspicuous structures on the site are the four natural draft cooling towers. Other salient buildings on the PINGP 1 and 2 site include the reactor building, auxiliary building, turbine building, intake and plant screenhouses, and the PINGP 1 and 2 substation (NMC 2008). Figure 2-2 provides a general layout of the PINGP 1 and 2 site.

PINGP 1 and 2 used (or spent) fuel is stored in a pool inside the plant until it is cooled, and transferred to dry storage containers located on site, called the Independent Spent Fuel Storage Installation (ISFSI). Spent fuel will be stored there until the federal government removes it to be reprocessed or stored at a government facility. As of early 2009, Prairie Island's ISFSI housed 24 dry-storage containers, which hold a total of approximately 920 spent fuel assemblies (NMC 2008).

2.1.1 Reactor and Containment Systems

PINGP 1 and 2 is a two-unit plant with Westinghouse Electric Company PWRs. PINGP 1 and 2 received its construction permit on June 25, 1968. Full commercial operating began on December 16, 1973, for Unit 1 and December 21, 1974, for Unit 2 (NMC 2008).

Reactor fuel consists of uranium-dioxide enriched to 5.0 percent by weight with uranium-235 enclosed in Zircaloy tubes (NMC 2008). Each reactor core consists of 121 fuel assemblies and 29 moveable control rod assemblies (NMC 2008). Control rods consist of stainless steel absorber rods and Zircaloy guide tubes and are used for short-term reactivity control associated with changes in power level and with changes in fuel burnup between adjustments in reactor coolant dissolved boron concentrations (AEC 1973). Average fuel burnup does not exceed 62,000 megawatt days per metric ton uranium (MWd/MTU) for the peak rod (NMC 2008).

In the PWR power generation system, reactor heat is transferred from the primary coolant to a lower pressure secondary coolant loop, allowing steam to be generated in the steam supply system. The primary coolant loops, two for each unit, each contain one steam generator, one centrifugal coolant pump, and the interconnected piping. Reactor coolant is pumped from the reactor through the steam generators and back to the reactor via vertical, single-stage, centrifugal pumps. Each steam generator is a vertical U-tube unit that produces superheated steam at a constant pressure over the reactor operating power range. Coolant flows from the tubes, and steam is generated on the lower pressure shell side. Steam then flows from the steam generator to the tandem-compound, three-element 1800-rpm turbine generator (AEC 1973). NUREG/CR-5640, "Overview and Comparison of U.S. Commercial Nuclear Power Plant, Nuclear Power Plant System Source" (NRC 1990), provides a comprehensive overview and description of the PWR power generation system.

The primary containment is the reactor building and its associated isolation systems. The reactor building is a cylindrical steel pressure vessel with a hemispherical dome and ellipsoidal bottom (NMC 2008). Secondary containment consists of a 205-ft (62.5-m)-high by 120-ft (36.6-m)-diameter cylindrical shield building made of reinforced concrete (NMC 2008).

2.1.2 Radioactive Waste Management

By design, the operation of nuclear power plants is expected to result in small releases of radiological effluents (gaseous, liquid, and solid) through controlled processes. However, releases must meet stringent NRC and EPA regulatory limits.

PINGP 1 and 2's radioactive waste disposal systems are designed to collect, treat, and dispose of the radioactive and potentially radioactive wastes that are byproducts of plant operations. Byproducts include: activation products resulting from the irradiation of reactor water and impurities therein (principally metallic corrosion products) and fission products resulting from defective fuel cladding or uranium contamination within the reactor coolant system. Operating procedures for radioactive waste disposal systems ensure that the radioactive wastes are safely processed and discharged from the plant in manners that meet the release limits as set forth in 10 CFR Part 20, "Radiation Protection Standards;" 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities;" the plant's technical specifications; and the PINGP 1 and 2 Offsite Dose Calculation Manual (NMC 2007b).

Radioactive wastes resulting from plant operations are classified as liquid, gaseous, or solid. Liquid radioactive wastes are generated from liquids received directly from portions of the reactor coolant system or were contaminated by contact with liquids from the reactor coolant system. Gaseous radioactive wastes are generated from gases or airborne particulates vented from reactor and turbine equipment containing radioactive material. Solid radioactive wastes are solids from the reactor coolant system, solids that have come into contact with reactor coolant system liquids or gases, or solids used in the reactor coolant system or steam and power conversion system operation or maintenance.

Reactor fuel that has exhausted a certain percentage of its fissile uranium content is referred to as spent fuel. Spent fuel assemblies are removed from the reactor core and replaced with fresh fuel assemblies during routine refueling outages, typically every 18 to 24 months (NMC 2008). Spent fuel assemblies are then stored for a period of time in the spent fuel pool in the reactor building and later transferred to the PINGP 1 and 2 Independent Spent Fuel Storage Installation. (ISFSI; NMC 2008)

PINGP 1 and 2's Offsite Dose Calculation Manual contains the methodology and parameters used to calculate offsite doses resulting from radioactive gaseous and liquid effluents, and the gaseous and liquid effluent monitoring alarm and trip set points used to verify that the radioactive material being discharged meets regulatory limits (NMC 2007b). The Offsite Dose

Calculation Manual also contains the radioactive effluent controls and radiological environmental monitoring activities and descriptions of the information that should be included in the annual Radiological Environmental Operating Report and annual Radioactive Effluent Release Report required by Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion 'As Low as is Reasonably Achievable' (ALARA) for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents," to 10 CFR Part 50, and 10 CFR 50.36a, "Technical Specifications on Effluents from Nuclear Power Reactors," respectively.

2.1.2.1 *Radioactive Liquid Waste*

The PINGP 1 and 2's liquid radioactive waste processing system, in combination with the steam generator blowdown system, collects, holds, treats, processes, and monitors all liquid radioactive wastes for reuse or disposal. The PINGP 1 and 2 liquid radioactive waste processing system segregates various stream wastes at the point of their collection into the following categories: non-aerated and aerated wastes, chemical drains, steam generator blowdown and resin waste.

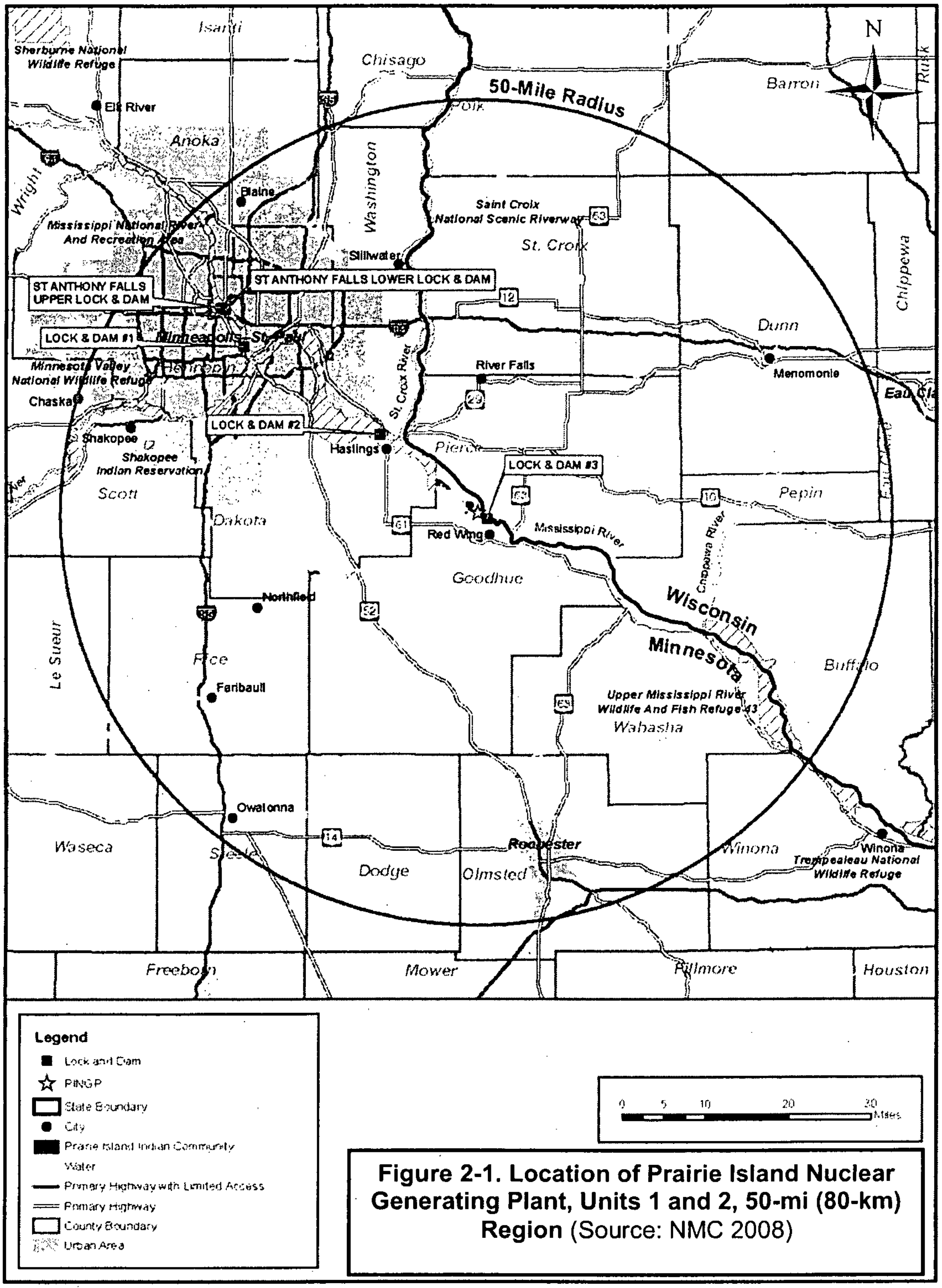


Figure 2-1. Location of Prairie Island Nuclear Generating Plant, Units 1 and 2, 50-mi (80-km) Region (Source: NMC 2008)

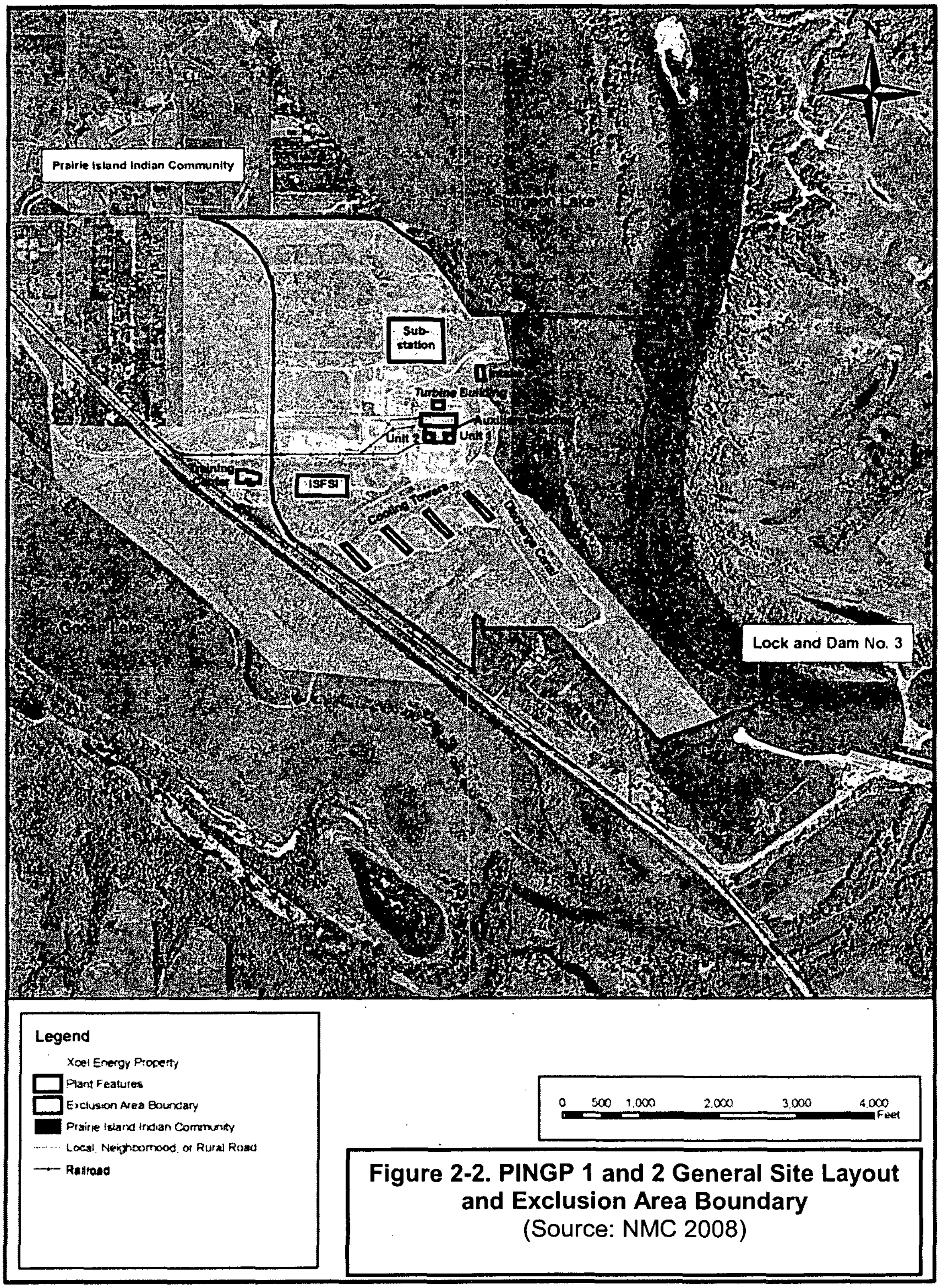


Figure 2-2. PINGP 1 and 2 General Site Layout and Exclusion Area Boundary
(Source: NMC 2008)

Liquid wastes are collected in sumps and drain tanks and transferred to the appropriate subsystem collection tanks for subsequent treatment, disposal, or recycling. Non-aerated waste is originated primarily by the reactor coolant system, which is transferred to the holdup tanks for processing after collection. Aerated waste originates primarily from the floor drains, aerated equipment drains and leaks, laundry equipment drains and decontamination area drains and is transferred to aerated drains treatment tanks for monitoring and final release or reprocessing. Chemical drains from the hot sampling station and hot chemical laboratory are collected in the chemical drain tank, periodically neutralized (if needed), transferred to the aerated sump tank and finally transferred to the aerated drains treatment collection tanks for processing through the aerated drains treatment cartridge filters and three flushable ion-exchangers, which are shared by PINGP 1 and 2, and final discharge. PINGP 1 and 2 steam generators blowdown waste is discharged into a flash tank in the associated unit, transferred to the holdup tanks and directed to the condenser through the system of a filter and ion exchanger under normal operation conditions. Occasionally (such as during startup) the blowdown used to control steam generator chemistry is released to the circulating water canal via a radiation monitor. Liquid releases from the steam generator blowdown monitor tank are made based on the results of a radiochemical batch analysis of the tank contents and are monitored by the waste disposal system liquid effluent monitor. Resin waste is collected from the resin disposal building sump in the drains collection tanks or the waste holdup tank. Waste water from the truck loading enclosure sump is pumped to the aerated sump tank and further processed by the liquid radioactive waste processing system. The PINGP 1 and 2 liquid radwaste discharge point and steam generator blowdown was extended from the original discharge point at the head of the circulating water discharge canal to just upstream of the circulating water canal discharge structure at the Mississippi River in order to minimize the potential for the tritium to enter the local groundwater. Liquid releases are limited to the maximum extent possible to satisfy the design objectives of Appendix I to 10 CFR Part 50. Liquid discharges occur when the radioactive material has been analyzed and the projected dose to members of the public has been calculated to be within the values specified in the Offsite Dose Calculation Manual, 10 CFR 20, and Appendix I to 10 CFR 50. (NMC 2001)

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the PINGP 1 and 2 radioactive effluent release reports for 2003 through 2007 for liquid effluents (NMC 2004a, 2005a, 2006b, 2007c, 2008b). The releases in 2007 were representative of the releases in prior years. Variations in the amount of radioactive effluents released from year to year are expected based on the overall performance of the plant and the number and scope of outages. The liquid radioactive wastes reported by PINGP 1 and 2 are reasonable and no unusual trends were noted. These releases would result in minimal doses to members of the public that are well below the ALARA dose design objectives of Appendix I to 10 CFR 50, as discussed in Section 4.8.1.

Northern States Power Co. (NSP) is planning to replace the Unit 2 steam generators during the period of extended operations. Such an action is not likely to result in a significant increase of liquid radioactive effluents being discharged as compared to the amount discharged during normal plant operations. This is based on consideration that any liquids generated, processed, and released during the outage will be offset by the amount of liquid waste that would not be generated, processed, and released during normal plant operations. Based on the historical evaluation and there being no significant increase in liquid effluents from the replacement of the PINGP Unit 2 steam generators, similar quantities of radioactive liquid effluents are expected to be generated during normal operations and outages from PINGP 1 and 2 during the period of extended operations.

2.1.2.2 *Radioactive Gaseous Waste*

The gaseous radioactive waste processing system and the plant ventilation exhaust system control, collect, process, store, and dispose of gaseous radioactive wastes generated as a result of normal operation. Gaseous effluents are treated before release to the environment. PINGP 1 and 2's gaseous radioactive waste processing system consists of two interconnected process loops: the low level and the high level loops.

PINGP 1 and 2's gaseous radioactive waste processing system receives radioactive gases mainly from the four sources: displacement of cover gases as liquids accumulate in various tanks, miscellaneous equipment vents and relief tanks, automatic gas analysis and sampling for hydrogen and oxygen in cover gases and nitrogen stripping of reactor coolant to remove hydrogen during shutdown operations. The low-level loop is designed to accumulate, contain and process cover gases from all these sources. During normal operating conditions the gas flow is split through the hydrogen recombiner to the decay tanks. The system is vented into the atmosphere and resulted in an occasional discharge only in case of the disposal of the gases collected from shutdown operations and from miscellaneous vents. Prior to discharge the low-level decay tank content is sampled and analyzed to record gas activity, and discharged to the auxiliary building vent at a controlled rate. The high-level loop is designed to collect, hold and process high-activity gases received during hydrogen reactor coolant stripping that allows removing of the fission gases. The high-level loop is normally not used because the activity level of the reactor coolant fission gas is usually low. The high-level loop gas decay tanks are used for the low-level loop reserve holding capacity, which minimizes the frequency of gas decay tank releases. PINGP 1 and 2 maintains radioactive gaseous effluents in accordance with the procedures and methodology described in the Offsite Dose Calculation Manual. The gaseous radioactive waste processing system is used to reduce radioactive materials in gaseous effluents before discharge to meet the ALARA dose objectives in Appendix I to10 CFR Part 50. (NMC 2007b)

The NRC staff reviewed the PINGP 1 and 2 radioactive effluent release reports for 2003 through 2007 for gaseous effluents (NMC 2004a; 2005a; 2006b; 2007c; 2008b). The gaseous discharges for 2007 are consistent with the radioactive gaseous effluents discharged from 2003 through 2006. Based on the gaseous waste processing systems and effluent controls and performance from 2003 through 2007, similar small quantities of radioactive gaseous effluents are expected from PINGP 1 and 2 and are not expected to increase or decrease during the period of extended operation. These releases would result in doses to members of the public that are well below the ALARA dose design objectives. Section 4.8.1 provides a discussion of the calculated doses to the maximally exposed individual as a result of these releases.

NSP is planning to replace the Unit 2 steam generators during the period of extended operations. Such an action is not likely to result in a significant increase of gaseous radioactive effluents being discharged as compared to the amount discharged during normal plant operations. This is based on consideration that any gaseous effluents released during the outage will be offset by the amount of gaseous effluents that would not be generated, processed, and released during normal plant operations. Based on the historical evaluation and there being no significant increase in gaseous effluents from the replacement of the PINGP Unit 2 steam generators, similar quantities of radioactive gaseous effluents are expected to be generated during normal operations and outages from PINGP 1 and 2 during the period of extended operations.

2.1.2.3 *Solid Radioactive Waste*

The solid radioactive waste management system at PINGP 1 and 2 is designed to collect, package, provide shielded storage facilities and to allow temporary storage prior to offsite shipment for processing or disposal of low-level radioactive wastes generated as a result of normal plant operation. The system is designed to maintain ALARA radiation exposure to plant personnel in accordance with General Design Criterion 60 of the Appendix A to 10 CFR Part 50 and Regulatory Guide 8.8. This system maintains personnel exposures below 10 CFR Part 20 requirements. The solid radioactive waste management system equipment is located in the radioactive waste processing facility and the dry active waste facility. The dry active waste facility is also capable of storing the packaged waste until it is shipped offsite to a waste processor for treatment/disposal or to the licensed burial sites. Transportation and disposal of solid radioactive wastes are performed in accordance with the applicable requirements of 10 CFR Part 71 and 10 CFR Part 61, respectively. Access to the process equipment and solid radioactive waste storage areas is controlled to minimize personnel exposure by suitable barriers such as locked doors, gates, or control cards.

Low-level mixed waste is waste that exhibits hazardous characteristics and contains low levels of radioactivity. PINPGP does not produce any low-level mixed waste.

PINGP 1 and 2 solid wastes are comprised mainly of dry active waste such as contaminated paper, plastic, wood, metals and spent resin that can be compacted for offsite disposal or stored onsite. PINGP 1 and 2's solid radioactive waste management system operations include dewatering and pH adjustment of beaded resins, powdered resins, evaporator bottoms, and solidification of the waste with an in-drum cement system. Contaminated metals are compacted for offsite disposal (or may be stored onsite if the disposal site is not available). Spent resins are received, dewatered and handled in the disposal building, next to the radwaste building (NMC 2001).

The NRC staff reviewed PINGP 1 and 2 solid radioactive waste reports for 2003 through 2007 (NMC 2004b; 2005b; 2006c; 2007d; 2008c). Based on the performance from 2003 through 2007, similar quantities of radioactive solid wastes are expected from PINGP 1 and 2 during the period of extended operation. Variations on the amount of solid radioactive waste generated and shipped from year to year are expected based on the overall performance of the plant and the number and scope of maintenance work and outages. The volume and activity of solid radioactive waste reported by PINGP 1 and 2 are reasonable and no unusual trends were noted.

NSP is planning to replace the Unit 2 steam generators during the period of extended operations. Such an action is likely to result in a small increase in the amount of solid radioactive waste generated. During an outage of this type, there will be an increased use of protective clothing, safety equipment, increased use of filters, and a general increase in generation of debris that will have to be disposed of as radioactive waste. However, the increased volume is expected to be within the range of solid waste that can be safely handled by PINGP 1 and 2 during the period of extended operations.

2.1.3 Nonradiological Wastes

Section 2.3.7.3 of the GEIS states, "The nonradioactive waste generated at nuclear power plants is generally not of concern unless it is classified as Resource Conservation and Recovery Act (RCRA) waste. All waste that is hazardous, that is, classified as RCRA waste, is packaged and disposed of in a licensed landfill consistent with the provisions of RCRA." RCRA governs the disposal of solid and hazardous wastes, and its regulations are contained in Title 40, "Protection of the Environment," Parts 239 through 299 (40 CFR 239, et seq.), of the *Code of Federal Regulations*. Parts 239 through 259 of Title 40 contain regulations for solid (nonhazardous) waste, and Parts 260 through 279 contain regulations for hazardous waste. RCRA Subtitle C establishes a system for controlling hazardous waste from "cradle-to-grave," and RCRA Subtitle D encourages States to develop comprehensive plans to manage nonhazardous solid waste and mandates minimum technological standards for municipal solid waste landfills (EPA 2007). In Minnesota, RCRA regulations are administered by the Minnesota Pollution Control Agency (MPCA). MPCA addresses the identification, generation, minimization, transportation, and final treatment, storage, or disposal of hazardous and nonhazardous wastes. PINGP 1 and 2 generate nonradioactive waste from routine plant maintenance, cleaning, and operational processes—most of this waste consists of nonhazardous waste oil, oil-filled equipment, and oily debris (NMC 2008).

2.1.3.1 *Hazardous Waste*

Hazardous waste means solid waste, or a combination of solid wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may cause or contribute to an increase in mortality or serious illness. Such waste may also pose a significant present or potential hazard to human health or the environment if it is not properly treated, stored, transported, disposed of, or otherwise handled (40 CFR Part 261, "Identification and Listing of Hazardous Waste"). PINGP 1 and 2 generate a small quantity of hazardous waste including spent and expired chemicals, laboratory chemical wastes, Freon-contaminated oil, and occasional project-specific wastes (NMC 2008).

PINGP 1 and 2 are classified as a Small Quantity Generator of hazardous waste because the plant generates less than 1,000 kilograms (kg) (2,205 pounds (lbs)) of hazardous waste in one month, and no more than 6,000 kg (13,228 lbs) of hazardous waste may be accumulated on site at any one time (EPA 2007a). According to the U.S. Environmental Protection Agency (EPA) Envirofacts Warehouse online database, PINGP 1 and 2 is classified as an active small quantity generator of hazardous wastes (EPA ID No. MND049537780). The Envirofacts Warehouse database showed no violations for PINGP 1 and 2 (EPA 2009). In accordance with the Minnesota hazardous waste generator re-licensing process (Minnesota Administrative Rules, part 7045.0248), PINGP 1 and 2 submit annual reports to MPCA detailing the amounts and types of hazardous wastes generated at the plant. A review of hazardous waste license applications submitted by Xcel Energy to MPCA revealed that through 2003 through 2007, PINGP 1 and 2 generated approximately 12,575 kg (27,724 lbs) of hazardous waste. The majority of this was paint-related waste, hazardous metals, and corrosive liquids.

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires applicable facilities to provide information on hazardous and toxic chemicals to local emergency planning authorities and the EPA. On October 17, 2008, EPA finalized several changes to the Emergency Planning Notification (Section 302), Emergency Release Notification (Section 304), and Hazardous Chemical Storage Reporting Requirements (Sections 311 and 312) regulations (73 FR 65452). PINGP 1 and 2 are subject to Federal EPCRA reporting requirements, and thus submits annual Emergency and Hazardous Chemical Inventory Forms to the Minnesota Emergency Response Commission, pursuant to Section 312.

2.1.3.2 *Universal Waste*

Universal waste is hazardous waste that is generated in a variety of settings by a vast community, which poses collection and management problems. EPA classifies several hazardous wastes as universal wastes—including batteries, certain pesticides, mercury-containing devices, and fluorescent lamps (40 CFR Part 273, "Standards for Universal Waste Management"). Minnesota has incorporated EPA's regulations regarding universal wastes in Minnesota Administrative Rules part 7045.1400, "Adoption of Federal Standards for Universal Waste Management." MPCA defines lighting ballasts, polychlorinated biphenyl (PCB) small capacitors, mercury containing devices, batteries, antifreeze, circuit boards, electronics, photographic negatives, cathode ray tubes, alkaline batteries, and non-TCLP (toxic characteristic leaching procedure) fluorescent and HID (high intensity discharge) lamps as universal waste. PINGP 1 and 2 are classified as a Small Quantity Generator of universal waste, accumulating less than 5,000 kg (11,023 lbs) of universal waste per month (NMC 2008).

2.1.3.3 *Permitted Discharges*

PINGP 1 and 2 generate two types of wastewater: industrial effluents and sanitary liquid wastes. Industrial effluents, including cooling water, are discharged to the Mississippi River according to the facility's individual wastewater discharge NPDES permit (No. MD0004006), as enforced by MPCA (MPCA 2006). Normal operating processes used to control the pH of reactor coolant, prevent scale and erosion in the cooling system, and clean and defoul the condenser of biological organisms, all generate chemical and biocide wastes. Waste liquids from these processes are combined with cooling water and are discharged to the Mississippi River according to the NPDES permit limitations.

Sanitary liquid wastes are directed to seven onsite septic systems. Section 2.1.7.3 of this report provides more information on the PINGP 1 and 2 NPDES permit and effluent limitations, and radioactive liquid waste is addressed in Section 2.1.2.1.

2.1.3.4 *Pollution Prevention and Waste Minimization*

Under NSP's (formerly Xcel Energy's) *Waste Management Program Procedure/Waste Management Guidance Manual*, PINGP 1 and 2 implement a waste minimization program that consists of steps such as segregating hazardous and nonhazardous wastes, choosing nonhazardous substitutes when possible, recycling or reclaiming appropriate waste materials, monitoring expired chemicals to determine minimum stocking requirements to reduce recurring excess, finding alternate uses for excess materials, or returning unused materials to the manufacturer. The manual also provides guidelines for proper handling, storage, transport, and disposal of hazardous materials (NMC 2008). NRC staff determined at the site audit in August of 2008 that PINGP 1 and 2 do not recycle common waste materials such as paper, plastic, or aluminum.

In support of nonradioactive waste minimization efforts, the EPA Office of Pollution Prevention and Toxics established a clearinghouse that provides information regarding waste management and technical and operational approaches to pollution prevention. The EPA clearinghouse can be used as a source for additional opportunities for waste minimization and pollution prevention at PINGP 1 and 2, as appropriate (EPA 2008b).

2.1.4 Plant Operation and Maintenance

Maintenance activities conducted at PINGP 1 and 2 include inspection, testing, and surveillance to maintain the current licensing basis of the facility and to ensure compliance with environmental and safety requirements. Various programs and activities currently exist at PINGP 1 and 2 to maintain, inspect, test, and monitor the performance of facility equipment. These maintenance activities include inspection requirements for reactor vessel materials, boiler and pressure vessel in-service inspection and testing, a maintenance structures monitoring program, and maintenance of water chemistry.

Additional programs include those implemented to meet technical specification surveillance requirements, those implemented in response to the NRC generic communications, and various periodic maintenance, testing, and inspection procedures. Certain program activities are performed during the operation of the unit, while others are performed during scheduled refueling outages. Nuclear power plants must periodically discontinue the production of electricity for refueling, periodic in-service inspection, and scheduled maintenance. PINGP 1 and 2 refuel on at 20-month interval.

2.1.5 Power Transmission System

The PINGP 1 and 2 substation, located on the PINGP 1 and 2 site just north of the generating facilities, provides connections for four 345-kV lines, owned by NSP and maintained by Xcel Energy, and one 161-kV line, owned and maintained by Great River Energy (Figure 2-3). Unless otherwise noted, the discussion of the power transmission system is adapted from the ER (NMC 2008), or information gathered during NRC's site audit.

NSP constructed approximately 78 mi (126 km) of new transmission lines to support the operation of PINGP 1 and 2 and acquired 32.8 mi (528 km) of new right-of-way (ROW) land for these newly constructed lines (AEC 1973). In total, the transmission lines associated with the operation of PINGP 1 and 2 comprise approximately 2300 ac (930 ha) of ROW land.

Transmission lines considered in scope for license renewal are those constructed specifically to connect the facility to the transmission system (10 CFR 51.53(c)(3)(ii)(H)); therefore, the Red Rock 1 connection, the Adams connection, the Red Rock 2 line, the Blue Lake Line, and the Spring Creek line are considered in-scope for this supplemental environmental impact statement (SEIS) and are discussed below in detail. These transmission lines span Goodhue, Dakota, Scott, and Washington Counties (Figure 2-4).

The Red Rock 1 connection and the Adams connection split a previously existing transmission line, the 345-kV Red Rock-Adams line, in order to connect the line to the PINGP 1 and 2 substation. Because the Red Rock-Adams line was constructed and put into service before the construction of PINGP 1 and 2, only the two portions constructed to connect this line to the PINGP 1 and 2 substation are considered in-scope for purposes of this analysis. Each connection is 345 kV and 2.5 mi (4.0 km) in length. The connections are contained within Goodhue County and share a 250-ft (76-m)-wide ROW with the Red Rock 2 and Blue Lake lines.

The 345-kV Red Rock 2 line runs northwest for approximately 32 mi (52 km) to the Red Rock substation in St. Paul, Minnesota. The line spans Goodhue, Dakota, and Washington Counties. The Red Rock 2 line shares a 250-ft (76-m)-wide ROW with the Red Rock-Adams transmission line connections and the Blue Lake line for the first 2.5 mi (4.0 km) and shares a 350-ft (107-m)-wide ROW with the Red Rock 1 line for the remaining length. Construction of this line did not require the creation of any additional ROWs because the entire length of the line was routed along an existing ROW.

The 345-kV Blue Lake line runs west for approximately 50 mi (80 km) to the Scott County substation. The line spans Goodhue, Dakota, and Scott Counties. The Blue Lake line shares a 250-ft (76-m)-wide ROW with the Red Rock-Adams transmission line connections and the Red Rock 2 line for the first 2.5 mi (4.0 km) and has a 150-ft (46-m)-wide ROW for the remaining length. The first segment of this line required the creation of a new ROW from PINGP 1 and 2 to the Inver Grove substation in Dakota County, Minnesota; the remaining length to the Blue Lake substation was routed along an existing ROW.

The 161-kV Spring Creek line runs south for approximately 5 mi (8 km) to the Spring Creek substation near Red Wing, Minnesota. The line is contained within Goodhue County and has a 100-ft (30 m)-wide ROW.

Xcel Energy and Great River Energy maintain transmission line ROWs to promote low-growing grasses and non-woody vegetation directly under towers and conductors. ROW borders are maintained to promote slow-growing shrubs and shorter trees that do not interfere with transmission lines or structures. Woody vegetation within ROWs may be pruned, chemically controlled, or removed to ensure adequate line clearance; however, neither Xcel Energy nor Great River Energy disturb or remove trees and shrubs unless they have the potential to interfere with transmission facilities. The majority of ROWs associated with PINGP 1 and 2 consist of grasslands or agricultural land, which require minimal maintenance. Herbicides, when necessary, are applied by licensed certified applicators in full compliance with the Minnesota Pesticide Control Law of 1987. All herbicides used near waterways or in wetland areas are EPA-approved for aquatic application. Xcel Energy does not spray herbicides on foliage at heights above 10 ft (3 m), which minimizes the risk of drift to wetlands and waterways. For pesticides that are not approved for aquatic use, Great River Energy requires a non-treated buffer zone of 25 to 50 ft (7.6 to 15.2 m) between the treated areas and any waterways.

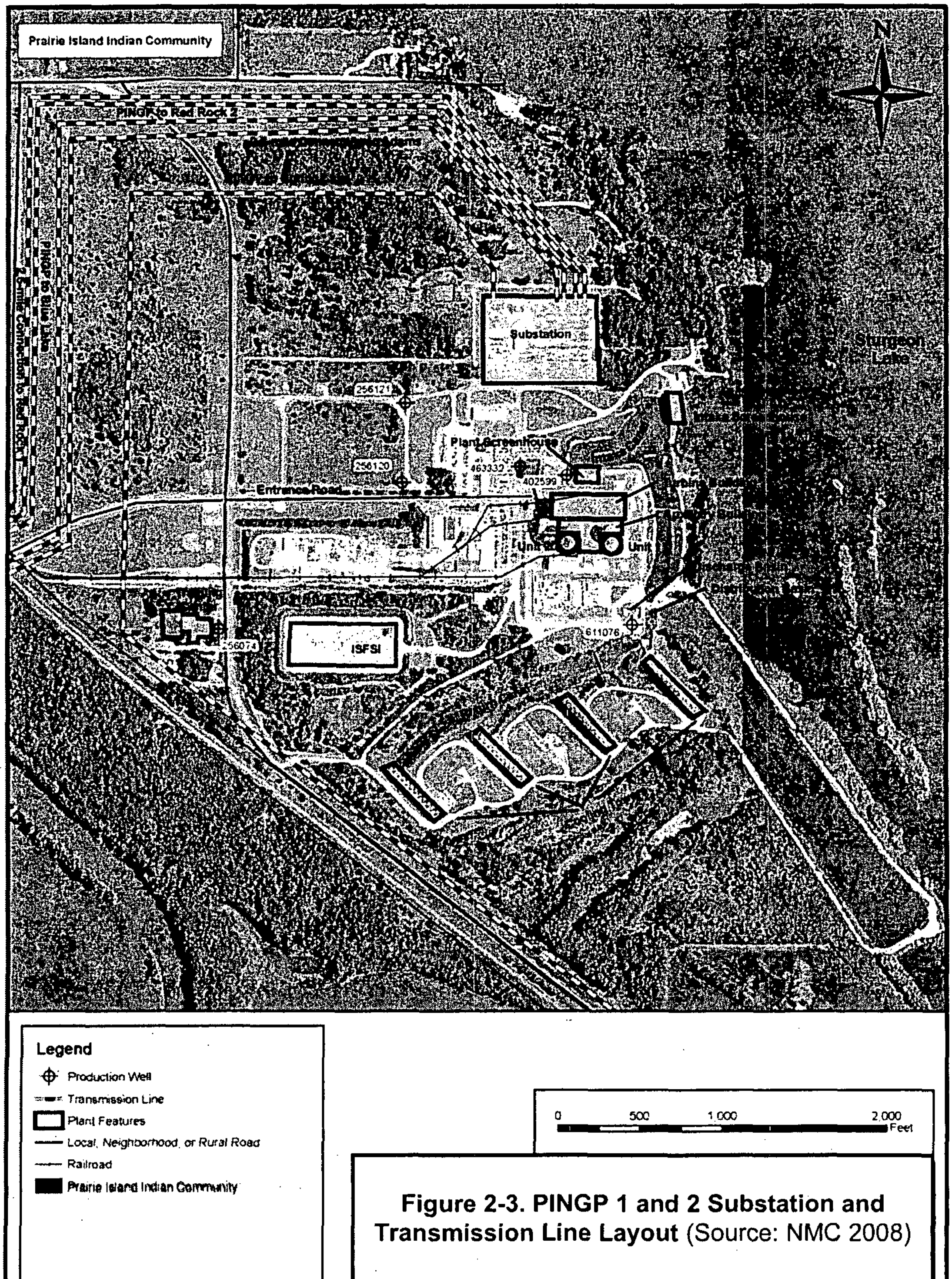
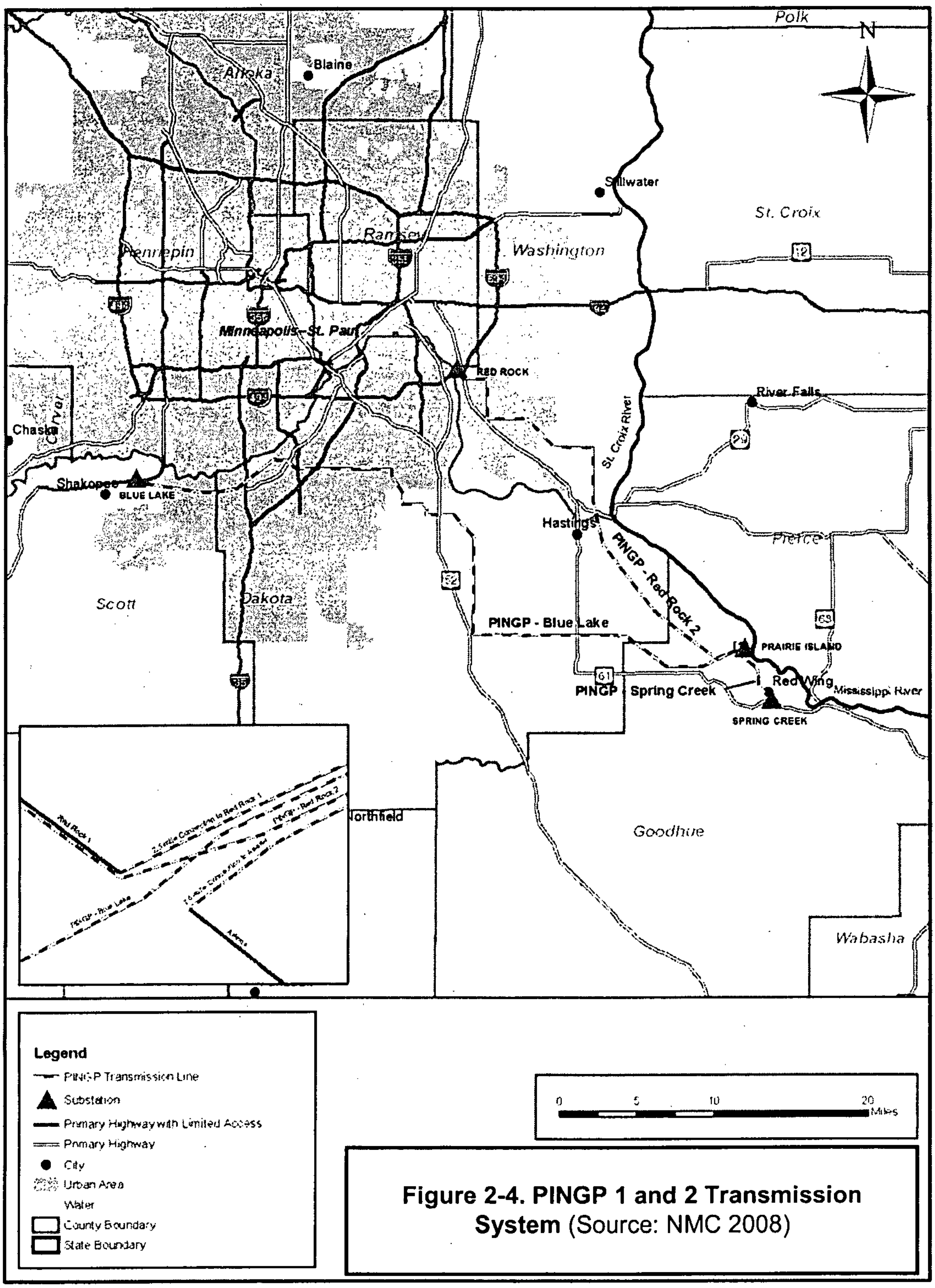


Figure 2-3. PINGP 1 and 2 Substation and Transmission Line Layout (Source: NMC 2008)



1 **Figure 2-4. PINGP 1 and 2 Transmission System** (Source: NMC 2008)

Both Xcel Energy and Great River Energy perform regular flyovers to identify areas that require maintenance. Because much of the ROW land is privately owned agricultural land, Xcel Energy will avoid spraying herbicides at the owner's request and will only remove trees and shrubs that are hazardous to transmission lines or structures. The Xcel Energy vegetative management guidelines also includes measures to ensure avian protection by including procedures workers must follow when tree crews encounter active and/or inactive nests and dead or injured birds.

All transmission lines will remain a permanent part of the transmission system and will be maintained by Xcel Energy and Great River Energy, regardless of PINGP 1 and 2 continued operation.

Table 2-1. PINGP 1 and 2 Transmission Lines. *Five transmission lines convey electricity from PINGP 1 and 2 to the regional electric transmission system via three rights of way (ROWs).*

			Approximate Distance	ROW Width	ROW Area
Line	**Owner**	**kV**	**mi (km)**	**ft (m)**	**ac (ha)**
Red Rock 1 connection	NSP (Formerly Xcel)	345	2.5 (4.0)	250 (76)	76 (31)[(a)]
Red Rock 2	NSP	345	32 (52)	350 (107)	1360 (550)[(a)]
Blue Lake	NSP	345	50 (80)	150 (46)	940 (380)[(a)]
Adams connection	NSP	354	2.5 (4.0)	250 (76)	76 (31)[(a)]
Spring Creek	Great River Energy	161	5 (8)	100 (30)	61 (25)

[(a)] ROW area values for the Red Rock 1 connection, the Adams connection, the Red Rock 2 line, and the Blue Lake line include 76 ac (31 ha) shared by all four lines along the first 2.5 mi (4.0 km) of ROW traveling west from PINGP 1 and 2.

Source: NMC 2008

2.1.6 Cooling and Auxiliary Water Systems

The Mississippi River is the source for cooling water for the main condenser at PINGP 1 and 2. Cooling river water can be circulated through the station in one of three modes of operation: open cycle (once-through cooling, with no cooling towers in operation), helper cycle (once-through cooling, with mechanical draft cooling towers in operation), and closed cycle (using cooling towers to recirculate up to 95 percent of the cooling water). The mode of operation is selected by the applicant to limit the heat discharged to the river to ensure compliance with the thermal limits of the NPDES permit No. MD0004006 (MPCA 2006; NMC 2008).

The components of the current cooling water system are the eight intake bays, the intake screenhouse, trash racks, traveling screens, high/low pressure wash systems, fish return system, bypass gates, intake canal, plant screenhouse, circulating water pumps, condensers, discharge basin, mechanical draft cooling towers, discharge canal, and distribution basin. (NMC 2008)

The Final Environmental Statement (FES) for PINGP 1 and 2 (NRC 1973) describes the original cooling water system. Water was withdrawn from the Mississippi River into the 750-ft (230-m)-long intake canal, and into what is now called the plant screenhouse. Inside the screenhouse, the water passed through trash racks and coarse-mesh traveling screens to remove fish and debris before supplying the condensers. The plant could operate in each of the three modes described above, and so the heated effluent from the plant was either pumped to the cooling towers or released to the river, via an 800-ft (240-m)-long canal.

In the early 1980s, the State of Minnesota directed PINGP 1 and 2 to modify the cooling system to reduce impacts to aquatic communities. This was done by installing the intake screenhouse, equipped with trash racks, coarse- and fine-mesh traveling screens, variable pressure wash systems, and a fish return system, described below (Stone and Webster 1983).

Water flows from the river, under a skimmer wall, into the eight intake bay openings, each 18.5 by 11.2 ft (5.6 by 3.4 m), of the intake screenhouse. The intake bays each have a trash rack, a traveling screen, and high/low pressure wash systems, and a fish return system. After passing through the intake screenhouse, water flows down the intake canal to the plant screenhouse, where four 147,000-gpm (9.3-m^3/s) circulating water pumps supply water to the condensers for a total flow for both units of approximately 588,000 gpm (37.1 m^3/s). (NMC 2008)

After leaving the condensers, the cooling water then enters the discharge basin, and from there the final path of the cooling water is determined by the operating mode of the plant. In open cycle, the cooling water flows from discharge basin, through the distribution basin, into the discharge canal, ultimately returning to the Mississippi River. In helper and closed cycles, the water is pumped from discharge basin to the cooling towers, and from there returns to the intake canal for recirculation (closed cycle) or flows through the distribution basin, into the discharge canal, and out to the Mississippi River (helper cycle). A small amount of warm water from the discharge canal is pumped to the intake structure to prevent ice formation on trash racks, traveling screens, and bypass gates. (NMC 2008)

2.1.6.1 *Intake Screenhouse and Fish Return*

Within the intake screenhouse are the trash racks and traveling screens. The trash rack in each bay is made of 3/8 in. by 3 in. (0.95 cm by 7.6 cm) steel bars, mounted on an incline 1.5 in. (3.8 cm) apart; a trash rake clears accumulated debris (NMC 20008; Stone and Webster 1983).

After passing through the trash rack, the water flows through the traveling screens. The NPDES permit No. MD0004006, issued June 30, 2006, by the MPCA, dictates that from September 1 through March 31, PINGP 1 and 2 may operate with up to 3/8 in. (0.95 cm) mesh traveling screens, and that from April 1 through August 31, the traveling screens must be 0.5 mm (0.02 in.) fine mesh screens (MPCA 2006). Before the cooling water system was modified in 1983, the approach velocity to the existing traveling screens was 1.3 fps (0.40 m/s) at normal water levels and 1.4 fps (0.43 m/s) at low water levels. The design criteria for the average face velocity through the gross area of the screen material for the fine mesh screens should not exceed 0.5 fps (0.15 m/s) at low water level and a discharge rate of 800 cfs (22.6 m^3/s). Flow measurements taken in 1983 and 1984 were less than 0.2 m/s (0.66 fps), and most were below 0.1 m/s (0.33 fps). Intake velocities were again studied in 2003, during coarse mesh screen operation, and the results of that study are shown in Table 2-2. Based on this data, the authors of the study concluded that the intake velocities are not outside the design requirements. (Xcel Energy Environmental Services 2006).

Table 2-2. Post-modification Velocity Profiles for the PINGP 1 and 2 Cooling Water Intake System

Blowdown in cfs (m^3/s)	River Level in ft (m)	Average Velocity at Center of Bays in fps (m/s)		Average Velocity Across All Bays in fps (m/s)
		Maximum	**Minimum**	
1006 (28)	674.6 (205.6)	0.388 (0.118)	0.599 (0.183)	0.481 (0.147)
815 (23)	674.6 (205.6)	0.337 (0.103)	0.427 (0.130)	0.362 (0.110)
Blowdown in cfs (m^3/s)	**River Level in ft (m)**	**Average Calculated Through-Screen Velocity (Coarse Mesh) in fps (m/s)**		**Average Velocity Across All Bays in fps (m/s)**
		Maximum	**Minimum**	
1006 (28)	674.6 (205.6)	0.807 (0.246)	1.246 (0.380)	1.00 (0.305)
815 (23)	674.6 (205.6)	0.701 (0.214)	0.888 (0.271)	0.752 (0.229)
Blowdown in cfs (m^3/s)	**River Level in ft (m)**	**Average Calculated Through-Screen Velocity (Fine Mesh) in fps (m/s)**		**Average Velocity Across All Bays in fps (m/s)**
		Maximum	**Minimum**	
1006 (28)	674.6 (205.6)	0.899 (0.274)	1.388 (0.423)	1.114 (0.340)
815 (23)	674.6 (205.6)	0.781 (0.238)	0.989 (0.301)	0.838 (0.255)

Source: adapted from Xcel Energy Environmental Services 2006

To remove larvae and fish from the upward travel side of the screen, a low pressure spray is used, at 10 psi (0.7 kg/cm^2) from the inside for the fine mesh screen (larval screenwash), and at 20 (1.4 kg/cm^2) psi from the outside when the coarse mesh screen is in use (fish screenwash) (Stone and Webster 1983; NMC 2008). On the downward travel side of the screen, a high pressure spray from the inside is used to remove debris from the screens, at 50 psi (3.5 kg/cm^2) for the fine mesh screen and 100 psi (7 kg/cm^2) for the coarse mesh screen (NMC 2008). The fine mesh screens rotate continuously between 3 and 20 fpm (1 and 6 m/min), based on the amount of debris collected; the coarse mesh screens rotate at the same range of speeds when the screen differential is higher than 4 in. (10 cm) or if the screens have not rotated for 8 hours (Xcel Energy Environmental Services 2006; NMC 2008).

Fish are washed off the upward travel side of the screens into a trough and debris is washed from the downward travel side into a separate trough. The troughs combine into a common trough and are transported back to the river via a 2200-ft-(670-m)-long, buried pipe, which discharges into the river 1500 ft (460 m) south of the Intake Screenhouse, below mean water elevation, and at a depth below any ice cover. Fish and debris travel through the pipe at velocities between 3 to 5 ft/s (1 to 1.5 m/s), but may speed up in sections of the pipe. (Stone and Webster 1983; Xcel Energy Environmental Services 2006; NMC 2008).

If the screens are clogged, the head differential across the traveling screens or across the intake screenhouse can become too high, triggering bypass gates to open allowing water to circumvent the intake screenhouse. The plant screenhouse (part of the original cooling system) is still equipped with 3/8 in. screens that remove debris before the water enters the condensers, and the intake screens are cleared to minimize the time the bypass gates are open. (Stone and Webster 1983).

2.1.6.2 *Discharge and Cooling Tower System*

The discharge basin receives all of the cooling water from the condensers. The path that the water takes next is dependent on the operating mode of the cooling system.

During open cycle, the water flows through the distribution basin, into the discharge canal, and out to the Mississippi River. During closed and helper cycles, the water is pumped to the cooling towers. The cooled water is then routed via the cooling tower return canal to the distribution basin. In closed cycle, the distribution basin returns the water to the intake canal to recycle through the condensers. In helper cycle, the distribution basin routes the water to the discharge canal to be discharged into the river. (NMC 2008)

Water enters the discharge canal through four 10 by 11 ft (3 by 3.4 m) openings to four sluice gates which are operated by motors. The sluice gates lead to four pipes, which vary in diameter [5, 6, 7, and 8 ft (1.5, 1.8, 2.1, and 2.4 m)] and are used in different combinations to achieve the desired discharge rate. If only the smallest pipe is in use, the discharge rate is 150 cfs (4 m^3/s). If all four pipes are used (all sluice gates are open), the maximum discharge rate is 1390 cfs (39 m^3/s), and the velocity of the discharging water is 10.17 ft/s (3.1 m/s). (Stone and Webster 1983)

The mechanical draft cooling tower system includes four cooling towers, fans, water distribution headers, and basins. Each tower, made up of a bank of 12 sections cells, includes a cooling tower pump, which pumps water from the discharge basin through distribution pipes to the top of the cooling tower. Spray nozzles disperse the water, which drops through a maze of "fill" to the basin at the base of the cooling towers. Fans blow air up through the falling water, evaporating water and allowing the heat to disperse out the top of the cooling towers into the atmosphere. The water in the cooling tower basin flows through the cooling tower return canal to the distribution basin, where it can either be routed back through the facility's condensers by way of the intake canal (closed cycle) or sent to the discharge canal to return to the Mississippi River (helper cycle). The cooling towers can be used for the total circulating water flow of 588,000 gpm (37.1 m^3/s) and can remove up to 96 percent of the waste heat created by the facility. (NMC 2008)

2.1.6.3 *Requirements Under NPDES Permit*

In accordance with the Federal Water Pollution Control Act (or the Clean Water Act [CWA]), PINGP 1 and 2 effluent discharges are regulated by the NPDES and State Disposal System Permit No. MN0004006 issued and enforced by the MPCA. Section 402 of the CWA states that "NPDES prohibits [discharges] of pollutants from any point source into the nation's waters except as allowed under an NPDES permit." The purpose of this permit is to regulate wastewater discharge to preserve the water quality of the surrounding water bodies. As of the most recent permit issued, there have been no notices of violation for the PINGP 1 and 2 site. Information in this section was obtained from the most recent PINGP 1 and 2 NPDES permit, a copy of which is included in the applicant's license renewal ER. The most recent renewal of this permit occurred in June 2006 and expires August 2010.

In order to minimize the impacts from the PINGP 1 and 2 cooling system on entrainment and impingement of fish and shellfish, the NPDES permit dictates the screen size the plant must use during the spring and summer (Table 2-3).

Additionally, the NPDES permit imposes limits on the discharge of cooling water from April to June, in order to minimize the impacts of entrainment and impingement of fish and shellfish

(Table 2-4). This indirectly restricts the withdrawal rates, as the discharge rate approximates the withdrawal rate.

To minimize the impacts of the heated discharge from the PINGP 1 and 2 cooling system, the NPDES permit specifies the times and trigger points when the plant must switch the operating mode of the cooling system (Table 2-5). The permit defines the fall trigger point as when the daily average upstream ambient river temperature falls below 43 °F (6 °C) for five consecutive days. (MPCA 2006)

Table 2-3. PINGP 1 and 2 Screen Mesh Size and Spray Wash Pressure Requirements. *Mesh size and spray wash pressure are specified by the PINGP 1 and 2 NPDES permit and vary by time of year.*

Time of Year	Screen Mesh Size	Spray Wash Pressure
April 1 to August 31	0.5 mm fine mesh screen	Low Pressure (larval): 10 psi High Pressure (debris): 50 psi
September 1 to March 31	3/8 in. coarse mesh screen	Low Pressure (fish): 20 psi High Pressure (debris): 100 psi

Table 2-4. PINGP 1 and 2 Plant Flow (Discharge) Restrictions. *Discharge restrictions are implemented in the PINGP 1 and 2 NPDES permit and vary by time of year and river flow.*

Time of Year	River Flow	Plant Flow (Discharge)
April 15-30	< 15,000 cfs (425 m^3/s)	97 mgd (150 cfs; 4.25 m^3/s)
April 15-30	≥ 15,000 cfs (425 m^3/s)	194 mgd (300 cfs; 8.5 m^3/s)
May	n/a	194 mgd (300 cfs; 8.5 m^3/s)
June 1-15	n/a	259 mgd (400 cfs; 11.3 m^3/s)
June 16-30	n/a	517.5 mgd (800 cfs; 22.7 m^3/s)

Table 2-5. PINGP 1 and 2 Cooling Mode Requirements. *Cooling mode requirements are specified by the PINGP 1 and 2 NPDES permit and vary by time of year.*

Time of Year	Requirements
April 1 through Fall Trigger	Operate cooling towers as necessary so that: • Receiving water is not raised by more than 5 °F (-15 °C) above ambient. • Cooling water discharge does not exceed a daily average temperature of 86 °F (30 °C) • If the daily average ambient temperature reaches 78 °F (26 °C) for two consecutive days, all cooling towers shall be operated to maximum extent practicable

Fall Trigger through March 31	If temperature of receiving water exceeds 43 °F (6 °C) for two consecutive days, the MPCA and MN DNR must be notified. The MPCA may require the use of cooling towers or alternative measures to reduce water temperatures.

[1] Requirements begin April 1, but can be earlier, if the daily average ambient river temperature increases to 43 °F (6 °C) or above for five consecutive days.

[2] The fall trigger point is when the daily average upstream ambient river temperature falls below 43 °F (6 °C) for five consecutive days.

[3] Receiving water is the water immediately below Lock and Dam 3.

[4] Ambient water temperatures are based on upstream monitoring and the monthly averages of maximum daily temperatures at three monitoring probes located at the dam.

Periodically, NSP treats the PINGP 1 and 2 cooling water system with oxidizing biocides, chlorine and bromine, to prevent the growth of biofouling micro-organisms. The NPDES permit limits the release of these biocides, as shown in Table 2-6. (MPCA 2006; NMC 2008)

Table 2-6 shows the quantitative effluent limitations regulated under the NPDES permit, or the residual concentrations of permitted chemical additives that may be discharged to the surface waters. In accordance with this permit, if PINGP 1 and 2 introduce any new chemical additives in its operation, or the current dosages are increased, they must first be reviewed and approved by the MPCA. In addition to these effluent limitations, the permit includes thermal limitations and water intake restrictions.

Table 2-6. NPDES Effluent Limitations for PINGP 1 and 2

Outfall No.	Total Suspended Solids (mg/L)		Total Residual Bromine (mg/L)		Total Residual Chlorine (mg/L)		Oil and Grease [Hexane Extraction] (mg/L)	
	Quarterly Avg.	Daily Max.	Daily Max.	Instant Max.	Daily Max.	Instant Max.	Monthly Avg.	Daily Max.
SD001	NLR	NLR	0.001	0.05	0.04	0.2	NLR	NLR
SD002	30	100	NLR	NLR	NLR	NLR	NLR	NLR
SD003	30	100	NLR	NLR	NLR	NLR	NLR	NLR
SD004	NLR	NLR	NLR	NLR	NLR	NLR	NLR	NLR
SD005	30	100	NLR	NLR	NLR	NLR	10	15
SD006	30	100	NLR	NLR	NLR	NLR	10	15
SD010	30	100	NLR	NLR	NLR	NLR	10	15
SD012	NLR	NLR	NLR	NLR	NLR	NLR	NLR	NLR

Source: MPCA 2006
NLR = No Longer Regulated

The permit outlines the effluent limitations and monitoring requirements of eight different discharge outfalls. In addition to the effluent limitations shown in Table 2-6, the permit describes the minimum number of sampling events that are required for each outfall, where necessary. Flow monitoring requirements (based on the time of year) are outlined for certain outfalls, as well as required pH monitoring, with the pH levels expected to be between 6.0 and 9.0 year-round. The permit also stipulates there will be no discharge of oil or other substances that result in a visible film, as well as no discharge of floating solids or visible foam.

The outfall effluent limitations in Table 2-7 were calculated based on the maximum discharge flow rates from Table 2-6. Outfall SD 001 is the circulating water system discharge canal, which discharges wastewater directly to the Mississippi River. A portion of the water from this canal is rerouted to the intake screenhouse during the winter months to help prevent ice build-up there. All of the following surface discharges (SD) are monitored outfalls; however, they are all discharged to the Mississippi via SD 001, the circulating water system discharge canal. Steam generator blowdown is discharged via SD 002. Radwaste treatment system effluent is discharged via SD 003. The reverse osmosis system effluent is discharged via SD 004. SD 005 and SD 006 discharge wastewater from the Unit 1 and Unit 2 turbine building sumps, which are comprised of noncontact cooling water, condensate traps and drains, roof and floor drains, Unit 1 and Unit 2 condensate blowdown and the heating system blowdown. SD 010 discharges wastewater from miscellaneous floor drains. The Unit 1 and Unit 2 cooling water systems are the plant's two internal waste streams (WSs), WS 001 and WS 002. These waste streams contain bromine and chlorine residuals and are also discharged to the river via SD 001.

The only surface discharge aside from SD 001 that discharges directly to the Mississippi is SD 012. SD 012 discharges the plant intake screen backwash as well as the fish return system of any impinged fish, aquatic organisms, or debris directly to the river.

Table 2-7. Surface Discharge (SD) and Internal Waste Stream (WS) Discharges from PINGP 1 and 2 (in millions of gallons per day [mgd])

Outfall No.	Maximum Flow (mgd)	Average Flow (mgd)
SD 001	864.0	503.0
SD 002	0.576	0.012
SD 003	0.230	0.002
SD 004	0.244	0.051
SD 005	0.360	0.030
SD 006	0.360	0.030
SD 010	0.015	0.001
SD 012	3.200	2.000
WS 001& WS 002	69.00	25.00

Source: MPCA 2006

Cooling water discharge is restricted at certain times of the year. From April 15 to April 30 discharge is restricted to 194 mgd (7.34 x 10^5 m^3/day) if the flow of the Mississippi River is at or above 15,000 cfs (424.8 m^3/s). If the river flow is below this level, discharge is limited to 97 mgd (3.67 x 10^5 m^3/day). From May 1 to May 31 discharge is restricted to 194 mgd (7.34 x 10^5 m^3/day), from June 1 to June 15 the discharge rate may increase to 259 mgd (9.80 x 10^5 m^3/day), and from June 16 to 30 it may increase to 517.5 mgd (1.96 x 10^6 m^3/day). Outfall SD 001 is permitted to exceed these discharge limitations only in the event that it is necessary in order to prevent temperatures from exceeding 85 °F (29 °C).

Thermal limitations require temperature monitoring at five different locations: the discharge canal outfall (SD 001), the plant intake (SD 002), a specified point in the main river channel (SD 003), a specified point in Sturgeon Lake (SD 004), and a point directly downstream of Lock and Dam No. 3 (SD 001) which is to be monitored using three different temperature probes. The permit states that the daily average temperature should under no circumstances exceed 86 °F (30 °C) and that the temperature of the receiving water should not be raised over 5 °F (-15 °C) above the ambient water temperature. The permit specifies that if the ambient water temperature reaches 78 °F (26 °C) for two consecutive days all cooling towers should be operated to their maximum extent.

2.1.7 Facility Water Use and Quality

The PINGP 1 and 2 circulating water system and the service water system both draw water from, and discharge to, the Mississippi River. Onsite groundwater wells also supply water for cooling water makeup, domestic water consumption, and other industrial uses. The following sections detail water use at PINGP 1 and 2.

2.1.7.1 *Groundwater Use*

A portion of the water utilized by PINGP 1 and 2 for its supplemental operations is groundwater. Specifically, PINGP 1 and 2 uses groundwater to supplement primary and secondary makeup cooling water, plant sanitary facilities, pump bearing lubrication, pump motor cooling, pump seal lubrication, domestic uses, and lawn watering (Minnesota Department of Natural Resources [MNDNR] Permit 865114). The plant draws onsite groundwater from six wells screened in the surficial aquifer. The MNDNR permits five of these wells for groundwater withdrawal, while the sixth remains unpermitted because it draws less than 10,000 gallons per day (37.9 m^3/day) and therefore does not require a permit (MNDNR Permit 865114).

Sanitary wastewater is treated either with the site's septic system or is transported to the Red Wing Wastewater Treatment Plant or the Prairie Island Community Water Treatment Plant because there is no onsite sanitary wastewater treatment facility (MPCA 2006).

2.1.7.2 *Surface Water Use*

PINGP 1 and 2's treatment and disposal systems include a chemical treatment system (in which water is treated with bromine and/or chlorine to control biofouling organisms), a reverse osmosis system, a radioactive waste treatment system, an intake screening system, and mechanical draft cooling towers (MPCA 2006). The surface water used in the plant's circulating water system and the cooling water system is withdrawn from the Mississippi River through the plant's intake structure and is eventually discharged back to the river via the discharge canal (MPCA 2006).

PINGP 1 and 2 withdraw approximately 2.0 x 10^{11} gallons per year (848 cfs; 24 m^3/s) from the river annually under these conditions, with a highest recorded annual withdrawal of 2.08 x 10^{11} gallons (882 cfs; 25 m^3/s) in 2005 (TtNUS 2006). The intake structure is designed to pump river water into the system during both normal conditions and major flood levels. PINGP 1 and 2 has no formal protocol to accommodate extremely low river conditions because the upstream Lock and Dam 3 controls the river elevation at the site. However, the plant does have an emergency plan in the event of the loss of Lock and Dam 3.

Cooling tower blowdown discharge averages 1.9 x 10^{11} gallons per year (810 cfs; 23 m^3/s), with a highest recorded average of 2.0 x 10^{11} gallons per year (851 cfs; 24 m^3/s) in 2000 (TtNUS 2006). Blowdown discharges back to the Mississippi via the plant's discharge canal in a manner complying with the plant's NPDES Individual Wastewater Discharge Permit No. MN 0004006 issued by MNDNR in 2006 (MPCA 2006). The primary sources of river water consumption and evaporation are drift losses and PINGP 1 and 2 averages 9.2 x 10^9 gallons per year (39 cfs; 1.1 m^3/s). The plant's consumptive river water use constitutes 4.6 percent of the Mississippi River flow at the site, which averages 18,380 cfs (520 m^3/s) annually (TtNUS 2006).

2.1.7.3 *Surface Water Quality*

While no water quality studies have been conducted by PINGP 1 and 2 in recent years, the MPCA monitors water quality at Lock and Dam 3.

PINGP 1 and 2 is located in the Upper Mississippi Sub-basin, an area of the Mississippi River that has a number of water quality issues. Hypoxia, a zone of decreased dissolved oxygen, has become a serious problem in the Gulf of Mexico as a result of nutrient enrichment, particularly nitrogen enrichment (EPA 2006). The Mississippi River is one of the two main nutrient contributors to the Gulf of Mexico and Minnesota in particular contributes an estimated five to six percent of this nitrogen flux to the Gulf of Mexico (EPA 2006). Management practices in the Upper Sub-basin are implemented to reduce nitrogen and phosphorus discharges into the river system (MPCA 2000).

Wastewater discharges from the PINGP 1 and 2 facility to the Mississippi River are regulated by the MPCA issued NPDES permit. In terms of surface water quality issues, the facility's NPDES permit regulates effluent limitations, thermal limitations, and water intake restrictions. For a more detailed description of the NPDES permit, refer to Section 2.1.6.3.

PINGP 1 and 2 implements a Storm Water Pollution Prevention Plan onsite to reduce the amount of pollution discharged through storm water runoff. The purpose of this plan is to eliminate any contact that discharged storm water may have with possibly contaminated materials.

2.1.7.4 *Dredging*

Since the original construction of the discharge canal, PINGP 1 and 2 has not conducted any dredging aside from routine maintenance. In 2009, PINGP 1 and 2 plans to perform several larger-scale maintenance dredging projects, including work on the main discharge canal and the intake channel. NSP has stated that it will implement best management practices to reduce pollution risks will be implemented during these dredging activities.

2.2 Affected Environment

This section provides general descriptions of the environment near PINGP 1 and 2 as background information. This section also provides detailed descriptions where needed to support the analysis of potential environmental impacts of refurbishment and operation during the renewal term, as discussed in Chapters 3 and 4. Section 2.2.9 describes historic and archaeological resources in the PINGP 1 and 2 area, and Section 2.3 describes the possible impacts associated with other Federal project activities.

2.2.1 Land Use

<u>PINGP 1 and 2</u>

PINGP 1 and 2 are located on approximately 578 ac (234 ha) of land, owned by NSP. Prior to construction of PINGP 1 and 2, the site was used for agriculture. Approximately 240 ac (97 ha) were disturbed by the construction of the plant in the early 1970s. The developed portion of the PINGP 1 and 2 site, which occupies approximately 60 ac (24 ha), consists of the power plant structure and associated buildings, maintenance facilities, parking lots (AEC 1973). The remaining 180 ac (73 ha) of disturbed land were landscaped after construction was completed and most of this land is grassland (AEC 1973). The remainder of the site (about 338 ac [137 ha]) is primarily wooded. Figure 2.2 depicts the general site layout and exclusion zone boundary. The exclusion zone boundary extends east of the plant to the main channel of the Mississippi River. Islands within this boundary, as well as a small strip of land northeast of the plant, are owned by the U.S. Army Corps of Engineers (USACE) (NMC 2008).

<u>PIIC</u>

The Prairie Island Indian Community (PIIC) is a Federally-recognized Indian Tribe organized under the Indian Reorganization Act (25 USC 476). PINGP 1 and 2 are located immediately south, south-east of the Prairie Island Indian Community. It is because of the PINGP 1 and 2's location relative to the PIIC that the Tribal Council asked to be a Cooperating Agency for purposes of developing sections of the supplemental Environmental Impact Statement (SEIS) for the PINGP 1 and 2 license renewal environmental review.

The PIIC has gained land through several Federal reorganization acts and direct purchases by the Tribal Council. The PIIC's land holdings now total over 3000 ac (1200 ha) (both land and water). The PIIC has grown substantially since PINGP 1 and 2 first went on-line in 1973. Currently, the PIIC consists of 801 enrolled band members, of whom approximately 250 members reside within 2 mi (3.2 km) of PINGP 1 and 2 on tribal lands. PIIC's reservation contains 60 housing units on the reservation, new Trust lands (i.e., the Upper Island) hold 29 housing units, and 47 additional units are proposed for 2009. (See Chapter 4, Figure 4-1) (PIIC 2009)

The PIIC owns and operates the Treasure Island Resort and Casino, which is on reservation land and located within 1 mi (1.6 km) of PINGP 1 and 2. Treasure Island also includes a 24-lane bowling center, a multi-use event center, an RV park, a marina, and a sightseeing and dinner cruise boat. (PIIC 2009)

Because of its unique legal and political status as a Federally-recognized Indian Tribe, the Prairie Island Indian Community is not subject to State or local land use jurisdiction. The Tribe is free to develop its own land-use policies and management plans for its Trust lands. (PIIC 2009)

2.2.2 Air and Meteorology

2.2.2.1 *Climate and Meteorology*

Minnesota's climate is characterized by the Koppen Climate Classification System as humid continental, or *Dfa*, in which precipitation is low, but adequate, and seasonal temperatures vary greatly (Strahler 1984). The region is subject to temperature extremes in winter from continental polar and/or Arctic air masses, and in summer from tropical air masses moving in from the Gulf of Mexico, which can cause occasional extended periods of heat (NCDC 2006). Common storm systems include Alberta Clippers, fast moving air masses with low pressure that develop in the north in winter months and move southward, and Panhandle Hooks, low pressure air masses that form in the southwest and move northeast and often carry significant moisture (NWS 2008a; NWS 2008b). Statewide mean monthly temperatures range from 4 °F (-15 °C) in January to 70 °F (20 °C) in July (NCDC 2006). Data collected from 1949 to 2001 at the Red Wing Dam 3 weather station indicate that the mean monthly temperatures in the vicinity of PINGP 1 and 2 range from 12.0 °F (-11 °C) in January to 72.1 °F (22.2 °C) in July (MRCC 2001). Statewide 1-day temperature extremes range from -60 °F (-51 °C) to 114 °F (45.6 °C) (NCDC 2006).

Mean annual precipitation ranges from 35 in. (89 cm) in the southeastern portion of the state to 19 in. (48 cm) in the northwest portion of the state (NCDC 2006). Data collected from 1971 to 2000 at the Red Wing Dam 3 weather station indicate that the mean annual precipitation in the vicinity of PINGP 1 and 2 is 29.95 in. (76.07 cm); the period June through August receives the highest mean precipitation (NCDC 2000). Approximately two-thirds of annual precipitation occurs between May and September, which coincides with the April-to-October native growing season and May-to-September row crops growing season (NCDC 2006). Thunderstorms are most common during months of heavier rainfall. Southern Minnesota averages 45 thunderstorm days annually (NCDC 2006).

Statewide annual snowfall varies greatly and averages from 40 in. in the southern portion of the state to 70 in. (180 cm) in the northeastern portion of the state (NCDC 2001). In the vicinity of the PINGP 1 and 2 site, annual snowfall averages about 44 in. (110 cm) per year (NMC 2008). Snowfalls of 4 in. (10 cm) or greater are common from mid-November to mid-April and snowfall with blizzard conditions occur about two times per year (NCDC 2006).

Average annual wind speed documented over a 30-year period is 10.6 mph (17.1 kph) for Minneapolis, 39 mi (63 km) northwest of PINGP 1 and 2 (NCDC 2005). Prevailing wind directions for the site region are northwest in the winter months, east-southeast in the early summer, and south in the late summer months (NCDC 1998). In the vicinity of the PINGP 1 and 2 site, wind direction is primarily influenced by the Mississippi River Valley.

Tornadoes have been documented in Minnesota from March through November and occur most frequently in May, June, and July (MCWG 2008). These months account for over 75 percent of observed tornadoes, of which June accounts for 33 percent of these (NCDC 2006). Goodhue County has 18 recorded tornadoes between the period of 1950 to 2005 (NWS 2005). Of these, all occurred between May and August; twelve were F0, four were F1, and one was an F3 on the Fujita Tornado Damage Scale (NWS 2005).

The PINGP 1 and 2 Meteorological Monitoring Program, which is part of the PINGP 1 and 2 Environmental Monitoring Program, includes operation of weather instruments mounted on a primary 140-ft (42.6-m)-high tower, which is located approximately 1800 ft (549 m) northwest of the reactor building. Wind speed, direction and temperature variance are measured at 33 ft (10 m) and 197 ft (60 m). Precipitation is measured at ground level. This meteorological data is gathered once per hour and stored in a database, which is reviewed daily by the site meteorologist. Quality controlled meteorological data is then compiled into monthly, quarterly and annual reports.

2.2.2.2 *Air Quality*

Under the Clean Air Act (CAA), the EPA has established National Ambient Air Quality Standards (NAAQS) six criteria pollutants: nitrogen dioxide, sulfur dioxide, carbon monoxide, lead, ozone, and particulate matter (PM_{10} and $PM_{2.5}$). Under the NAAQS, areas are designated as being in "attainment" or "non-attainment" for the standards established for each criteria pollutant. Areas that are re-designated attainment after being designated non-attainment are considered "maintenance areas." In addition to meeting the air quality standards, maintenance areas must create a plan describing how the area will continue to meet the air quality standards over a 10-year period.

Goodhue County, in which PINGP 1 and 2 is located, is part of the Southeast Minnesota-LaCross (Wisconsin) Interstate Air Quality Control Region (40 CFR 81.66). All of these counties, with the exception of Olmsted County, are in attainment (NMC 2008). Olmsted County, which is approximately 65 mi (105 km) from the PINGP 1 and 2 site, is a maintenance area for sulfur dioxide and PM_{10} (40 CFR 81.324).

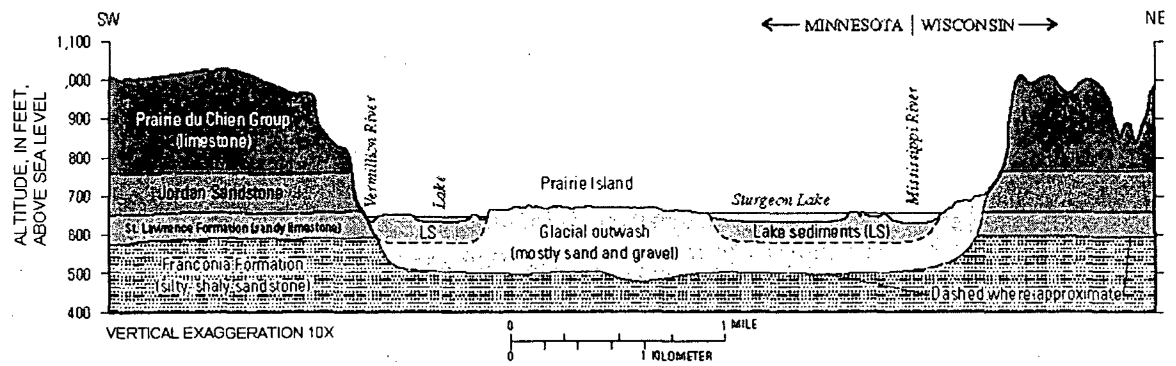
PINGP 1 and 2 has a number of stationary emission sources, which include four standby emergency power supply diesel generators, one backup generator and auxiliaries required for safe start-up and continuous operation, that do not require the facility to secure a Title V permit. PINGP 1 and 2 are recognized as a Synthetic Minor facility by Minnesota State due to the low quantity of emissions and the restrictions on operation of its stationary sources; therefore, operation of the sources is regulated by a Minnesota Synthetic Minor Operating Permit. PINGP 1 and 2 generators are tested periodically to ensure their continued performance capability, and NPS has procedures in place to ensure continuous monitoring, sampling, and filtering of the oil. Used oil is collected for offsite disposal; waste management is discussed in Section 2.1.3.

2.2.3 Groundwater Resources

Prairie Island is an island terrace within a three mile wide valley of the Mississippi River floodplain. Six groundwater wells utilize the surficial aquifer directly beneath the site. The deepest of these wells extends to 165 ft (50.3 m) (NMC 2008). This alluvial aquifer (or, water table) is 130 to 200 ft (39.6 to 60.9 m) thick and is composed of sands, gravels, and other finer-grained lake sediments resulting from glacial outwash (Cowdery 1999). The water table is found 5 to 20 ft (1.5 to 6.1 m) underneath the PINGP 1 and 2 site. The groundwater flow in the surficial aquifer is influenced directly by its hydraulic surface water boundaries: the Mississippi River to the northeast and the Vermillion River to the southwest. Typically, the groundwater flows southwest from the Mississippi to the Vermillion (Winterstein 2001). However, in the spring if there are conditions of snowmelt or heavy rain, a groundwater mound can form, resulting in radial flow (Cowdery 1999). Recharge to the aquifer comes from interaction with these surface water systems as well as from rain, snowmelt and floodwater. A sediment barrier limits the recharge and discharge flow interaction between the surficial aquifer and the surface waters (Ruhl 2002).

The area's primary aquifers are found in bedrock composed of layers of limestone and sandstone. The Prairie du Chien Group and Jordan Sandstone are the uppermost of these aquifers (See Figure 2-1). The Jordan Sandstone is a confined aquifer and the St. Lawrence Formation separates it from the underlying Franconia Formation. Because the Mississippi River Valley cuts through these formations, forming the bluffs on either side of the valley, the Franconia Formation is the aquifer found directly beneath the shallow alluvial aquifer at the PINGP 1 and 2 site and is less thick at this point than its total measured thickness of 180 feet (24.4 m).

Figure 2-5. Lithology and Generalized Geologic Section for the Prairie Island Low Island Terrace (Source: Cowdery 1999)



The upper three strata discharge from the bluffs as springs, while the deeper Franconia Formation discharges to the sediments that partially fill the Mississippi Valley. Beneath the Franconia Formation is the Dresbach formation, which consists of sandstone, siltstone and shale and measures over 100 ft (30.5 m) in thickness. The Dresbach formation includes the Mount Simon formation, which is the primary water producing aquifer for the nearby community of Red Wing and the PIIC. The wells at the PINGP 1 and 2 site, however, draw water from the shallow alluvial aquifer. The Cowdery study notes that despite a high hydraulic head gradient between aquifers, the exchange of water between the alluvial aquifer and the bedrock aquifer below is small because of a boundary of clay-rich materials between the two strata. (Cowdery 1999)

2.2.3.1 *PINGP 1 and 2 Water Supply Wells*

PINGP 1 and 2 has six onsite wells screened in the surficial aquifer (NMC 2001g). Five of these wells are permitted for groundwater withdrawal by MNDNR, while the sixth remains unpermitted because it draws less than 10,000 gpd (37.9 m^3/day) and therefore does not require a permit (NMC 2006a). The two largest of these wells are 165 ft (50.3 m) in depth and 10 inches (25.4 cm) in diameter and yield up to 116,000 ft^3/day (3,285 m^3/day) of groundwater.

The average total yield of the five permitted wells is 91 gpm (5.7×10^{-3} m^3/s), with the unpermitted well averaging 1 gpm (6.3×10^{-5} m^3/s), resulting in a total annual average yield of 92 gpm (5.8×10^{-3} m^3/s) from 2000 to 2005 (See Table 2-8). The highest recorded annual average yield occurred in 2005 at 118 gpm (7.4×10^{-3} m^3/day) and the lowest was recorded in both 2000 and 2002 at 77 gpm (4.9×10^{-3} m^3/day).

Table 2-8. Total Annual Groundwater Withdrawal (Gallons) for PINGP 1 and 2.

Year	Well (Non-permitted)	Well 256120	Well 256121	Well 611076	Well 402599	Well [BLANK]	Total Annual gal	Total Annual gpm
2000	-	13,676,800	12,812,800	3,745,780	7,474,900	2,242,900	39,953,180	76
2001	-	16,974,300	16,372,060	3,663,190	7,267,700	2,971,700	47,248,950	90
2002	-	18,958,300	11,609,300	3,550,800	4,280,700	1,674,100	40,073,200	76
2003	-	10,648,800	14,248,900	4,163,190	10,969,500	1,884,000	41,914,390	80
2004	563,100	18,576,900	13,336,200	5,280,430	15,517,800	1,824,900	54,536,230	104
2005	563,100	20,833,300	19,933,600	6,830,210	12,055,695	1,946,200	61,599,005	117
Total Withdrawal		99,668,400	88,312,860	27,233,600	57,566,295	12,543,850	285,324,955	-
Avg. Annual Withdrawal		16,611,400	14,718,810	4,538,933	9,594,383	2,090,633	47,554,159	-
Avg. gpm	1.07	32.00	28.00	9.00	18.00	4.00	-	91

Source: [NMC 2008]

2.2.3.2 *PINGP 1 and 2 Groundwater Monitoring*

Groundwater monitoring at PINGP 1 and 2 is primarily targeted at the groundwater infiltration of radionuclides such as tritium. Tritium is a product of manmade sources, as well as natural processes. Groundwater sampling first revealed detectable levels of tritium in a nearby residence well in 1989, which led to the first establishment of a tritium sampling program at PINGP 1 and 2. In 1991, the plant modified the discharge canal by lengthening the submerged liquid discharge pipe. This pipe ensured that all liquid discharges from the plant were released towards the end of the canal, preventing any radioactive water from remaining in the discharge canal long enough to allow tritium to leach into the groundwater supply. In response to an unusually high tritium sample (1360 picocuries per liter [pCi/L]) in one of the onsite wells, the plant replaced an aging pipe system in 1992. (NMC 2006s)

Conclusions drawn from the 2006 Radiation Environmental Monitoring Program Annual Report indicate that, while tritium levels detected in that same onsite well fluctuate from year to year, high tritium levels have not been detected since the plant took steps towards the prevention of tritium leaching. All groundwater sampling, both onsite and offsite, has yielded results well below the EPA's tritium drinking water standard of 20,000 pCi/L. (NMC 2006s)

Aside from the Radiation Environmental Monitoring Program, PINGP 1 and 2 does not currently implement a general Groundwater Monitoring Program. However, PINGP 1 and 2 has plans to initiate one in the near future. (NMC 2008x)

2.2.4 Surface Water Resources

PINGP 1 and 2 are located on Prairie Island, which is on the Mississippi River. The Mississippi is the longest river in North America and spans 2302 mi (3705 km) from its source at Lake Itasca in Minnesota to where it empties into the Gulf of Mexico. The river drains approximately 189,000 square miles and 31 different states. The Mississippi can be divided into six sub-basins: the Upper Mississippi River, Lower Mississippi River, Arkansas Red-White River, Ohio

River, Missouri River, and Tennessee River Sub-basins. The PINGP 1 and 2 facility is located in the Upper Mississippi sub-basin. (EPA 2006)

The Upper Mississippi Sub-basin covers 20,100 square miles and has 12 major tributaries, the most notable being the Missouri River, the Illinois River, the Wisconsin River, and the Iowa River (MPCA 2008). Annual average discharge of this portion of the river ranges from 9,180 cfs to 204,800 cfs (259.9 to 5799.2 m^3/s). (USGS 2006)

Prairie Island itself is a low-lying island located in a one to three mile-wide (1,609 to 4,828 m) section of the Mississippi River Valley, with the majority of the island being less than 25 feet (7.6 m) above the river. On either side of the valley are 360 foot high (110 m) bluffs composed of Paleozoic limestones and sandstones (Cowdery 1999). Prairie Island is located between the Mississippi River and the Vermillion River, with the confluence of the two rivers at the downstream end of the island (EPA 2006). About 1.5 miles (7920 ft) downstream from the island is Lock and Dam Number 3, which controls the water level and flow of this stretch of the Mississippi (USGS 2006). Typically, the Mississippi is kept at a water level higher than that of the Vermillion River and discharge from Lock and Dam Number 3 tends to be at its peak in the spring and summer. (Cowdery 1999)

PINGP 1 and 2 are located on Sturgeon Lake, an area of the Mississippi created by the rise in water elevation by Lock and Dam Number 3 and the subsequent flooding of sections of the floodplain. The nearest upstream flow monitoring station to PINGP 1 and 2 is the Prescott U.S. Geological Survey (USGS) monitoring station, located at river mile 811.4. The nearest downstream flow monitoring station is the Winona USGS monitoring station, located at river mile 725.7. At the Prescott station the annual recorded mean flow from 1928 to 2005 is 18,380 cfs (520.5 m^3/s), with the highest annual mean flow being 38,540 cfs (1,091 m^3/s) and the lowest 4,367 cfs (123.7 m^3/s). At the downstream Winona station the annual recorded mean flow from 1928 to 2005 is 29,590 cfs (837.9 m^3/s), with the highest annual mean flow being 56,850 cfs (1,610 m^3/s) and the lowest 9,742 cfs (276 m^3/s). Table 2-4 and 2-5 show the monthly average and yearly total discharge flows at Lock and Dam 3 from 1999 to 2006 respectively. (USGS 2006)

Table 2-9. Monthly Average Discharge Flow at Lock and Dam 3 from 1999 to 2006

Month	**Monthly Average (cfs)**
January	10,425
February	10,621
March	15,654
April	44,634
May	39,562
June	33,758
July	23,641
Month	**(cfs)**
August	14,223
September	13,294
October	16,084

	Monthly Average
November	14,578
December	11,455

Source: USGS 2006

Table 2-10. Total Yearly Discharge Flow at Lock and Dam 3 from 1999 to 2006

Year	Total Discharge Flow (cfs)
1999	272,245
2000	168,796
2001	355,385
2002	280,864
2003	198,688
2004	221,612
2005	272,099
2006	213,727

Source: USGS 2006

2.2.5 Description of Aquatic Resources

PINGP 1 and 2 is located on the west bank of the Mississippi River, north of Red Wing, Minnesota. The cooling system withdraws from and discharges to the main stem of the Mississippi, 13 river miles (21 river kilometers) below the confluence of the St. Croix River and 4 river miles north of where the Vermillion River joins the Mississippi (AEC 1973). The Mississippi is dammed for navigation about 1.5 mi (2.4 km) downstream from the facility by Lock and Dam 3. The area of the river adjacent to PINGP 1 and 2 is known as Pool 3, and is bounded by Lock and Dam 3 (downstream) and Lock and Dam 2 (upstream), which lie about 18 river miles (29 river kilometers) apart (NMC 2008). Immediately north and east of the plant is Sturgeon Lake, a side slough or impoundment that would be considered a marsh if it were not associated with the main stem of the river (AEC 1973). The Vermillion River borders the southwest of the site. The power transmission system includes three in-scope lines, which cross a variety of water bodies, as discussed in Section 2.1.5.

Mississippi River and River Basins

Because the river is always changing, the exact length of the Mississippi River varies. According to USGS, the river flows about 2300 mi (3700 km), from Lake Itasca in Minnesota to the Gulf of Mexico (NPS 2008a). The Mississippi River Basin, which drains 41 percent of the continental United States, a total area between 1.2 and 1.8 million mi^2 (3.1 and 4.7 million km^2), and includes all or portions of 31 states and 2 Canadian provinces, is divided into six subbasins:

Upper Mississippi River, Lower Mississippi River, Arkansas Red-White River, Ohio River, Missouri River, and Tennessee River (NPS 2008a).

The Upper Mississippi River, flowing about 1300 mi (2100 km) from the head waters in Lake Itasca to the confluence of the Ohio River, was dammed to provide 9-ft (2.7-m) deep channels for navigation, and is not used for flood control (UMRBA undated; USACE 2004). As described above, PINGP 1 and 2 are located on the Minnesota shore of Pool 3, the area of the Mississippi River created by Lock and Dams 2 and 3. The normal level of Pool 3, 674.5 ft (205.6 m) above mean sea level, is controlled by Lock and Dam 3, located a little over a mile downstream from the facility (NMC 2008).

Phytoplankton and zooplankton were monitored in preoperational studies, but have not been studied since (NMC 2008; AEC 1973). Monitoring showed high phytoplankton densities in the vicinity of the plant. Dominant species indicated eutrophic conditions, and pollution-tolerant species were common. Zooplankton was primarily rotifers, crustaceans, and protozoa. Phytoplankton and zooplankton communities may have changed in the decades since these studies were performed.

Due to barge navigation, much of the river bottom at the time of preoperational monitoring was scoured so that only the sand and clay substrate remained, and very little benthic fauna. The areas that were not so disturbed by shipping were dominated by midge fly larvae and oligochaetes, as well as tubificid worms, groups generally tolerant of severe pollution and environmental disturbance. Pollution-tolerant macroinvertebrates, such as caddisflies and mayflies, had begun to establish themselves just above Lock and Dam 3, downstream of the discharged waste and runoff from the urban areas, Minneapolis and St. Paul, Minnesota. The FES for PINGP 1 and 2 reported only a few small clam beds in the area, without giving more details on the species present, and indicated that areas monitored upstream on the Mississippi River and on the St. Croix revealed a higher diversity of species, which generally increased as water quality increased. (AEC 1973)

In 2000 and 2001, MN DNR conducted a survey of mussels in the Mississippi National River and Recreation Area Corridor for the National Park Service (Kelner and Davis 2002). The southern-most reach of study sites was Upper Pool 3, defined from Lock and Dam 2 to approximately 9 river miles (14 km) upstream of PINGP 1 and 2. Among the areas studied, Upper Pool 3 was the most species-rich area of the survey, and second in overall mussel abundance – Upper Pool 2 had the highest abundance. The 2,486 mussels collected covered 23 species; the top three species were *O. relexa* (47.2 percent), *A. plicata* (25.0 percent), and *F. flava* (10.1 percent). A high number of empty shells were collected, indicating that the historic number of species was at least 37 species. The survey also found that 2.6 percent of native mussels in Upper Pool 3 were infested by zebra mussels (*Dreissena polymorpha*), the highest level of infestation in the study.

In 1988, the non-native zebra mussel made its first appearance in the United States, in Lake St. Clair near Detroit, Michigan. By 1990, the invasive bivalve had colonized in all the Great Lakes, and by 1992, established populations in many major rivers, including the Mississippi (Benson 2008). In the Upper Mississippi River System, adults or veligers (free-swimming larvae) have been identified as far upriver as Lock and Dam 1 (River Mile [RM] 848) (rkm 1365) by St. Paul, Minnesota and as far downriver as Lock and Dam 24, at Hannibal, Missouri (Tucker et al. 1993; MNDNR 2008i). Annual surveys of zebra mussel population densities conducted in the lower St. Croix River from 2005 through 2007 showed a dramatic increase in the relative abundance of zebra mussels at Prescott, located at the confluence of the Mississippi River and St. Croix River (RM 815, rkm 1312), about 11 mi (18 km) upriver from PINGP 1 and 2 (RM 797, rkm 1283). The density of zebra mussels increased over the three-year study from $72/m^2$ ($86/yd^2$) to $574/m^2$

(686/yd^2). Four miles upriver of Prescott on the St. Croix River at St. Croix Bluffs, the density of zebra mussels increased exponentially during this same period from 89/m^2 (106/yd^2) to 12,288/m^2 (14,696/yd^2) (NPS 2008b).

Zebra mussels are filter feeders and are one of the only freshwater mollusks capable of firmly attaching themselves to solid objects, using adhesive structures called byssal threads (WDNR 2004). They are often found in large numbers attached to various underwater objects, including boat hulls, pilings, pipes, rocks, other larger bivalves, and each other (USGS 2008). Females can produce up to one million eggs annually (MNDNR 2008i), and the fertilized eggs develop into larvae, or veligers. The veligers swim in the water column for one to five weeks and then begin to sink. The veligers then attach to a solid surface where they metamorphose to adult shape, grow, and eventually reproduce, often reaching reproductive maturity in the first year (WDNR 2004). Zebra mussels can live from three to nine years (USGS 2008).

At high densities zebra mussels can cause severe biofouling of water intake structures and irrigation systems and can cause severe ecological problems. Zebra mussels will frequently colonize the intake pipes of public water supply plants and the cooling water intake structures at power plants, and may reduce by two-thirds the diameter of the intake pipes, thereby constricting cooling water flow. In a USACE study, zebra mussels colonized upon native mussels at an average infestation rate of 5 to 58 zebra mussels per native mussel (NPS 2008b). At higher colonization densities zebra mussels can smother native mussels. Their filter feeding can effectively deplete the water column of suspended planktonic organisms used for food by other aquatic organisms, including fish and native mussels (WDNR 2004). Even though waterfowl and fish such as the common carp feed on zebra mussels (WDNR 2004; Tucker et al. 1996), once the zebra mussels have become established in a waterway, there is very little that can be done to control their numbers (WDNR 2004).

Preoperational monitoring (1969-1971) indicated that the composition of the fish population varied between the lower end of Pool 3 and upstream portion of Pool 4 (downstream of Lock and Dam 3), due to the difference in flow. Slow currents above the dam yielded a relatively stable, lake-like habitat, while downstream of Lock and Dam 3 exhibited a fast-water, riverine habitat. Rough (non-game) fish, such as common carp (*Cyprinus carpio*), and redhorse (*Moxostoma spp.*) made up about 66 percent of the species in Pool 3 and 87 percent of the species in Sturgeon Lake, with game species, including black crappie (*Pomoxis nigromaculatus*), white crappie (*P. annularis*), and white bass (*Morone americana*), making up the remaining species. Pool 4 had a much higher proportion of game fish, including walleye (*Stizostedion vitreum*) and sauger (*S. canadense*), and was considered a major spawning and rearing area for game fish, compared to Pool 3. (AEC 1973)

Sections 3169(a) and 316(b) of the CWA requires that the location, design, construction, and capacity of the cooling water intake structures reflect the best technology available (BTA) in order to minimizing adverse environmental impacts, specifically impingement and entrainment, to protect fish, shellfish, and other forms of aquatic life (33 USC 1326). Phase II of Section 316(b)'s implementing regulations applies to large existing electric generating plants, such as PINGP 1 and 2, that withdraw more than 50 million gallons of water per day (gpd; 6.7 million cubic feet per day [cfd]). The EPA implemented Phase II on July 9, 2004 (69 FR 41575). The new Phase II performance standards were designed to significantly reduce impingement mortality due to water withdrawals associated with cooling water intake structures used for power production and were to be implemented through the National Pollution Discharge Elimination System (NPDES) permitting process. The rule would require licensees to demonstrate compliance with Phase II performance standards upon renewal of their NPDES permit. To attain a renewed NPDES permit, licensees may have been required to alter their intake structure, redesign the cooling system, modify station operation, or take other mitigative measures to comply with the Phase II regulations.

However, EPA suspended the Phase II rule on July 9, 2007 (72 FR 37107) in response to the Second Circuit Court of Appeals decision in Riverkeeper, Inc. v. EPA, No. 04-6692. As a result, the EPA directed NPDES permit writers for Phase II facilities to develop technology-based permit conditions on a case-by-case basis using all reasonably available and relevant data and Best Professional Judgement (BPJ) as to the BTA.

PINGP 1 and 2 conducted monitoring as a requirement of Sections 316(a) and 316(b) of the Clean Water Act. Gizzard shad (*Dorosoma cepedianum*), white bass, freshwater drum (*Aplodinotus grunniens*), and common carp made up over half the fish collected between 1973 and 1976 (NMC 2008). In later years (1988-2006), the relative abundance of eight species (carp, white bass, freshwater drum, sauger, black crappie, shorthead redhorse [*Moxostoma macrolepidotum*], walleye, and gizzard shad) ranged from 69 to 89 percent of all fish caught each year (ESWQD 2005). The status of eight species (carp, white bass, freshwater drum, sauger, shorthead redhorse, walleye, gizzard shad, smallmouth bass [*Micropterus dolomieui*], and largemouth bass [*Micropterus salmoides*]) is discussed in each annual environmental monitoring report. Each of these eight species was considered "relatively stable" in the last available annual report (ESWQD 2005).

The Minnesota Department of Health (MDH) has published fish consumption guidelines for the general public and for sensitive groups, defined as women who are or may become pregnant and children under the age of 15, due to the presence of mercury, PCBs, and perfluorooctanesulfonic acid (PFOS). For Pool 3, from Hastings Dam to Red Wing, MDH recommends no more than one meal per week of bluegill sunfish (*Lepomis macrochirus*), crappie, (*Pomoxis* spp.), flathead catfish (*Pylodictis olivaris*), freshwater drum, largemouth bass, northern pike (*Esox lucius*), sauger, smallmouth bass, walleye for both the general public and sensitive groups. Additionally, for sensitive groups, flathead catfish larger than 20 in. should not be eaten more than once a month. MDH recommends both the general public and sensitive groups eat no more than one meal per month of buffalofish (*Ictiobus* spp.), carp (Cyprinidae), channel catfish (*Ictalurus punctatus*), and white bass. (MDH 2008a; MDH 2008b)

2.2.6 Terrestrial Resources

The 578-ac (234-ha) PINGP 1 and 2 site is located on the west bank of the Mississippi River on a low island terrace of the Mississippi River floodplain. This region is characterized by prairie land, bluffs, and stream valleys that range from 500 to 600 ft (150 to 180 m) in depth (MNDNR 2006b). The PINGP 1 and 2 site is composed of flat to slightly rolling topography (NMC 2008). The Vermillion River lies to the west of Prairie Island, and the Mississippi River lies to the east.

Approximately 60 ac (24 ha) of the PINGP 1 and 2 site contain the generating facility, associated buildings, parking lots, and roads (NMC 2008). An additional 180 ac (73 ha) of previously disturbed land has been converted to maintained grassy areas or prairie grassland habitat (NMC 2008). The remaining 338 ac (137 ha) consist of wooded areas characteristic of eastern broadleaf forests (NMC 2008). Vegetation varies by type of habitat found on the PINGP 1 and 2 site, which includes floodplain, flat uplands, north-facing slopes, and south-facing slopes. White oak (*Quercus alba*), red oak (*Q. rubra*), black oak (*Q. velutina*), bitternut hickory (*Juglans cinerea*), and shagbark hickory (*Carya ovata*) comprise the dominant species in oak-hickory forests of eastern broadleaf habitat (USFS Undated). Additionally, the FES (AEC 1973) for PINGP 1 and 2 also noted the presence of silver maple (*Acer saccharinum*), cottonwood (*Populus deltoids*), and green ash (*Fraxinus pennsylvanica*) within floodplain areas; burr oak (*Q. marcrocarpa*), pin oak (*Q. ellipsaidalis*), and eastern red cedar (*Juniperus virginiana*) within flat uplands; sugar maple (*A. saccarum*), American basswood (*Tilia americana*), paper birch (*Betula paprifera*), ironwood (*Carpinus caroliniana*), and black walnut (*Juglans nigra*) on north-facing valley slopes; and trembling aspen (*P. tremuloides*) and bitternut hickory (*Carya cordiformis*) on south-facing slopes (AEC 1973; NMC 2008). Major shrub species that occur within a 10-mi (16-km) radius of PINGP 1 and 2 include bittersweet (*Celastrus scandens*), red-osier dogwood (*Cornus stolonifera*), river grape (*Vitis riparia*), red raspberry (*Rubusindaeus* spp.), Virginia creeper (*Parthenocissus quinquefolia*), and prickly ash (*Xanthoxylum americanum*) (AEC 1973).

The PINGP 1 and 2 site contains and is surrounded by freshwater emergent wetland and freshwater forested/shrub wetland habitat, as indicated by the U.S. Fish and Wildlife (FWS) National Wetlands Inventory database (FWS 2008c). Though these areas remain undisturbed, no wetlands on or near the PINGP 1 and 2 site have been officially delineated.

A variety of wildlife is found in the forested and grassland communities on and in the vicinity of the PINGP 1 and 2 site. The small fragmented forest tracts in the northern portion of the site provide habitat for small mammals such as raccoons (*Procyon lotor*), gray squirrels (*Sciurus carolinensis*), and fox squirrels (*S. niger*) as well as birds such as wood warblers, thrushes, woodpeckers, kinglets and hawks (NMC 2008). Larger spans of wooded areas found on the southern portion contain sloughs and lakes, which support salamanders, frogs, and other amphibians as well as birds, including numerous duck species and wading birds (AEC 1973; NMC 2008).

The Mississippi River Valley is a major North American migratory flyway. Approximately 40 percent of migratory birds and waterfowl in the U.S. use the flyway as their primary migration corridor (NPS 2006a). Migrating birds commonly observed on and in the vicinity of the PINPG site include herons, hawks, plovers, terns, flycatchers, nuthatches, wrens, thrushes, shrikes, warblers, and blackbirds (AEC 1973; NMC 2008). Additionally, the FES for PINGP 1 and 2 noted a number of bird species that have been recorded to nest within 10 mi (16 km) of the site, which included wading birds such as great blue herons (*Ardea herodias*) and green herons (*Butorides virescens*); raptors such as Cooper's hawks (*Accipiter cooperii*), red-tailed hawks (*Buteo jamaicensis*), northern harriers (*Circus cyaneus*), great horned owls (*Bubo virginianus*), and barred owls (*Strix varia*); and songbirds such as black-capped chickadees (*Poecile atricapillus*), wrens, thrushes, cedar waxwings (*Bombycilla cedrorum*), belted kingfishers (*Megaceryle alcyon*), horned larks (*Eremophila alpestris*), and whip-poor-wills (*Caprimulgus vociferous*) (AEC 1973). More detailed listings of migratory bird species and nesting bird species recorded to be common to the PINGP 1 and 2 site can be found in Appendix A of the FES for PINGP 1 and 2 (AEC 1973).

Purple loosestrife (*Lythrum salicaria*), a perennial herb, is the only terrestrial invasive species that has been documented on the PINGP 1 and 2 site. The plant is native throughout Europe and Asia and was introduced to the U.S. in the 1800s (PCA 2006). Purple loosestrife can invade wetland areas and outcompete native grasses and sedges to form dense stands (PCA 2006). NSP does not manage purple loosestrife populations as the species has not been found to interfere with any intake structures or operation of the facility.

The Mississippi National River and Recreation Area corridor lies about 20 mi (32 km) northwest of the PINGP 1 and 2 site and spans 72 mi (116 km) of the Mississippi River from Hastings, Minnesota to Ramsey, Minnesota (NMS 2008; NPS 2006b). The corridor encompasses part of the Mississippi flyway and provides habitat for more than 50 species of mammals, 270 species of birds, 150 species of fish, and 25 species of mussels (NPS 2006a). More than a dozen pairs of bald eagles (*Haliaeetus leucocephalus*) nest within the corridor, and several heron, egret, and cormorant rookeries exist along the river as well (NPS 2006a). The corridor contains a variety of eastern deciduous forest and tall grass prairie communities, which include floodplain forest, upland prairie, maple-basswood forest, oak-savanna, dry oak forest, mesic oak forest, brushland, wetland, wet meadows, and fens (NPS 2006c).

The Upper Mississippi River National Wildlife and Fish Refuge lies about 30 mi (48 km) southeast of the PINGP 1 and 2 site and spans 261 mi (420 km) of the Mississippi River and 240,220 ac (97,213 ha) of land beginning at the confluence of the Chippewa River near Wabasha, Minnesota and continuing to Rock Island, Illinois (FWS Undated a; Undated b). The refuge encompasses part of the Mississippi flyway and constitutes the largest river refuge in the continental United States (FWS Undated b). The refuge contains 167 known bald eagle nests and 5,000 blue heron (*Ardea herodias*) and great white egret (*Ardea alba*) nests in 15 colonies as well as over 48,000 ac (19,400 ha) of marsh habitat (FWS Undated a). The FWS focuses on restoration of riverine habitat and native grass prairie, bank stabilization, island building, and bird and waterfowl nest counts and surveys in their management of the refuge (FWS Undated b).

PINGP 1 and 2-associated transmission lines cross five wildlife refuges, wildlife management areas, and parks. The Red Rock 2 line crosses Gores Pool #3 Wildlife Management Area, a 6449-ac (2610-ha) area in Goodhue County that consists of floodplain forest and backwater marshes and contains a migratory bird refuge; Lost Valley Scientific and Natural Area, a 200-ac (81-ha) bluff prairie in Washington County that is one of the few sites in the state containing rock sandwort (*Minuartia michauxii*); and the northern part of Cottage Grove Ravine Regional Park in Washington County (MNDNR 2008c; MNDNR 2008h; NMC 2008). The Blue Lake line crosses the Black Dog Unit of the Minnesota Valley National Wildlife Refuge and the Savage Fen Scientific and Natural Area, a 43-ac (17-ha) area in Scott County that consists of a unique wetland plant community that grows on moist peat substrate and is sensitive to disturbance (MNDNR 2008e; NMC 2008).

2.2.7 Threatened and Endangered Species

Tables 2-11 and 2-12 lists threatened, endangered, or candidate species known to occur in Goodhue County, in which PINGP 1 and 2 is located, or Dakota, Washington, or Scott Counties, through which transmission line ROWs associated with PINGP 1 and 2 traverse. Table 2-11 also includes any aquatic species listed in Pierce County, WI, which lies on the opposing shore of the Mississippi River from PINGP 1 and 2.

2.2.7.1 *Aquatic Species*

<u>Higgins eye pearlymussel</u>

The Higgins eye pearlymussel was Federally listed as an endangered species on June 14, 1976 (41 FR 24064). The Higgins eye was never abundant, although the historical range is not completely known. It is currently found in the Upper Mississippi River above Lock and Dam 19, in the St. Croix, Wisconsin, and Rock Rivers, an estimated 50 percent from the historical range (FWS 2000a).

Preferring medium to large rivers with firm substrate ranging from sand to boulders, the Higgins eye are typically found in large, stable, species-diverse mussel beds (FWS 2000a; 2004a). Current velocities typical of Higgins eye habitat range from 0.5 to 1.5 fps (1.5 to 4.5 cm/s), and depths range from 3.3 to 19.7 ft (1-6 m) (FWS 2000a). Although no critical habitat is listed for the species, 10 Essential Habitat Areas (EHAs) have been designated for the Higgins eye: six in the Mississippi River, three in the St. Croix River, and one in the Wisconsin River (FWS 2004a). The closest EHA to PINGP 1 and 2 is in the St. Croix river, just upstream of the junction with the Mississippi River, near Prescott, Wisconsin (FWS 2004a).

To reproduce, male Higgins eyes release sperm into the water. As the females siphon water for food, they also take in the sperm to fertilize eggs in gill sacs (marsupia), where the fertilized eggs mature into glochidia, a larval stage. The ribbon-like mantle edge near the posterior of the female acts as a lure to attract fish; when the fish attack the mantle, glochidia are released into the water and attach to the gills of the host fish. If the glochidia successfully attach to fish gills, they can mature into juvenile mussels (typically 3 weeks), excyst from the gills, settle to suitable substrate, and mature into adults. Some studies suggest glochidia remain in the marsupia through winter and are released in spring or summer. (FWS 2000a; FWS 2004a)

Suitable fish hosts for the glochidia of the Higgins eye pearlymussel include freshwater drum (*Aplodinotus grunniens*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca falvescens*), sauger (*Stizostedion canadense*), and walleye (*Stizostedion vitreum vitreum*); marginal fish hosts include northern pike (*Esox lucius*), bluegill (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*) (FWS 2004a).

Currently, the major threat to the Higgins eye pearlymussel, like most other native mussels in the Upper Mississippi River, is the invasion of the zebra mussel. As described in Section 2.2.5, zebra mussels compete for food and space, and even colonize on native mussels. The subfamily Lampsilinae (to which the Higgins eye belongs) is one of the most sensitive groups of mussels to zebra muscles (FWS 2000a). Researchers have not developed effective and practical measures to control zebra populations without harming native aquatic organisms (WDNR 2004).

The creation of the lock and dam system in the Upper Mississippi River has resulted in pools replacing once-flowing water, and species of fish that serve as hosts to native mussel species are now restricted in their movements. In the case of the Higgins eye, it is possible that the damming of the Mississippi led to higher populations of the species in some pools, given the species' propensity towards low velocity waters. However, some observations state that the population of Higgins eye has decreased since impoundment in other pools, possibly due to conditions such as increased sedimentation. Therefore it is uncertain how the changes to the Mississippi River have affected the Higgins eye populations. (FWS 2000a)

Other activities, such as dredging, the disposal of dredged material, channelization, and commercial navigation are all threats to the survival of native mussel species, including Higgins eye pearlymussel. There are few documented reports of the commercial harvest of Higgins eye. (FWS 2000a)

In 1993, the USACE began a consultation with the FWS under Section 7 of the Endangered Species Act of 1973 (ESA) for a project, the operation and maintenance of the 9-foot Navigation Project on the Upper Mississippi River. The Higgins eye pearlymussel was included in this consultation. In 2000, FWS issued a Biological Opinion (BO) (FWS 2000a), with a jeopardy determination for the Higgins eye. In the BO, FWS provided reasonable and prudent alternatives to allow for the project while offsetting adverse impacts to the species involved, including the alternative that USACE develop a Higgins' eye pearlymussel relocation action plan, as well as conduct a study to control the spread of zebra mussels.

In 2002, USACE, in cooperation with the Mussel Coordination Team, an interagency team of biologists, issued a definite project report and environmental assessment for a relocation plan for the Higgins eye (USACE 2002), with a proposal to establish five new populations of the Higgins eye by moving adults from zebra mussel-infested areas into sections of the river that had no or low levels of zebra mussels, as well as raising juvenile mussels at hatcheries and stocking areas of the river (USACE 2002).

A team including FWS, USACE, and the Mussel Coordination Team, selected an area within Pool 3, 0.5 mi (0.8 km) upstream of the PINGP 1 and 2 intake structure for one of the relocation sties. In the 2002 environmental assessment (USACE 2002), the USACE states that this site had shown good recovery of mussels after the relocation of 100 adult Higgins eye by MNDNR, WDNR, and FWS. In addition, the location was identified as a good relocation site based on the 2000 Minnesota 305(b) water quality status report, which listed Pool 3 as "full support" for aquatic life (USACE 2002). Over 4000 sub-adults have been relocated to the Sturgeon Lake section of Pool 3, as of the 2005 Status Report (Mussel Coordination Team 2005). The Mussel Coordination Team (2005) reported "good recovery" for Pool 3 subadults after conducting monitoring in 2003. Other sites have not had as positive results, such as Pool 4 (just downstream of Lock and Dam 3, in which only 5 percent of the mussels were recovered; predation by carp could be the cause of the low success of the Pool 4 population (Mussel Coordination Team 2005).

Winged mapleleaf

The winged mapleleaf (*Quadrula fragosa*) is Federally listed as an endangered species. Historically found in 34 rivers and 12 states, the winged mapleleaf has been limited to one population that is known to be reproducing, on a 12.4-mi stretch of the St. Croix River, 44 river miles upstream of the confluence with the Mississippi (FWS 2000a). Additionally, there are populations in the Ouachita and Saline Rivers of Arkansas and the Bourbeuse River in Missouri (FWS 2004b). The FWS lists the winged mapleleaf as endangered within Washington County. It is also state-listed as endangered by Minnesota in Dakota and Washington Counties (counties crossed by PINGP 1 and 2 transmission lines), and by Wisconsin in Pierce County (the county located across the Mississippi River from PINGP 1 and 2) (FWS 2008d; MNDNR 2008b; WDNR 2008). The winged mapleleaf is not known to be present in the vicinity of PINGP 1 and 2 or associated transmission line ROWs.

Spectaclecase and Sheepnose

The spectaclecase (*Cumberlandia monodonta*) and sheepnose (*Plethobasus cyphyus*) are considered candidates for listing by FWS. In Minnesota, populations of spectaclecase exist in the Mississippi and St. Croix Rivers and Rush Creek; populations of sheepnose (also called bullhead) occur in the Mississippi and St. Croix Rivers (FWS 2002a; 2002b). Neither species of mussel is known to be present in the vicinity of PINGP 1 and 2 or associated transmission line ROWs.

Paddlefish

The paddlefish (*Polyodon spathula*) is state-listed by both Minnesota and Wisconsin as threatened. Reaching weights of 50 lb (23 kg) in Minnesota, topping 150 lb (68 kg) farther south, the paddlefish feeds on plankton, is found in larger rivers and river lakes, and migrates into streams to spawn (Phillips et al. 1982). Human activities including water pollution, channelization, dredging, damming rivers, and over-fishing have reduced the numbers of paddlefish in the Mississippi River drainage (Schmidt 2004). Sturgeon Lake once provided habitat for the paddlefish, but sediment deposition reduced the suitability of the area for the fish (Schmidt Undated). However, individuals are occasionally found in the vicinity of PINGP 1 and 2 by Xcel Energy biologists.

Mucket, Butterfly, and Washboard

The mussels mucket (*Actinonaias ligamentina*), butterfly (*Ellipsaria lineolata*), and washboard (*Megalonaias nervosa*) are all Minnesota state-listed as threatened (MNDNR 2008b); Wisconsin lists the butterfly as endangered, and washboard as a species of special concern (WDNR 2008). The threats to these species are typical of the threats to mussels in the Mississippi, including impoundment, dredging, and zebra mussel infestation. All three have been found in the vicinity of the PINGP 1 and 2 site.

Table 2-11. Listed Aquatic Species. *The species below are Federally listed, Minnesota-listed, and/or Wisconsin-listed as threatened, endangered, or candidate species. These species may occur on the PINGP 1 and 2 site, within the Upper Mississippi River Basin, or within the transmission line rights-of-way.*

Scientific Name	Common Name(a)	Federal Status(b)	State Status(c)
Fish			
Acipenser fulvescens	lake sturgeon	-	MSC; WSC
Alosa chrysochloris	skipjack herring	-	MSC; WE
Ammocrypta asprella	crystal darter	-	MSC; WE
Anguilla rostrata	American eel	-	WSC
Clinostomus elongatus	redside dace	-	WSC
Cycleptus elongatus	blue sucker	-	MSC; WT
Etheostoma asprigene	mud darter	-	WSC
Etheostoma clarum	western sand darter	-	WSC
Fundulus diaphanus	banded killifish	-	WSC
Hiodon alosoides	goldeye	-	WE
Ictiobus niger	black buffalo	-	MSC; WT
Macrhybopsis aestivalis	shoal chub	-	WT
Macrhybopsi storeiana	silver chub	-	WSC
Moxostoma carinatum	river redhorse	-	WT
Notropis amnis	pallid shiner	-	MSC; WE
Notropis texanus	weed shiner	-	WSC
Opsopoeodus emiliae	pugnose minnow	-	WSC
Polyodon spathula	paddlefish	-	MT; WT
Mussels			
Actinonaias ligamentina	mucket	-	MT

Scientific Name	Common Name(a)	Federal Status(b)	State Status(c)
Alasmidonta marginata	elktoe	-	MT; WSC
Arcidens confragosus	rock pocketbook	-	ME; WT
Cumberlandia monodonta	spectaclecase	C	MT; WE
Cyclonaias tuberculata	purple wartyback	-	MT; WE
Ellipsaria lineolata	butterfly	-	MT; WE
Elliptio crassidens	elephant-ear	-	ME; WE
Elliptio dilatata	spike	-	MSC
Epioblasma triquetra	snuffbox	-	MT; WE
Fusconaia ebena	ebonyshell	-	ME; WE
Lampsilis higginsi	Higgins eye	E	ME; WE
Lampsilis teres	yellow/slough sandshell	-	ME; WE
Lasmigona costata	fluted-shell	-	MSC
Ligumia recta	black sandshell	-	MSC
Megalonaias nervosa	washboard	-	MT; WSC
Obovaria olivaria	hickory nut	-	MSC
Plethobasus cyphyus	sheepnose (bullhead)	C	ME; WE
Pleurobema sintoxia (formerly P. coccineu)	round pigtoe	-	MT; WSC
Quadrula fragosa	winged mapleleaf	E	ME; WE
Quadrula metanevra	monkeyface	-	MT; WT
Quadrula nodulata	wartyback	-	ME
Tritogonia verrucosa	pistolgrip (buckhorn)	-	MT; WT

(a) Common names indicated by parentheses are those listed by the Wisconsin Department of Natural Resources

(b) C = Candidate; E = Federally endangered; T = Federally threatened; - = No listing

(c) ME = Minnesota endangered; MT = Minnesota threatened; MSC = Minnesota species of concern; WE = Wisconsin endangered; WT = Wisconsin threatened; WSC = Wisconsin species of concern

Sources: FWS 2008a; MNDNR 2008b; NMC 2008; WDNR 2008

2.2.7.2 *Terrestrial Species*

Two Federally listed species, the dwarf trout lily (*Erythronium propullans*) and the prairie bush clover (*Lespedeza leptostachya*), potentially occur on or in the vicinity of the PINGP 1 and 2 site or along the in-scope transmission line ROWs. One state-listed species, the peregrine falcon (*Falco peregrinus*), is known to occur in the vicinity of PINGP 1 and 2.

Dwarf Trout Lily

The dwarf trout lily is Federally and Minnesota State-listed as endangered. The species is a spring ephemeral wildflower endemic to Minnesota and only occurs in Rice, Goodhue, and Steele Counties within the Straight, Cannon, Little Cannon, and North Fork Zumbro Rivers and Prairie Creek (FWS 2008c; Sather 1990a). Dwarf trout lily is found on north-facing slopes of maple- and basswood-dominated forests as well as elm- and cottonwood-dominated floodplains (FWS 2008c). Leaves are tapered and slightly mottled in color, and small, pale pink, four- to six-petal flowers are sparsely dispersed (Sather 1990a). The plant's rarity is attributed to its slow rate of reproduction as only a small percentage (one-tenth) of plants produce flowers each spring (Sather 1990a). The species generally reproduces vegetatively by putting out underground runners that bear new bulbs (Sather 1990a; FWS 2008c). Neither the FWS nor the MNDNR listed this species as present on or in the vicinity of the PINGP 1 and 2 site in their correspondence with the NRC regarding the proposed license renewal of PINPG (FWS 2008b; MNDNR 2008b).

Prairie Bush Clover

The prairie bush clover is Federally and Minnesota State-listed as threatened. The species is a slender-leaved legume in the pea family with pink to cream flowers that bloom in July (Sather 1990b). The prairie bush clover is endemic to the Midwest and only occurs in Minnesota, Wisconsin, Iowa, and Illinois tall-grass prairie habitat within the upper Mississippi River Valley (FWS 2000b). In 1990, about 100 known prairie bush clover sites existed, and by 2000, fewer than 40 known sites remained (FWS 2000b; Sather 1990b). Loss of prairie habitat is attributed to this species' decline (FWS 2000b). Neither the FWS or MNDNR listed this species as present on or in the vicinity of the PINGP 1 and 2 site in their correspondence with the NRC regarding the proposed license renewal of PINPG (FWS 2008b; MNDNR 2008b).

Peregrine Falcon

The peregrine falcon was removed from Federal listing in August 1999 but continues to be threatened at the State level. Adult birds have a bluish-black head and wings, are 14 to 19 in. (36 to 48 cm) tall, and have a wingspan of 39 to 43 in. (99 to 109 cm) (Cornell 2003). Peregrine falcons nest from April to July on high cliffs and bluffs and on tall city buildings along the North Shore of Lake Superior and the Mississippi River in the southeastern portion of the State (MNDNR 2008d). Females lay 2 to 5 eggs, which hatch in 28 to 29 days, and young leave the nest within 6 to 9 weeks of hatching (MNDNR 2008d). Peregrine falcons prey on ducks, pigeons, and other birds as well as small mammals and insects (MNDNR 2008d). Approximately 36 breeding pairs nest in Minnesota (MNDNR 2008d).

The PINGP 1 and 2, Unit 1, containment building has a nest box, in which a breeding pair has nested consistently since 1997 (NMC 2008). The pair is usually first observed in March, and young fledge by July; NSP has recorded 31 falcons that have fledged since 1997 (NMC 2008). NSP has designated staff members to monitor the peregrine falcons on site in conjunction with the MNDNR and the University of Minnesota Raptor Center. NSP educates its staff members on the falcons to ensure the safety of the birds in the event that specialists would need to be notified, such as if a fledgling fell from the nest and required veterinary care.

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a species of special concern in the State of Minnesota. Bald eagles mature at 4 to 5 years of age and average 8 to 9 lbs (kg) for males and 10 to 14 lbs (kg) for females with a 6 to 7.5 ft (m) wingspan (MNDNR 2008a). The FWS formally removed the bald eagles from the Federal List of Endangered and Threatened Wildlife effective August 8, 2007 though the species continues to be protected under the Bald and Gold Eagle Protection Act and the Migratory Bird Treaty Act (72 FR 37346). Two bald eagle nests are known to occur near the PINGP 1 and 2 site, though no bald eagle nests have been observed on PINGP 1 and 2 property (NMC 2008). A nest is located on the Vermillion River just south of the PINGP 1 and 2 site, and a nest is located approximately 2 mi (km) upstream of Lock and Dam 3 on the Mississippi River (NMC 2008). The Minnesota population continues to grow. According to statewide bald eagle surveys conducted by MNDNR in conjunction with the FWS and USGS, a 28 percent increase in active nests was observed between 2000 and 2005 (MNDNR 2006a).

Trumpeter Swan

The trumpeter swan (*Cygnus buccinator*) is migratory bird that is Minnesota State-listed as threatened. Adult trumpeter swans have white plumage and black bills and feet. Adults are 4 to 5 ft (m) tall, have a wingspan up to 8 ft (m), and weigh 20 to 30 lbs (kg) (MNDNR 2008f). Swans nest in marshy areas beginning at 3 to 4 years of age, and females lay clutches of 5 to 7 eggs in late April, which hatch within 33 to 37 days (MNDNR 2008f). Young swans generally fly at 14 to 17 weeks of age (MNDNR 2008f). The MNDNR Nongame Wildlife Program has been involved in restoration efforts of the Minnesota flock since the 1980s, and the population has gone from virtually extinct to more than 2000 individuals as of 2004 (MNDNR 2008g). The MNDNR did not list this species as prescent on or in the vicinity of the PINGP 1 and 2 site in their correspondence with the NRC regarding the proposed renewal of PINGP 1 and 2 (MNDNR 2008b).

Table 2-12. Listed Terrestrial Species. *The species below are Federally listed, Minnesota-listed, or both, as threatened, endangered, or candidate species. These species may occur on the PINGP 1 and 2 site, within the Mississippi River, or within the transmission line ROWs.*

Scientific Name	Common Name	Federal Status(a)	State Status(b)	Habitat
Reptiles and Amphibians				
Acris crepitans	northern cricket frog	-	ME	ponds and streams with submerged vegetation
Clemmys insculpta	wood turtle	-	MT	large rivers with sandy substrate
Coluber constrictor	blue racer	-	MSC	riparian areas; swamps
Crotalus horridus	timber rattlesnake	-	MT	forested areas; swamps
Emydoidea blandingii	Blanding's turtle	-	MT	shallow ponds; marshes; swamps
Pituophis catenifer	gopher snake	-	MSC	woodlands; agricultural areas; prairie

Scientific Name	Common Name	Federal Status(a)	State Status(b)	Habitat
Insects				
Aflexia rubranura	red tailed prairie leafhopper	-	MSC	mesic prairie
Speyeria idalia	regal fritillary	-	MSC	tall-grass prairie; meadows; floodplain forest edges
Birds				
Buteo lineatus	red-shouldered hawk	-	MSC	deciduous and deciduous-conifer forest; swamps
Cygnus buccinator	trumpeter swan	-	MT	prairie; marshes; shallow lakes
Dendroica cerulea	cerulean warbler	-	MSC	old-growth deciduous floodplain forest
Falco peregrinus	peregrine falcon	-	MT	grasslands; meadowlands
Haliaeetus leucocephalus	bald eagle	DL	MSC	forested areas near open water
Lanius ludovicianus	loggerhead shrike	-	MT	thicketed areas; meadows bordered by trees
Sterna forsteri	Forster's tern	-	MSC	marshes
Wilsonia citrina	hooded warbler	-	MSC	heavily forested areas
Mammals				
Perognathus flavescens	plains pocket mouse	-	MSC	sparsely vegetated areas
Plants				
Agalinis auriculata	eared false foxglove	-	ME	mesic tall-grass prairie
Aristida tuberculosa	sea-beach needlegrass	-	MSC	prairie
Arnoglossum plantagineum	tuberous Indian-plantain	-	MT	prairie
Asclepias amplexicaulis	clasping milkweed	-	MSC	prairie; sand barrens
Asclepias sullivantii	sullivant's milkweed	-	MT	prairie; sedge meadows
Besseya bullii	kitten-tail	-	MT	prairie
Botrychium oneidense	blunt-lobed grapefern	-	ME	moist, acidic woods; swamps

Scientific Name	Common Name	Federal Status(a)	State Status(b)	Habitat
Botrychium rugulosum	St. Lawerence grapefern	-	MT	open fields; secondary forests
Carex sterilis	sterile sedge	-	MT	lowland forest
Cirsium hillii	Hill's thistle	-	MSC	prairie
Cladium mariscoides	twig-rush	-	MSC	sand dunes
Cristatella jamesii	James' polanisia	-	ME	river banks; prairie
Cypripedium candidum	small white Lady's-slipper	-	MSC	lowland forest; prairie
Eleocharis rostellata	beaked spike-rush	-	MT	wet fens; shores
Eryngium yuccifolium	rattlesnake-master	-	MSC	prairie
Erythronium propullans	dwarf trout lily	E	ME	deciduous forest floodplains
Hudsonia tomentosa	beach-heather	-	MSC	sand barrens
Juniperus horizontalis	creeping juniper	-	MSC	cliffs; sand barrens; sand dunes
Lespedeza leptostachya	prairie bush clover	T	MT	prairie
Lesquerella ludoviciana	bladder pod	-	ME	coastal bluffs; prairie
Minuartia dawsonensis	rock sandwort	-	MSC	disturbed slopes; mesic forest openings; prairie
Oenothera rhombipetala	rhombic-petaled evening primrose	-	MSC	prairie; sand barrens
Opuntia macrorhiza	plains prickly pear	-	MSC	grassy woodlands; coniferous forests
Orobanche fasciculata	clustered broomrape	-	MSC	prairie
Panax quinquefolius	American ginseng	-	MSC	upland forests
Rhynchospora capillacea	hair-like beak-rush	-	MT	sand dunes
Scirpus clintonii	Clinton's bulrush	-	MSC	open forested areas; wetlands
Scleria verticillata	whorled nut-rush	-	MT	marshes; bogs
Trillium nivale	snow trillium	-	MSC	forested areas; floodplain

Scientific Name	Common Name	Federal Status(a)	State Status(b)	Habitat
				riverbanks
Valeriana edulis ciliata	valerian	-	MT	lowland forest; prairie

(a) DL = Delisted; E = Federally endangered; T = Federally threatened; - = No listing
(b) ME = Minnesota endangered; MT = Minnesota threatened; MSC = Minnesota species of concern
Sources: FWS 2008a; MNDNR 2008b; NMC 2008

2.2.8 Socioeconomic Factors

This section describes current socioeconomic factors that have the potential to be directly or indirectly affected by changes in PINGP 1 and 2 operations. PINGP 1 and 2 and the communities that support it can be described as a dynamic socioeconomic system. The communities provide the people, goods, and services required to operate PINGP 1 and 2. PINGP 1 and 2 operations, in turn, create the demand and pay for the people, goods, and services in the form of wages, salaries, and benefits for jobs and dollar expenditures for goods and services. The measure of the communities' ability to support the demands of PINGP 1 and 2 depends on their ability to respond to changing environmental, social, economic, and demographic conditions.

The socioeconomics region of influence (ROI) is defined as the areas in which PINGP 1 and 2 employees and their families reside, spend their income, and use their benefits, thereby affecting the economic conditions of the region. The PINGP 1 and 2 ROI consists of a three-county area (Goodhue and Dakota Counties in Minnesota and Pierce County in Wisconsin)

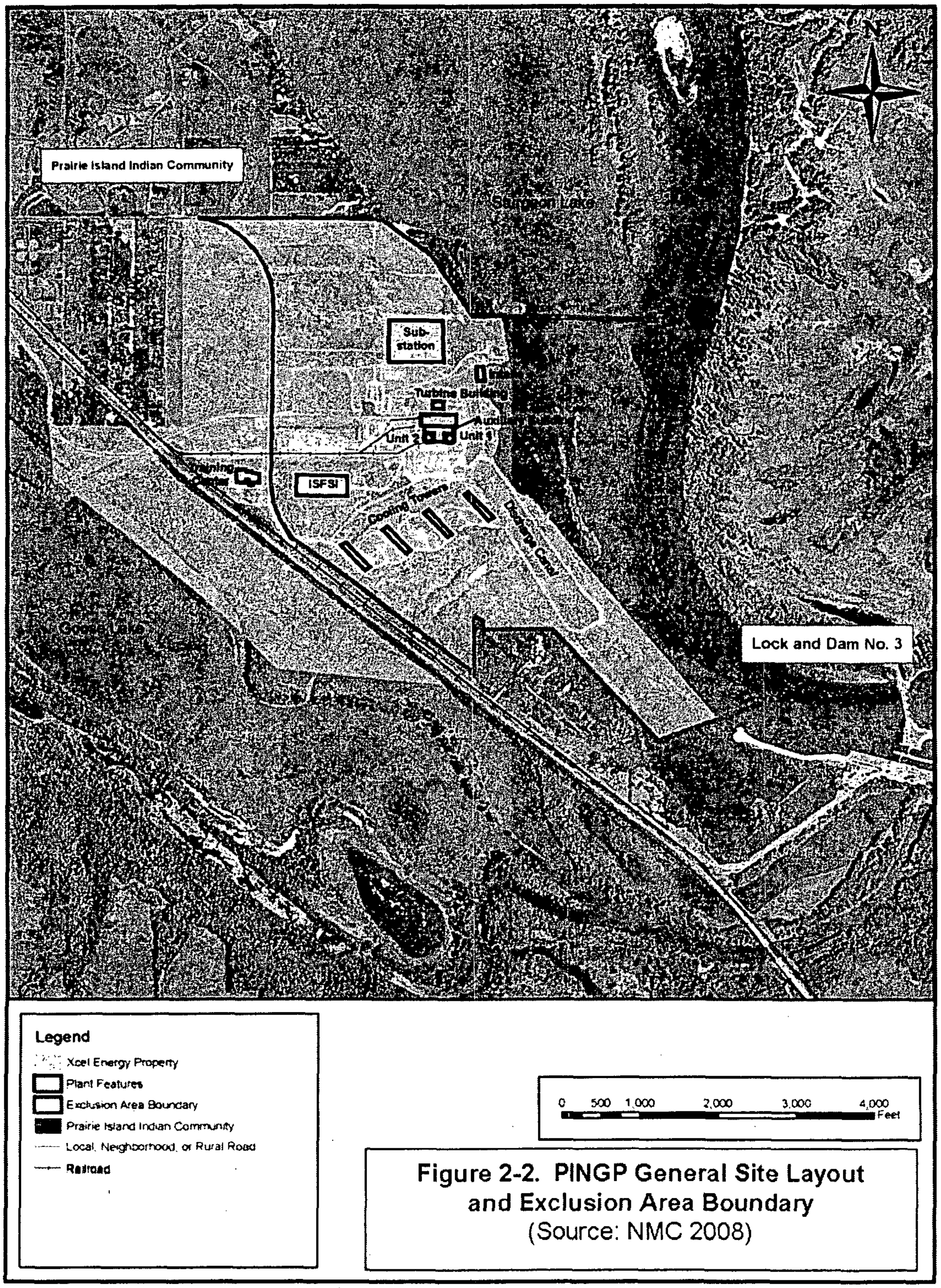


Figure 2-2. PINGP General Site Layout and Exclusion Area Boundary
(Source: NMC 2008)

where approximately 83 percent of PINGP 1 and 2 employees reside as well as the PIIC. The following sections describe the housing, public services, offsite land use, visual aesthetics and noise, population demography, and economy in PINGP 1 and 2's ROI.

NSP employs a permanent workforce of approximately 685 employees (NMC 2008). Approximately 83 percent live in Goodhue County and Dakota County, Minnesota, and Pierce County, Wisconsin (Table 2.13). The remaining 17.2 percent of the workforce are divided among 21 counties in Minnesota and Wisconsin with numbers ranging from 1 to 47 employees per county. Given the residential locations of PINGP 1 and 2 employees, the most significant impacts of plant operations are likely to occur in Goodhue County, Dakota County, and Pierce County. Therefore, the socioeconomic impact analysis in this SEIS will focus on the impacts of PINGP 1 and 2 on these three counties.

Table 2-13. PINGP 1 and 2 Employee Residence by County

County	Number of Employees	Percentage of Total
Goodhue, MN	329	48
Dakota, MN	139	20
Pierce, WI	99	15
Other	118	17
Total	685	100

Source: NMC 2008

Refueling outages at PINGP 1 and 2 generally occur at 20-month intervals. During refueling outages, site employment increases by as many as 925 workers for approximately 45 to 90 days (NMC 2008). Most of these workers are assumed to be located in the same geographic areas as the permanent PINGP 1 and 2 staff.

2.2.8.2 *Housing*

Table 2.14 lists the total number of occupied and vacant housing units, vacancy rates, and median value in the three-county ROI. According to the 2000 Census, there were over 165,000 housing units in the socioeconomic region, of which approximately 161,000 were occupied. The median value of owner-occupied units ranged from $116,000 in Goodhue County to $152,400 in Dakota County. Goodhue County has the highest vacancy rate (5.0 percent), followed by Pierce County (3.5 percent), and then Dakota County (1.9 percent). (USCB 2000)

By 2007, the estimated number of housing units within the three counties grew by approximately 14.2 percent. In Goodhue County, the number of housing units grew by 10.9 percent to an estimated 19,830 units. In Dakota County the number of housing units grew by 14.6 percent to an estimated 153,326 units. In Pierce County, the number of housing units grew by 13.8 percent to an estimated 15,354 units. (USCB 2007)

Table 2-14. Housing in Goodhue County and Dakota Counties, Minnesota, and Pierce County, Wisconsin

	Goodhue	Dakota	Pierce	Region
2000				
Total	17,879	133,750	13,493	165,122
Occupied housing units	16,983	131,151	13,015	161,149
Vacant units	896	2,599	478	3,973
Vacancy rate (percent)	5.0	1.9	3.5	2.4
Median value (dollars)	116,000	152,400	123,100	130,500
2007[a]				
Total	19,830	153,326	15,354	188,510
Occupied units	18,438	146,728	14,706	179,872
Vacant units	1,392	6,598	648	8,638
Vacany rate (percent)	7.0	4.3	4.2	4.6
Median value (dollars)	192,100	246,800	203,600	214,167

[a]Housing values for 2007 are estimates based on 2005-2007 American Community Survey 3-Year Estimates, U.S. Census Bureau

Sources: USCB 2000; USCB 2007

2.2.8.3 *Public Services*

This section presents a discussion of public services including water supply, education, and transportation.

Water Supply

Because approximately 83 percent of workers at PINGP 1 and 2 reside in Goodhue and Dakota Counties, Minnesota, and Pierce County, Wisconsin, the discussion of public water supply systems is limited to these counties. In Table 2.15, information about major municipal water suppliers in the three counties, their permitted capacities and/or maximum design yields, reported annual peak usage, and population served are presented. The primary source of potable water in the vicinity of the PINGP 1 and 2 is groundwater (NMC 2008).

Goodhue County tries to balance the county's natural resources, environmental habits, and growth to achieve long-term economic and ecological sustainability. Erosion control and stormwater issues are the greatest concern to watershed impacts. Planning officials are concerned with agricultural and household contaminants getting into the groundwater and the potential impact this could have on surface water (Goodhue County 2004).

Dakota County is concerned about projected population growth through 2025 and the impact this growth will have on the availability of groundwater and the effect this could have on surface water resources, which are dependent on groundwater (Dakota County 2005).

Approximately 70 percent of Wisconsin's private residents and most public water systems use groundwater for their water source. Wisconsin implemented a program in 1999 designed to develop capacity for these water systems. A capacity evaluation is required for all new water supply systems.

Most of the PIIC's water is supplied by the PIIC's central water system. This system serves all homes immediately adjacent to PINGP 1 and 2, the Treasure Island Resort and Casino, Dakota Station and government offices. The PIIC's average winter daily use is approximately 100,000 gpd (379,000 liters per day [LPD]), and their average summer daily use is approximately 370,000 gpd (1,401,000 LPD). Treasure Island has 480 sleeping rooms, which typically increase summer water use by approximately 370,000 gpd (1,401,000 LPD). The total expected peak daily usage is approximately 740,000 gpd (2,800,000 LPD). The central water system draws from the Mt. Simon-Hinckley aquifer at a depth of 500 ft (150 m). (PIIC 2008)

The newer homes on the PIIC's Upper Island land, which are located about 3 mi (5 km) from the PINGP 1 and 2 site, have individual wells. These wells draw from the Mt. Simon-Hinckley aquifer at about 180 ft (55 m). The 47 proposed additional homes, which would be located about 2 mi (3.2 km) from the PINGP 1 and 2 site, may also use individual wells. (PIIC 2008)

Education

PINGP 1 and 2 are located in Red Wing School District 256, which had an enrollment of approximately 2,900 students in the 2007-2008 school year (MDE 2007; 2008a). Including School District 256, Goodhue County has 4 public school districts with over 7,000 enrolled students (MDE 2008a, MDE 2008b). Dakota County has 8 public school districts (MDE 2008a). Total enrollment in Dakota County public schools in the 2007-2008 school year was approximately 74,500 students (MDE 2008b). Pierce County, Wisconsin, has 6 public school districts with a total enrollment of 7452 students (WDPI 2009).

Children from the PIIC attend Red Wing public schools or private schools. Additionally, the PIIC offers its members tutoring services, Dakota language classes, summer school, GED preparation, and assistance with college applications at its Learning Center, located on Prairie Island (PIIC 2008).

Table 2-15. Major Public Water Supply Systems (in million gallons per day [gpd])

Water Supplier a	Water Source[a][b]	Peak Annual Withdrawal (2004 – 2007)[c]	Permitted Annual Withdrawal[b]	Population Served[c]
Goodhue County, Minnesota				
City of Cannon Falls	GW	206	1,250	3,800
City of Kenyon	GW	65	144	1,700
City of Pine Island	GW	119	332	2,300
City of Red Wing	GW	624	6,750	16,100
City of Wanamingo	GW	35	120	1,000
City of Zumbrota	GW	179	660	3,000
Dakota County, Minnesota				
City of Apple Valley	GW	2,640	57,000	48,000
City of Burnsville	GW	2,980	57,800	62,200
City of Eagan	GW	3,350	89,700	66,700
Empire Township	GW	81	270	1,300
City of Farmington	GW	810	8,000	18,000
City of Hastings	GW	1,000	7,000	21,600
City of Inver Grove Heights	GW	1,150	10,000	33,200
City of Lakeville	GW	2,550	48,000	52,000
City of Rosemount	GW	944	11,500	21,000
City of South St. Paul	GW	1,240	9,600	20,300
Pierce County, Wisconsin				
Ellsworth Waterworks	GW	101	368	2,800
Prescott Waterworks	GW	171	1,310	4,000
River Falls Waterworks	GW	396	2,600	12,600
Spring Valley Waterworks	GW	38	258	1,300

[a] GW = Groundwater; SW = surface water

[b] EPA 2008b

[c] MNDNR 2008 for Minnesota; NMC 2008 for Wisconsin.

Sources: EPA 2008; MNDNR 2008; NMC 2008.

Transportation

Plant workers that commute from northeastern, southern, and central Dakota County may take U.S. Highway (US) 61 East (1) to the intersection of County Road 19, (2) continue to County Road 31, which connects with County Road 18, or (3) continue east on US 61 to County Road 18. For each route, workers must travel north on County Road 18 to Sturgeon Lake Road and then proceed east approximately 0.5 mi (0.8 km) on Sturgeon Lake Road, turn south onto the plant access road, and proceed to the plant entrance just past the intersection of Wakonade Drive. Plant workers that commute from the southern and eastern portions of Dakota County willl most likely travel to PINGP 1 and 2 via US 61.

Workers that commute from Pierce County may take US 63 and cross into Goodhue County at Red Wing and continue to US 61. Pierce County employees may also cross the Mississippi River via US 10, which connects with US 61 South via State Road 316. Employees would then travel southeast to Goodhue County Road 68 and then northeast to County Road 18. Commuters may also access County Road 18 via County Road 54 in Hastings to County Road 68 East.

Table 2.16 lists commuting routes to PINGP 1 and 2 and average annual daily traffic (AADT) volumes. The AADT values represent traffic volumes for a 24-hour period factored by both day of week and month of year. Table 2.16 data indicates that current AADTs are below maximum capacities for the roads leading to PINGP 1 and 2.

Because Sturgeon Lake Road is the only access road to the PIIC and PINGP 1 and 2, the PIIC is concerned about PINGP 1 and 2-related traffic impacts. Many PINGP 1 and 2 employees exit the plant in the afternoon via Wakonade Drive, which is currently limited to north-bound out-going traffic from the PINGP 1 and 2 site, and proceed to Sturgeon Lake Road and through the PIIC reservation, rather than accessing Sturgeon Lake Road directly from the plant access road. This traffic volume is cause for concern to the PIIC because the section of Sturgeon Lake Road that runs through the reservation has more pedestrian, bicycle, and small motorized cart traffic than the rest of the road. (PIIC 2009)

In addition to the traffic created by 685 full-time employees of PINGP 1 and 2 (and as many as 925 additional workers during outages), daily traffic on Sturgeon Lake Road includes approximately 102 Tribal government employees, and as many as 16,000 Treasure Island guests, and 1,500 Treasure Island employees. (PIIC 2009)

2.2.8.4 *Offsite Land Use*

Offsite land use conditions in Goodhue County, Dakota County, and Pierce County are described in this section. In addition to property taxes, Goodhue and other counties in the vicinity of PINGP 1 and 2 also receive revenue from sales taxes and fees paid by NSP and its employees residing in the region. Changes in the number of workers at PINGP 1 and 2 and tax payments to local jurisdictions could affect land use conditions in these counties. PINGP 1 and 2 are located in northeastern Goodhue County. Dakota County and Pierce County are located north and northeast of Goodhue County along the Mississippi River.

Although Goodhue County remains largely undeveloped, the county's population has experienced some growth (see Section 2.2.8.5) and State and local planning officials expect the county to grow another 7 percent by 2010. The majority of residential, commercial, and industrial development has occurred along two highway corridors, US 61 and US 52. Regional planners estimate that, as the Minneapolis-St. Paul area continues to expand and commuting distances increase, growth will continue in this region (Goodhue County 2004).

Goodhue County has a comprehensive land use plan and zoning and subdivision ordinances to guide development. The ordinances promote the public health, safety, and general welfare of residents; protect agricultural land from urban sprawl; and provide a basis for orderly development. The ordinances require building permits, conditional use permits, plat development, zoning district controls, and variance requests; however, the county has no formal growth control measures.

Table 2-16. Major Commuting Routes in the Vicinity of the Prairie Island Nuclear Generating Plant and 2007 Average Annual Daily Traffic (AADT) Counts

Roadway and Location	Road/Highway Capacity (vehicles per day)	Annual Average Daily Traffic (AADT)[a]
County Road 18 (just north of intersection with Sturgeon Lake Road)	12,000	6,000
County Road 18 Segment (south of intersection with Sturgeon Lake Road and north of County Road 19)	12,000	6,300
County Road 18 (between County Road 19 and County Road 46, Mt. Carmel Road)	12,000+	6,200
Sturgeon Lake Road	20,000	10,500
County Road 19 (between County Road 18 and U.S. Highway 61)	5,000	315
County Road 31 (between County Road 18 and U.S. Highway 61)	10,000	530
County Road 7 (just south of intersection with U.S. Highway 61)	N/A	580
U.S. Highway 61 (between County Road 18 and County Road 19)	40,000	17,000
U.S. Highway 61 (between State Road 316 and County Road 19)	40,000	11,200

[a] All AADTs represent traffic volume during the average 24-hour day during 2006.
Source: Mn/DOT 2007; NMC 2008

Dakota County, Minnesota

Dakota County is located south of Minneapolis-St. Paul and covers approximately 370,000 ac (150,000 ha). The largest category of land use in Dakota County is agricultural. Land used for agriculture comprises approximately 65 percent of the county area. Commercial, industrial, and residential land use covers 22 percent. Open water, parks, and public land cover the remaining 15 percent (Dakota County 1999). The majority of the county population is concentrated in the northern third of the county.

As the cities of Minneapolis-St. Paul have grown, residential development has expanded to neighboring counties, such as Dakota County, and residents commute to the cities for employment (Dakota County 1999). In general, land use decision-making occurs at the city and township level through zoning and the influence of land use planning at the regional level (Dakota County 2005).

Pierce County, Wisconsin

Pierce County, located east of Minneapolis-St. Paul and northeast of PINGP 1 and 2, covers approximately 380,000 ac (154,000 ha), and is currently developing a county-wide comprehensive plan (Pierce County 2006). Land development activities are guided by the County's municipalities through the use of local zoning and subdivision regulations until the county plan is complete.

Pierce County planners report that, between 2002 and 2005, approximately 8 percent of the county's farmland was converted from agriculture to other uses. Planners estimate that, by 2025, the county may need to accommodate over 7,000 ac (280 ha) of new residential, commercial, and industrial land use along with additional acreage needed for infrastructure, parks, community facilities, and similar uses (Pierce County 2006).

Prairie Island Indian Community

Most of the PIIC's lands are held in Trust, for the benefit of the PIIC, by the U.S. Government. Trust status means that the land is protected from State or local jurisdiction, including taxation, can never be sold, and is forever available for the common benefit of the Tribe. Regulations governing the transfer of land into Trust can be found at 25 CFR 151. (PIIC 2008)

Past Congressional actions (i.e., the General Allotment Act or the Dawes Act, in effect from 1887 until 1934), resulted in the loss of Indian lands to non-Indians because of foreclosure due to the inability to pay property taxes on land allotted to individual Indians. During the 47 years that the Allotment Act was in effect, approximately 90,000,000 ac (36,400,000 ha) of Treaty-protected land or about two-thirds of the 1887 national tribal land base was lost. The Indian Reorganization Act (or Wheeler-Howard Act), passed by Congress in 1934, slowed the practice of assigning tribal lands to individual tribal members and reduced the loss of Indian land holdings. (PIIC 2008)

In addition to its Trust land, the PIIC also owns approximately 685 ac (280 ha) of land that is not in Trust and is therefore subject to State and local land use jurisdiction. The Mount Frontenac Golf Course (426 ac [170 ha]) is not in Trust and the Tribe does not plan to request that the U.S. Government, through the Bureau of Indian Affairs, take the land into Trust. The PIIC Tribal Council is in the process of developing Fee-to-Trust applications for the remaining 259 ac (105 ha) of land in order to develop additional home sites. (PIIC 2008)

As mentioned previously, the PIIC's land (with the exception of the 685 ac [280 ha] not in Trust) are not subject to State or local land use jurisdiction. The PIIC is therefore free to develop its own land-use management policies and plans for Trust lands. Some land management projects include the following (PIIC 2008):

> Native Prairie Restoration Project
>
> The prairie restoration project has restored over 200 ac (80 ha) of native prairie. The restored prairies serve several important functions: they are an important food source for the Tribe's Buffalo herd; they are a potential source of medicinal and culturally important plants; they protect the Mississippi River by reducing agricultural and sediment run-off; and they provide important habitat for birds and other wildlife. Since each prairie planting has its own personality, proper management is the key to maintaining a healthy prairie. The Tribe is in the process of creating a comprehensive prairie management plan to guide management practices that will allow the tribe to create and maintain healthy diverse prairies in the future. (PIIC 2008)
>
> Wild Rice Re-seeding Project

Wild rice is culturally significant to the Prairie Island Indian Community and an important food source for many waterfowl species found near Prairie Island. For these reasons, the Tribe has been re-establishing wild rice beds since 2001. To date, over 30 ac (12 ha) of wild rice have been seeded in wetlands along the Mississippi River. This project will be continued until the wild rice plants are self-sustaining. (PIIC 2008)

Water Quality Monitoring

The Prairie Island Indian Community has been conducting its own water quality monitoring since 1999. The Tribe has collected water quality data for the lakes, rivers, sloughs, and backwaters (i.e., habitats) adjacent to and within the study area (i.e., the lands of the Prairie Island Indian Community). Current studies include water quality monitoring, macroinvertebrate surveys, aquatic plant surveys, sediment quality monitoring, and shoreline habitat/land use surveys. This data will be useful in determining the current health of the lakes, river, and wetlands and determining the viability of re-establishing freshwater fish and other aquatic species. (PIIC 2008)

Source Water Protection Plan

The Tribe is currently developing a Source Water Protection Plan (SWPP) to ensure the safe supply of drinking water and protect these water resources. Once the SWPP is complete, strategies will be developed for protecting the Tribe's drinking water, planning for the future, and contingency planning. (PIIC 2008)

Higgins Eye Mussel Restoration Project

The Tribe has also been collaborating with the Minnesota Department of Natural Resources (MNDNR), the U.S. Fish and Wildlife Service (FWS), and the U.S. Army Corp. of Engineers (USACE) to restore the Higgins eye pearly mussel (*Lampsilius higginsii)*, which has been on the endangered species list since 1976. The Higgins pearly mussel aids water quality and is a food source for muskrats and otters (an important traditional species for tribal members), whose numbers have also declined in the last several decades. (PIIC 2008)

The MNDNR, FWS, and USACE are taking mussels from Lake Pepin, below Lock and Dam No. 3, where conditions are unfavorable due to the zebra mussel, and relocating them to Sturgeon Lake, adjacent to the tribe's land and within Pool 3 of Lock and Dam No. 3, where conditions are now more favorable for the mussel. (PIIC 2008)

Habitat Assessment through Breeding Bird Surveys

The tribe conducted an existing habitat assessment by conducting a breeding bird survey. In general, excellent habitat will have many species of birds, while poor and degraded habitat will have fewer species. The field work for this project was completed in June and July 2008 and May and June of 2009. In 2008, 72 long-term sampling sites were established in all areas of the reservation. Sixty-nine bird species were surveyed during 2008. The same sample sites were visited in 2009 and 75 bird species were surveyed. Several species of conservation concern for MN were surveyed in both years, including the Bald eagle, Dickcissel, Prothonotary Warbler, Cerulean Warbler, Wood Thrush, and the Willow Flycatcher. The diversity of habitats on tribal lands—prairies, meadows, wetlands, and riparian forests—are important to many of these breeding species. The Tribe's current and future management activities include efforts to maintain and enhance existing breeding habitats for birds. (PIIC 2008)

Invasive Plant Inventory and Native Plant Community Assessment

Because of concerns about invasive plants taking over native plant habitat, the Tribe conducted a plant inventory on reservation lands in 2008. Fortunately, many areas still consist of healthy natural habitats and a total of 460 vascular plant species were documented. The project also identified 22 invasive plant species on tribal lands. Buckthorn is the most prevalent invasive species in Reservation woodland areas; it was originally planted as a hedgerow tree and it spread quickly. Purple loosestrife was the most prevalent invasive species in wetland areas, especially near the Mississippi River. An extensive database and vegetation maps were created for this project to assist the Tribe has in managing lands in the future. The tribe has also begun the removal of buckthorn and purple loosestrife in some areas. (PIIC 2008)

Medicinal and Culturally Important Plants

The Tribe is currently conducting a project to assess the presence of medicinal and culturally important plant species on tribal lands. Surveys were conducted in the summer of 2008 and are continuing during the spring/summer of 2009. As part of the study, the tribe has collected voucher specimens for a permanent herbarium. Thus far, 72 of the 180 potential cultural/medicinal plant species historically present on Prairie Island have been found. The medicinal plant survey will help the Tribe manage lands and restore areas with plant species that are currently not present. (PIIC 2008)

Forest Inventory

The Bureau of Indian Affairs (BIA), Midwest Region, is conducting a forest inventory of Tribal lands which will include a delineation of forest cover types, such as open prairie, forested wetlands, shrub swamps, and other palustrine wetland types. The BIA began the inventory in the fall of 2008 and will complete the project in 2009. The inventory will be beneficial, as the data from the inventory will help establish habitat enhancement targets. (PIIC 2008)

Draw-down Study of Pool 3 (Sturgeon Lake)

The Prairie Island Indian Community is working with the USACE (St. Paul District) on various aspects of a proposed water level management plan aimed at modifying river regulation in Pool 3 to improve habitat conditions. This ecosystem restoration project would target goals to improve water quality, emergent and submersed aquatic plants, and fish and wildlife. (PIIC 2008)

Agricultural Leases

The tribe annually leases 726 ac (290 ha) to tribal members for agricultural production. Typically corn and soybeans are planted. (PIIC 2008)

2.2.8.5 *Visual Aesthetics and Noise*

PINGP 1 and 2 are located on an island on the west side of the Mississippi River. Both units can be seen from the river, but are partly shielded by surrounding vegetation. The turbine building and reactor containment structures dominate the landscape of the site.

With mechanical draft cooling towers, the most obvious aesthetic impact is the visible steam plume in the sky. The plumes are more persistent under certain meteorological conditions when the capacity for the atmosphere to hold additional water vapor is lowest. This occurs when relative humidity is high and/or air temperatures are low. Plume rise is less with a mechanical-draft tower than it is for a natural-draft tower, and plumes can rise to heights between 200 and 500 ft (60 to 150 m) before evaporating completely. (AEC 1973)

Noise from nuclear plant operations can be detected offsite. Sources of noise from PINGP 1 and 2 operations include the mechanical-draft cooling towers, turbines, large pumps, and cooling water system motors. Given the industrial nature of the station, noise emissions from the station are generally nothing more than an intermittent minor nuisance. However, noise levels may sometimes exceed the 55 dBA level that the EPA uses as a threshold level to protect against excess noise during outdoor activities (EPA 1974). However, according to the EPA this threshold does "not constitute a standard, specification, or regulation," but was intended to provide a basis for state and local governments establishing noise standards.

2.2.8.6 *Demography*

According to the 2000 Census, approximately 107,131 people lived within 20 mi (32 km) of PINGP 1 and 2, which equates to a population density of 85 persons per square mile (mi^2) (NMC 2008). This density translates to the less sparse generic environmental impact statement (GEIS) Category 3 (60 to 120 persons/mi^2 or less than 60 persons/mi^2 with at least one community with 25,000 or more persons within 20 mi [32 km]). Approximately 2,733,326 people live within 50 mi (80 km) of PINGP 1 and 2 (NMC 2008). This equates to a population density of 349 persons/mi^2. Applying the GEIS proximity measures, this density is classified as proximity Category 4 (greater than or equal to 190 persons/mi^2 within 50 mi [80 km]). Therefore, according to the sparseness and proximity matrix presented in the GEIS, the rankings of sparseness Category 3 and proximity Category 4 result in the conclusion that PINGP 1 and 2 are located in a high population area.

Table 2.17 shows population projections and growth rates from 1970 to 2050 in Goodhue County and Dakota County, Minnesota, and Pierce County, Wisconsin. The growth rate in Goodhue County showed an increase of 8.4 percent for the period of 1990 to 2000. County populations are expected to continue to grow in all three counties in the next decades although Dakota County's population is expected to increase at a higher rate than the others through 2050.

Table 2-17. Population and Percent Growth in Goodhue County and Dakota County, Minnesota, and Pierce County, Wisconsin, from 1970 to 2000 and Projected for 2006 to 2050

	Goodhue, MN		Dakota, MN		Pierce, WI	
Year	Population	Percent Growth[a]	Population	Percent Growth[a]	Population	Percent Growth[a]
1970	34,763	—	139,808	—	26,652	—
1980	38,749	11.5	194,279	39.0	31,149	16.9
1990	40,690	5.0	275,227	41.7	32,765	5.1
2000	44,127	8.4	355,904	29.3	36,804	12.3
2007	45,539	3.2	385,971	8.4	39,296	6.8

2010	47,140	6.8	422,990	18.8	39,818	8.2
2020	50,430	7.0	470,460	11.2	42,655	7.1
2030	52,890	4.9	501,020	6.5	45,850	7.5
2040	55,873	5.6	595,611	18.9	49,640	8.3
2050	58,798	5.2	659,939	10.8	52,919	6.6

— = No data available.

[a] Percent growth rate is calculated over the previous decade.

Sources: MSCD 2002; USCB 2008; WDSC 2004

Demographic Profile

The 2000 and 2006 (estimated) demographic profiles of the three-county region of influence (ROI) population is presented in Table 2.18 and Table 2.19. According to the 2000 Census, minorities (race and ethnicity combined) comprised 8.8 percent of the total three-county population. The minority population is composed largely of Hispanic or Latino and Asian residents.

According to the most recent U.S. Census Bureau's 2005-2007 American Community Survey 3-Year Estimates, minority populations in the three-county region were estimated to have increased by nearly 19,700 persons and comprised 12.3 percent of the total three-county population (see Table 2.19). The largest increases in minority populations were estimated to occur in Black or African American populations. The Hispanic or Latino and Asian populations were both estimated to have increased by approximately 54 percent, and have also increased slightly as a percentage of the total three-county population.

Prairie Island Indian Community

Currently, the PIIC has 801 enrolled members; approximately 250 members reside on tribal land. The PIIC is growing at an approximate rate of 30 new members per year (based on birth rates for the past several years). It is expected that the PIIC will grow by 600 members over the 20-year PINGP 1 and 2 renewed license period. (PIIC 2009)

Table 2-18. Demographic Profile of the Population in the PINGP 1 and 2 Three-County Socioeconomic Region of Influence in 2000

	Goodhue, MN	Dakota, MN	Pierce, WI	Region of Influence
Total Population	44,127	355,904	36,804	436,835
Race (percent of total population, Not-Hispanic or Latino)				
White	96.1	90.0	97.5	91.2
Black or African American	0.6	2.2	0.2	1.9
American Indian and Alaska Native	0.9	0.3	0.3	0.4
Asian	0.6	2.9	0.4	2.4
Native Hawaiian and Other Pacific Islander	0.0	0.0	0.0	0.0
Some other race	0.1	0.1	0.1	0.1

Two or more races	0.6	1.5	0.6	1.3
Ethnicity				
Hispanic or Latino	473	10,459	301	11,233
Percent of total population	1.1	2.9	0.8	2.6
Minority Populations (including Hispanic or Latino ethnicity)				
Total minority population	1,722	35,662	908	38,292
Percent minority	3.9	10.0	2.5	8.8
Source: USCB 2008b				

Table 2-19. Demographic Profile of the Population in the PINGP 1 and 2 Three-County Socioeconomic Region of Influence in 2005-2007, 3-Year Estimate

	Goodhue, MN	Dakota, MN	Pierce, WI	Region of Influence
Total Population	45,539	385,971	36,804	470,806
Race (percent of total population, Not-Hispanic or Latino)				
White	95.0	85.9	96.7	87.7
Black or African American	1.0	3.9	0.1	3.3
American Indian and Alaska Native	0.9	0.4	0.4	0.5
Asian	0.8	4.0	1.5	3.5
Native Hawaiian and Other Pacific Islander	0.2	0.0	0.0	0.1
Some other race	0.1	0.2	0.0	0.2
Two or more races	0.4	1.4	0.3	1.2
Ethnicity				
Hispanic or Latino	768	16,147	379	17,294
Percent of total population	1.7	4.2	1.0	3.7
Minority Populations (including Hispanic or Latino ethnicity)				
Total minority population	2,274	54,392	1,292	57,958
Percent minority	5.0	14.1	3.3	12.3
Source: USCB 2008b				

<u>Transient Population</u>

Within 50 mi (80 km) of PINGP 1 and 2, colleges and recreational opportunities attract daily and seasonal visitors who create demand for temporary housing and services. In 2007, approximately 187,000 students attended colleges and universities within 50 mi (80 km) of PINGP 1 and 2 (IES 2008).

In 2000, 1.8 percent of all Goodhue County housing units were considered temporary housing for seasonal, recreational, or occasional use. By comparison, seasonal housing accounted for 0.3 percent and 5.1 percent of total housing units in Dakota County and Minnesota, respectively

(USCB 2008a). Seasonal housing accounted for 1.3 percent and 6.1 percent of total housing units in Pierce County and Wisconsin, respectively (USCB 2008). Table 2.20 provides information on seasonal housing for the 25 counties located all or partly within 50 mi (80 km) of PINGP 1 and 2.

The Treasure Island Resort and Casino, located on Prairie Island, may have as many as 16,000 guests at any given time. The hotel also has 480 sleeping rooms (with an approximate 90 percent occupancy rate); an RV park (95 pads), and a marina (137 permanent and daily slips are typically full during the summer months). During the PIIC's annual Pow-Wow in July, an additional 500 to 2000 visitors may be in and around the Pow-Wow grounds. The reservation does not have any rental housing units or campgrounds. (PIIC 2008).

Table 2-20. Seasonal Housing in Counties Located within 50 mi (80 km) of PINGP 1 and 2

County[a]	Housing units	Vacant housing units: For seasonal, recreational, or occasional use	Percent
Minnesota	**2,065,946**	**105,609**	**5.1**
Anoka	108,091	300	0.3
Carver	24,883	124	0.5
Chisago	15,533	679	4.4
Dakota	133,750	381	0.3
Dodge	6,642	18	0.3
Goodhue	17,879	314	1.8
Hennepin	468,824	2,491	0.5
Le Sueur	10,858	973	9.0
Olmsted	49,422	226	0.5
Ramsey	206,448	808	0.4
Rice	20,061	628	3.1
Scott	31,609	150	0.5
Steele	13,306	103	0.8
Wabasha	9,066	239	2.6
Waseca	7,427	79	1.1
Washington	73,635	604	0.8
Winona	19,551	163	0.8
County Subtotal	1,216,985	8,280	1.6 (avg.)
Wisconsin	**2,321,144**	**142,313**	**6.1**
Barron	20,969	2,299	11.0
Buffalo	6,098	247	4.1
Dunn	15,277	285	1.9
Eau Claire	37,474	375	1.0
Pepin	3,036	134	4.4
Pierce	13,493	182	1.3
Polk	21,129	4,211	19.9
St. Croix	24,265	281	1.2
County Subtotal	141,741	8,014	5.6 (avg.)
County Total	**1,358,726**	**16,294**	**2.9 (avg.)**

Source: USCB 2008

[a]Counties within 50 mi (80 km) of PINGP 1 and 2 with at least one block group located within the 50-mi (80 km) radius

avg. = percent average for counties within the PINGP 1 and 2 50-mi (80 km) radius and excludes state percentage

Migrant Farm Workers

Migrant farm workers are individuals whose employment requires travel to harvest agricultural crops. These workers may or may not have a permanent residence. Some migrant workers follow the harvesting of crops, particularly fruit, throughout the rural U.S. Others may be permanent residents near PINGP 1 and 2 who travel from farm to farm to harvest crops.

Migrant workers may be members of minority or low-income populations. Because they travel and can spend a significant amount of time in an area without being actual residents, migrant workers may be unavailable for counting by census takers. If uncounted, these workers would be "underrepresented" in USCB minority and low-income population counts.

Information on migrant farm and temporary labor was collected in the 2007 Census of Agriculture. Table 2.21 provides information on migrant farm workers and temporary farm labor (less than 150 days) within 50 mi (80 km) of PINGP 1 and 2. According to the 2007 Census of Agriculture, approximately 15,700 farm workers were hired to work for less than 150 days and were employed on 4,800 farms within 50 mi (80 km) of PINGP 1 and 2. The county with the largest number of temporary farm workers (1,025 workers on 150 farms) was Washington County, Minnesota.

In the 2002 Census of Agriculture, farm operators were asked for the first time whether any hired migrant workers, defined as a farm worker whose employment required travel that prevented the migrant worker from returning to their permanent place of residence the same day. A total of 237 farms in the 50-mi (80-km) radius of PINGP 1 and 2 reported hiring migrant workers. Dakota County, Minnesota reported the most farms (28) with hired migrant workers, followed by Winona County and Goodhue County in Minnesota with 22 and 18 farms, respectively.

According to 2007 Census of Agriculture estimates, 970 temporary farm laborers were employed on 338 farms in Goodhue County, and 1,012 temporary farm workers were employed on 218 farms in Dakota County (USDA 2007a). Pierce County, Wisconsin, had 720 temporary farm workers employed on 298 farms (USDA 2007b).

Table 2-21. Migrant Farm Worker and Temporary Farm Labor in Counties Located within 50 mi (80 km) of PINGP 1 and 2

County[(a)]	Number of farm workers working for less than 150 days	Number of farms hiring workers for less than 150 days	Number of farms reporting migrant farm labor	Number of farms with hired farm labor
Minnesota	**19,337**	**16,085**	**54,851**	**1,186**
Anoka	94	77	451	7
Carver	220	177	548	15
Chisago	179	160	612	4
Dakota	270	218	1,012	28
Dodge	207	172	547	9
Goodhue	433	338	970	18
Hennepin	154	110	696	6
Le Sueur	226	194	512	2

County[a]	Number of farm workers working for less than 150 days	Number of farms hiring workers for less than 150 days	Number of farms reporting migrant farm labor	Number of farms with hired farm labor
Olmsted	300	250	837	11
Ramsey	13	12	66	0
Rice	264	224	671	2
Scott	182	143	496	6
Steele	208	167	552	7
Wabasha	270	207	695	6
Waseca	198	151	532	7
Washington	179	150	1,025	11
Winona	341	255	795	22
Minnesota Counties Subtotal	**3,738**	**3,005**	**11,017**	**161**
Wisconsin	**17,889**	**13,169**	**45,921**	**636**
Barron	354	251	726	9
Buffalo	274	197	455	11
Dunn	304	219	714	18
Eau Claire	254	193	506	8
Pepin	121	86	196	2
Pierce	358	298	720	7
Polk	277	219	594	4
St. Croix	355	290	793	17
Wisconsin Counties Subtotal	**2,297**	**1,753**	**4,704**	**76**
All Counties Total	**6,035**	**4,758**	**15,721**	**237**

[a]Counties within 50 mi (80 km) radius of PINGP 1 and 2 with at least one block group
Sources: USDA 2007a; USDA 2007b

2.2.8.7 *Economy*

This section contains a discussion of the economy, including employment and income, unemployment, and taxes.

Employment and Income

Between 2000 and 2007, the civilian labor force in Goodhue County increased 6.6 percent from 24,100 to 25,692 individuals. During the same time period, the civilian labor force in Dakota County and Pierce County grew by 9.6 and 10.3 percent, respectively. (USCB 2008a)

In 2007, educational services, health care and social assistance represented the largest sector of employment in the three-county region followed by manufacturing and retail trade industry.

The educational services, health care and social assistance sector employed the most people in Goodhue County followed by manufacturing and retail trade sectors. A list of some of the major employers in Goodhue County is provided in Table 2.22. As shown in the table, the largest employer in Goodhue County is the Treasure Island Resort and Casino.

Table 2-22. Major Employers in Goodhue County

Firm or Company	Number of Employees
Treasure Island Casino	1500[a]
Red Wing Shoe Co.	724
Xcel Energy	611[a]
Fairview Red Wing Medical Center	585
Independent School District #256	500
Norwood Promotional Products	380
SB Foot Tanning Co.	260
Express Services	236
Cannon Falls Public Schools-ISD#252	230
DB Industries, Inc.	225
Dairy Farmers of America	220
Bergquist Co.	200
Foldcraft-Plymold Co.	200
Gemini Inc.	184
DS Manufacturing Inc.	170
Midwest of Cannon Falls Inc.	164
Cannon Equipment Co.	161
Zumbrota-Mazeppa Public Schools	160
Pine Haven Care Center	150

[a] The ER (NMC 2008) reports the Treasure Island Casino to have 1600 employees and Xcel Energy to have 685 employees

Source: MDEED 2009

Estimated income information for the PINGP 1 and 2 ROI is presented in Table 2.23. According to the USCB 2005-2007 American Community Survey 3-Year Estimates (USCB 2007a), median household income in Dakota and Pierce Counties were each above their respective state median household income averages. Conversely, with the exception of Dakota County, per capita income in Goodhue County and Pierce County were both below their respective state averages. In Goodhue and Dakota Counties, an estimated 7.9 and 5.3 percent of the population was living below the official poverty level, respectively, while the percentage for the State of Minnesota as a whole was 9.6 percent. In Pierce County, an estimated 6.9 percent of the population was living below the official poverty level, while the percentage for the State of Wisconsin as a whole was 10.8 percent. The percentage of the population by family living below the poverty level was lower in all three counties than their respective state-wide estimates. The percentage of families living below the poverty level in Goodhue County (5.7 percent) was lower than the percentage of families in the State of Minnesota as a whole (6.3 percent). Dakota County had a much smaller percentage of families (3.8 percent) living below the poverty level. In Pierce County, an estimated 2.3 percent of the families were living below the official poverty level, while the percentage for the State of Wisconsin as a whole was 7.1 percent. (USCB 2007a)

Table 2-23. 2005-2007 Estimated Income for the PINGP 1 and 2 Region of Influence

	Goodhue	Dakota	Minnesota	Pierce	Wisconsin
Median household income (dollars)	55,098	72,393	55,616	58,011	50,309
Per capita income (dollars)	26,187	33,284	28,536	25,327	25,742
Families living below the poverty level (percentage)	5.7	3.8	6.3	2.3	7.1
Individuals living below the poverty level (percentage)	7.9	5.3	9.6	6.9	10.8

Source: USCB 2007a

Unemployment

According to the U.S. Census Bureau's 2005-2007 American Community Survey 3-Year Estimates (USCB 2007a), the annual unemployment average in Goodhue and Dakota Counties was 5.6 and 5.1 percent, respectively, which were slightly higher and lower than the annual unemployment average of 5.4 percent for the State of Minnesota, respectively. The annual unemployment average in Pierce County, Wisconsin was 5.4 percent, which was lower than the annual unemployment average of 5.8 percent for the state of Wisconsin (USCB 2007a).

Taxes

In Minnesota, public utilities are valued using cost and income approaches. Jurisdictional budgets are developed and taxes are levied to meet those budgets. Historically, annual property taxes have been gradually decreasing due to depreciation and the growth in Minnesota's residential and commercial tax bases. Additionally, state lawmakers have been conducting hearings for a rule change that could affect the way commercial businesses depreciate their facilities. Currently, NSP is unable to fully depreciate PINGP 1 and 2. Should the rule change, NSP may be able to increase the depreciation on PINGP 1 and 2 to further reduce the plant's value and tax payments. However, NSP plans to implement some refurbishment activities at PINGP 1 and 2 (see Chapter 3) that could increase the plant's assessed value, resulting in an increase in the amount of money NSP pays in property taxes.

As stated in NSP's ER (NMC 2008):

> The Minnesota Department of Revenue (DOR) is in the process of possibly revising its current utility company valuation rule. According to a fiscal impact study prepared by the DOR and based on the latest draft of the revised rule, the amount of property tax revenue received by the city of Red Wing and Goodhue County would decrease by approximately $1.4 million and $1.2 million annually, respectively. In order to stabilize these communities for their anticipated loss of property tax revenue from NSP due to a rule change, NSP executed revenue stabilization agreements with Red Wing and Goodhue County representatives in November 2006 (City of Red Wing, Minnesota and NSP 2006). NSP is also assessed the State General Tax, however, it will not be analyzed here because

the state's revenues are very large and NSP's payments represent an extremely small percentage of those revenues. Nuclear fuel is not taxed in the State of Minnesota and therefore is not included in the site's property tax assessment. Property taxes are paid directly to Goodhue County, which in turn distributes the money to the aforementioned taxing jurisdictions. Property taxes are the chief source of revenue for Minnesota counties, generally providing between 30 and 50 percent of their revenues (AMC 2002).

From 2001 through 2005, Goodhue County collected between $20.6 and $22.3 million annually in property tax revenues Table 2.24. Goodhue County property tax revenues fund, among other things, county operations, public safety, public works, cultural and recreational programs, human services, health services, roadway maintenance, economic development, and conservation programs (Hove 2006). Table 2.24 details the property tax payments made by the owners of PINGP for the same years. From 2001 to 2005, PINGP property tax payments represented 16.6 to 27.5 percent of Goodhue County's total property tax revenues.

From 2001 through 2006, the City of Red Wing collected between $8.9 and $11.6 million annually in property tax revenues Table 2.24. The City of Red Wing's property tax revenues fund city operations. Table 2.24 details the property tax payments made by the owners of PINGP for the same years. From 2001 to 2006, NSP property tax payments represented 52.3 to 36.4 percent of the City of Red Wing's total property tax revenues. Due to small PINGP payment decreases and increases in the City's total revenues collected, NSP's payment percentages are trending downward.

From 2002 through 2006, the School District 256 collected between $6.5 and $6.9 million annually in property tax revenues Table 2.24. From 2002 to 2006, PINGP property tax payments represented 28.5 to 38.0 percent of the School District 256's total property tax revenues. Prior to 2002, PINGP tax payments to School District 256 were significantly larger because the state-determined local school tax was included in School District 256 payments prior to year 2002. The 2001 Tax Law provided for major changes in the source of school funding in Minnesota and replaced the state-determined local school tax with the State General Tax, a statewide property tax levied for taxes payable on commercial, industrial and seasonal properties. Taxes under the State General Tax are paid into the State General Fund and redistributed by a state-determined formula to school districts state-wide, in part, based on student numbers. The State General Tax is levied at a uniform rate within each county, and the levy rate is determined by the Commissioner of Revenue (Fredrikson & Byron 2001).

Table 2-24. PINGP 1 and 2 Property Tax Paid and Percentage of Goodhue County, City of Red Wing, and School District 256 Tax Revenues, 2001 to 2006

Entity	Year	Total Revenue (millions of dollars)	Property Tax Paid by NSP (millions of dollars)	Percent of Total Revenue
Goodhue County	2001	21.0	5.8	27.6
	2002	20.6	4.6	22.3
	2003	21.1	4.4	20.9
	2004	21.7	4.0	18.4
	2005	22.3	3.7	16.6
	2006	22.4	3.7	16.5
City of Red Wing	2001	8.9	4.7	52.8
	2002	10.9	4.8	44.0
	2003	11.4	4.8	42.1
	2004	11.5	4.5	39.1
	2005	10.9	4.0	36.7
	2006	11.6	4.3	37.1
School District 256	2001	14.8	6.6	44.6
	2002	6.5	2.5	38.5
	2003	5.7	2.0	35.1
	2004	6.9	2.1	30.4
	2005	6.7	1.8	26.9
	2006	6.9	2.0	29.0

Source: NMC 2008; OSA 2007

In 2003, the PIIC entered into a Settlement Agreement with NSP, which includes certain provisions that relate to the PIIC's long-standing health and safety concerns about PINGP 1 and 2. (Minn. Stat. § 216B.1645, Subd. 4; Laws 2003, First Special Session Chapter 11.) This agreement was approved by the Minnesota Public Utilities Commission (MN PUC) and the Minnesota Legislative. Through the Agreement, funds are allocated to the PIIC to address a variety of issues: health concerns, emergency management, land acquisition, construction of community infrastructure, or other community purposes. The Agreement is in place as long as PINGP 1 and 2 is operational and the ISFSI continues to be used for dry cask storage, although certain provisions of the Agreement end when the current operating licenses expire. (PIIC 2008).

NSP also provided $25,000 to the PIIC to fund a preliminary engineering study or other activities to help facilitate the construction of an overpass over the railroad lines which cross Sturgeon Lake Road, which is the only exit from the reservation (PIIC 2008).

Similar to the support it provides to Goodhue County and the State of Minnesota, NSP also provides the PIIC with up to $17,000 annually to reimburse the Community for radiological emergency preparedness (REP) activities, such as training, travel to meetings, and supplies (PIIC 2008; 2009).

2.2.9 Historic and Archaeological Resources

This section discusses the cultural background and the known historic and archaeological resources at the site of PINGP 1 and 2 and in the surrounding area.

2.2.9.1 *Cultural Background*

The region around PINGP 1 and 2 contains prehistoric and historic Native American and Euro-American cultural resources. Sixty properties in Goodhue County are listed in the *National Register of Historic Places* (NRHP) (NPS 2009). Of these, 35 properties are located in Red Wing within 6 mi (9.7 km) of PINGP 1 and 2. The nearest property, the Bartron Village site, is partially located on the PINGP 1 and 2 site. Nine properties are located across the Mississippi River in Pierce County, Wisconsin. Two of these properties are within 6 mi (9.7 km) of PINGP 1 and 2.

The land around Prairie Island is composed of limestone cliffs and various river drainages, and is bounded by the Cannon and Trimbelle River Bluffs (Dobbs 1988; Schirmer 2002). Prairie Island was formed from the deposition of enriched silt resulting from glacial melt and periodic flooding from the Mississippi and other river drainages (Gibbon 1979). The USACE Lock and Dam No. 3, constructed in the 1930s, created Sturgeon Lake and flooded portions of the island, obscuring the original shoreline. The landscape within the PINGP 1 and 2 site boundary is mostly level with some wooded and swampy areas. The majority of the land is open grassland.

<u>Prehistoric Periods</u>

Paleo-Indians migrated into Southern Minnesota approximately 10,000 to 12,000 years ago when the glaciers receded and the forests and prairies reappeared (Scullin 1996). Paleo-Indian populations were highly mobile and left little evidence of their activities. Most Paleo-Indian sites would have been short-term occupations (campsites). Paleo-Indian people subsisted on hunted game and gathered plant material. The early Paleo-Indian period dates from 9550 B.C. to 8050 B.C. and includes the Clovis and Folsom cultures (Hildebrandt 2008). The primary artifact associated with the Paleo-Indian period is the Clovis point: a distinctive, fluted, lanceolate point. To date, no intact Clovis or Folsom sites have been identified within Minnesota; however spear points have been found. The late Paleo-Indian period dates from 8050 B.C. to 6050 B.C.

During the Archaic Period, from approximately 6050 B.C. to 1050 B.C., subsistence hunting and gathering underwent changes to adapt to resource availability. As glaciers retreated northward and larger animals disappeared from the region, humans adapted to modern plants and smaller game animals. Very few intact Archaic period sites have been found in Minnesota. Most information comes from surface finds and private artifact collections. Rapid climate changes and subsequent flooding may have buried or disturbed many Archaic sites. Archaic people did not appear to establish permanent settlements, though there is evidence that some areas were utilized frequently. Archaic people collected, hunted, and gathered most of what they needed for survival in their home territory. There are no known Archaic sites within Goodhue County (Dobbs 1988).

The Woodland culture existed from 1050 B.C. until European contact around 1600 A.D. This period is defined by the introduction of horticulture to augment subsistence hunting and gathering. A reliance on agriculture led to the establishment of more permanent settlements during this period. In Minnesota, Woodland culture is also defined by the production of pottery and earthen mound construction. Other characteristics of Woodland culture include increased population, emergence of social hierarchy, expanded interregional trade, and the introduction of the bow and arrow. Woodland peoples exchanged ideas and technologies with other locations in the Midwest. This period is typically divided into Early, Middle, and Late Woodland periods (Dobbs 1988). Changes in climate during this period caused changes in Woodland culture.

Very few Early Woodland cultural sites have been found in Minnesota and most are located in the southeastern portion of the state where the deciduous forest dominates the landscape. Early Woodland settlements were small and seasonally occupied. Sites from this period are difficult to locate and may be deeply buried.

In contrast, the Middle Woodland period is defined by more elaborate ritual and mortuary activities and increased trade. Mounds built during this time are larger than those found later in the Woodland period and include linear mounds, log crypts, and multiple burials (Hildebrandt 2008). Communities that lived in and around the Ohio and Mississippi valleys, including Prairie Island, acquired a wide range of exotic goods and raw materials from all over North America. Middle Woodland communities were linked by a network archaeologists refer to as the Hopewell Interaction Sphere involving the dissemination of ideas about social organization, technology, and long distance trade from various centers of Hopewell culture.

Late Woodland cultures are poorly understood in Minnesota. Many Late Woodland sites are located on floodplains where site preservation is compromised by flooding and erosion. Additionally, pottery types found in the area have not been well defined in Minnesota. Population densities in the Late Woodland were low and the peoples lived as hunters and gatherers (Dobbs 1988). Typical sites include mound groups (conical or effigy mounds ranging from two to fifteen mounds), short-term seasonal occupations, seasonal villages, rock shelters and caves, and shell middens (archeological feature comprised mainly of mollusk shells).

Two major cultural phases that follow the Late Woodland period are the Oneota and Middle Mississippian cultures. Current research is unable to clearly define the level of interactions between the Late Woodland, Oneota, and Middle Mississippian cultures in Minnesota. The period of most concentrated use of the Red Wing area, which includes Prairie Island, was the Silvernale Phase that is associated with the Mississippian culture (A.D. 1000 to 1300). The Silvernale Phase is distinguished by the presence of local and non-local pottery styles and decorations. Silvernale Phase artifacts are only found in the Red Wing area, unlike the Oneota artifact assemblages which are found throughout the Midwest (Gibbon and Dobbs 1991). There are at least seven major village sites in the Red Wing area.

One example is the Bartron Village site (21GD02). The Bartron Village site has yielded Middle Mississippian, Oneota, and Late Woodland artifacts. This evidence suggests discrete "neighborhood" along "cultural" lines (Gibbon 1979; Dobbs 1988; Gibbon and Dobbs 1991; Schirmer 2002:54, 57). The Bartron Village site has characteristics common to other Middle Mississippian occupations located throughout the Midwest. This multi-component site (from A.D. 1050 to 1300) is important for understanding the cultural evolutionary and settlement patterns at Prairie Island. Oneota peoples can be traced through the years to ancestral Chiwere, and Dakota and Dheigiha Sioux-speaking peoples (Hildebrandt 2008).

Oneota and Silvernale villages typically have associated mound groups. These mound groups are numerous and are usually conical and/or linear (ellipsoid) shaped. Oneota and Middle Mississippian habitation sites include semi-permanent (seasonal) Oneota or Silvernale villages, (possibly fortified) permanent Silvernale villages, outlying Silvernale-related farmsteads, garden plots, quarry sites, and sites associated with elite architecture and trade activities (Dobbs 1988).

During both prehistoric and historic (European contact) periods, the Mississippi River and its tributaries played an important role in the settlement and history of the region. The Mississippi River was the major means of transportation of people and goods resulting in a high density of prehistoric and historic sites along the Red Wing and Prairie Island areas (NMC 2008). There are hundreds of habitation sites in Goodhue and Pierce Counties, however, very few sites have been tested or professionally excavated.

Historic Period

During the 17th century, the two major tribes within Minnesota were the Dakota (Sioux) and the Ojibwe (Chippewa) (Willis 1914). Father Louis Hennepin was the first European to explore the Upper Mississippi River region. In 1680, he was captured near Milles Lacs by a Dakota war party and later discovered Lake Pepin and St. Anthony Falls while in captivity (Willis 1910).

In 1685, another Frenchman Nicholas Perrot established a trading post at Trempealau on the east bank of the Mississippi River, and Fort Saint-Antoine on Lake Pepin (Kneisler 1999). Frenchman, Pierre Charles Le Seuer, explored the region at the confluence of the Mississippi and Minnesota rivers, where Fort Snelling was later established. Le Seuer built a trading post on Prairie Island around 1695 (AEC 1973).

Evidence indicates that Le Sueur wintered on the southern end of Prairie Island from 1694 to 1695; however, this encampment has never been found (Hildebrandt 2008). Historic Dakota encampments and trading posts were also reported to exist on Prairie Island though none have been found (Hildebrandt 2008).

Around 1727, the French built Fort Beauharnois on the Mississippi River which facilitated the trade of furs with the Dakota people (MNDNR 2008). A chapel built at Fort Beauharnois, named the Mission of St. Michael the Archangel, is purported to be the first church in Minnesota. In 1763, the Treaty of Paris ended the French and Indian War (MNDNR 2008). As a result, Fort Beauharnois and the Frontenac settlement were abandoned. Subsequently, most of France's land holdings within the New World were divided between Spain and England.

Fort Snelling was built between 1819 and 1825 by the U.S. Army (MHS 2009). Fort Snelling was an important outpost that provided a meeting place for the U.S. government officials and representatives of the Dakota and Objibwe nations. The American and Columbia fur companies also constructed headquarters in this area, and the families of these employees settled at nearby Mendota. European immigrants and settlers from the East Coast established a settlement that later became St. Paul City (MHS 2009). Europeans settled on the west bank of the Mississippi River as a result of a treaty signed at Mendota in 1851. In 1857, Red Wing was incorporated as a city. A year later, in 1858, the territory of Minnesota became the 32nd state (City of Red Wing 2003).

According to a tribal elder (born in 1937), the land now owned by Xcel/NSP was predominately owned by two families. The Nauer family owned most the land where the PINGP 1 and 2 is located. Two Nauer family members are still residing (and farming) in the vicinity. The Larson family owned most of the land that is closest to the tribe's land (Edoka Street vicinity), where the north-south transmission lines are located. These two families had homesteads and barns. Whether these are the 5 cottages referenced in the 1973 AEC FES is unknown. (PIIC 2008)

History of the Prairie Island Indian Community

Today's PIIC members are descendents of the Mdewakanton Band of Eastern Dakota, who are also known as the Mississippi or Minnesota Sioux, who were parties to treaties with the U.S. Government from 1805 to 1863. Members of the PIIC have lived on Prairie Island for countless generations. According to archaeological evidence, Prairie Island has been a place of historical and cultural significance for thousands of years. The descendants of those earliest known inhabitants, the Mdewakanton Dakota (Sioux), traditionally used Prairie Island as a summer encampment for fishing, hunting, gathering medicines and foods, and raising crops.

The Prairie Island people are also part of a larger group called the "Dwellers of the Spirit Lake," or in the Dakota language, the Mde wakan ed otunwahe. This name has been shortened over the years to Mdewakantonwan or Mdewakanton (M'DAY-wah-kahn-tahn). The Mdewakanton are one of the seven sub-tribes who make up the alliance known as Oceti Sakowin - the Seven Council Fires. This alliance is more commonly known as the Sioux, which comes from an Ojibwe word nadowessi for "Little snakes." The name was changed by the French to Nadowesioiux or simply Sioux. Today, the Sioux call themselves Dakota, Lakota, or Nakota, a word that means "allies" or "friends" in all three dialects. The Dakota, Lakota, and Nakota have reservations in the states of Minnesota, Nebraska, South Dakota, North Dakota, and Montana, and in the Canadian provinces of Manitoba and Saskatchewan.

The following four paragraphs are provided by the PIIC as a history of the Dakota Uprising and PIIC land acquisition.

> In 1891, the U.S. Secretary of the Interior purchased 120 ac (49 ha) of land on Prairie Island for the benefit of the Mdewakanton Sioux in Minnesota who did not participate in the Dakota Uprising of 1862, an armed conflict between the United States and several bands of the Eastern Dakota which began on August 17, 1862, along the Minnesota River in southwest Minnesota.
>
> During the early to mid-1800s, the Dakota ceded vast tracts of land to the U.S. Government through various treaties with the U.S. In exchange, the Dakota were promised cash and annuities (goods and food) by the U.S. Government. Very little of the appropriated cash and annuities was actually paid to the Dakota, but instead went directly to the traders from whom the Dakota were purchasing goods. Tensions rose during the summer of 1862 when crops failed, the annuity payments were delayed, the U.S. Government refused to hand out food that was stored for the Dakota, and the traders refused to allow the Dakota to purchase food and goods on credit. The resulting severe food shortages caused widespread hunger among the Dakota.
>
> Frustrated with this situation and the continued encroachment of their lands, a council of Dakota decided to attack settlements throughout the Minnesota River Valley in an effort to drive whites out of the area. Continued battles between the Dakota against settlers and later, the U.S. Army, culminated with the surrender of most of the Dakota. On September 26, 1862, over 1200 Dakota men, women, and children were taken into custody at Fort Snelling, Minnesota. Two days later, on September 28, 393 Dakota were tried for their involvement in the conflict; 303 were sentenced to hang. On December 26, 1862, 38 Dakota were hanged in Mankato, Minnesota; this was the largest mass execution in U.S. history. In April of 1863, the rest of the Dakota were expelled from Minnesota and the U.S. Congress abolished their reservations.
>
> This land purchased in 1891 for the Mdewakanton Sioux at Prairie Island was assigned to individual Mdewakanton Sioux members (in 5 and 10 ac [2 and 4 ha] tracts) residing on Prairie Island. These land assignments, also known as the Red Seal Lands, were originally restricted to the descendents of the Mdewakanton Sioux who were residing in the State of Minnesota on May 20, 1886. A 1980 Act of Congress changed the status of those lands, transferring them into trust for the benefit of the PIIC.

Following the Indian Reorganization Act of 1034, the U.S. Government purchased and placed into trust an additional 414 ac (168 ha) of land for the PIIC. This purchase, which abutted the original 120 ac (49 ha), established the Prairie Island Reservation. Over the last several years, the PIIC has been able to expand its land base through the purchase of additional adjacent lands. The "Prairie Island Land Conveyance Act of 2005," passed by Congress in 2005, authorized the transfer of an additional 1,300 ac (526 ha) of USACE land (485 ac [196 ha] of forested wetlands and prairie and 819 ac [819 ha] of open water) to the PIIC. Today, the PIIC has grown to over 3,000 ac (1200 ha) (including land and water). Additionally, the tribe owns 685 ac (277 ha) of land (in Goodhue County) that are not in Trust and not considered part of the reservation, 465 ac (188 ha) in Florence Township and 259 ac (105 ha) in Welch Township.

2.2.9.2 *Historic and Archaeological Resources*

Previous Archaeological Research at Prairie Island

There are nine archaeological sites on the PINGP 1 and 2 property including seven known and recorded archaeological sites, one reported site (Vergil Larson II Mound Group site [21GDI]), and one unrecorded site (Prairie Island District 132 Schoolhouse) (see Table 2.25). The earliest investigation on Prairie Island was conducted by T.H. Lewis in 1885. Lewis was a surveyor for the Northwest Archaeological Survey. He documented the presence of hundreds of mounds and created a series of maps. Lewis never published his notes or maps. Lewis's work was followed by Jacob Brower and Warren Upham in the late 1880s. Many of the sites documented by Lewis were recorded in relation to a shoreline that no longer exists due to flooding from the construction of dams on the Mississippi River (Hildebrandt 2008). The discussion below is a chronological summary of the archaeological surveys and studies performed in the vicinity of the PINGP 1 and 2 site.

In the 1940s and 1950s, Lloyd Wilford, a professor at the University of Minnesota, continued the archaeological study of mounds and other sites on Prairie Island. He conducted a number of interviews with landowners and excavated some mounds and archeological sites on the island. He also conducted archaeological investigations at the Bartron Village site (21GD02) and the Birch Lake Mound Group (21GD58), both of which are on the present-day PINGP 1 and 2 property.

In the 1960s, Elden Johnson conducted several archaeological surveys and salvage excavations on Prairie Island. During a 1960 survey, Johnson reportedly located 41 burial mounds. In 1967, in anticipation of the construction of PINGP 1 and 2, Johnson conducted and coordinated surveys and excavations with NSP and the Minnesota Historical Society (MHS). Johnson identified and recorded an Oneota village (21GD02, previously excavated by Wilford in 1948) and site 21GD148, a prehistoric habitation site. Archaeological excavation of 21GD02 uncovered various subsurface features, including storage/refuse pits, fire hearths, and postmolds. Portions of two houses were also uncovered and possibly a portion of a palisade, also known as a type of fence.

Table 2-25. Archaeological Sites within the PINGP 1 and 2 Site Boundary

Site Number	Site Name	Description	Condition
21GD02	Bartron Village Site	Village Site; Oneota (Blue Earth Phase) affiliation	Moderately disturbed (from cultivation) (Gibbon 1979)
21GD58/61	Birch Lake Mound Group	Eight mounds; Mississippian affiliation	Unknown (Johnson, Peterson, and Streiff 1969)
21GD59	NSP II Mound Group	Six mounds; Mississippian affiliation	Heavily disturbed/destroyed (from cultivation and PINGP construction) (Johnson Data

			Recovery 1969)
21GD62	Mound	One mound; probable Woodland affiliation	Moderately disturbed (from cultivation and possibly railroad construction)
21GD148	Habitation site	Woodland and probable Mississippian affiliation	Minimally disturbed (Johnson 1980a)
21GD149	Possible Earthwork, Mound, or Habitation Site and Artifact Scatter	Possible Woodland and probably Oneota affiliation	Heavily disturbed (from erosion) (Johnson 1980 survey work)
21GD207	Artifact Scatter	Woodland affiliation	Unknown (Johnson 1980 survey work)
21GDI	Vergil Larson II Mound Group	Reported 3 mounds	Unknown
No site number	Prairie Island District 132 Schoolhouse Site	Subsurface remains of District Schoolhouse (1873 to 1953)	Minimally disturbed, site not formally investigated

Source: Boden 2008; Hildebrandt 2008

In 1968, the U.S. Atomic Energy Commission (AEC) issued the construction permits for PINGP 1 and 2. Shortly after the issuance of the permits, archaeological excavations began at the Bartron Village Site (21GD02), and continued through 1969. In 1979, Guy Gibbon documented the results from Johnson's 1968 and 1969 excavations at the Bartron Village Site (21GD02). Johnson also coordinated excavations at the Birch Lake Mound Group (21GD58/61) and the NSP II Mound Group (21GD59). Excavations at the Birch Lake Mound Group (21GD58/61) yielded enough information for publication (Johnson, Peterson, and Streiff 1969). There is no summary of the excavations conducted at the NSP II Mound Group (21GD59).

The layout of the PINGP 1 and 2 cooling towers was modified several times, finally resulting in an east-west configuration. Burial mounds at the NSP II Mound Group (21GD59) were reported to be in the vicinity and artifacts were encountered during excavation and were curated at the Minnesota Historic Society (MNHS) (Hildebrandt 2008). The four remaining mounds were either covered with fill or leveled during grading activities for the PINGP 1 and 2 cooling towers. No human remains were encountered.

In 1971, the Bartron Village Site (21GD02) was listed on the *National Register of Historic Places* (NRHP). NSP agreed to set aside the southern portion of the PINGP 1 and 2 property for archaeological preservation (NMC 2008).

A voluntary ban on excavating Indian burials in Minnesota began in the mid-1970s. Minnesota's Private Cemeteries Act (M.S 307.08) protects "...all human burials, human remains, and human burial grounds shall be accorded equal treatment and respect for human dignity without reference to their ethnic origins, cultural backgrounds, or religious affiliations. The provisions of this section shall apply to all human burials, human remains, or human burial grounds found on or in all public or private lands or waters in Minnesota." Previously, burials on public land were protected while burials on private land were not afforded the same protection.

In the early 1980s, Christine Harrison of the MNHS conducted a systematic survey of Goodhue County, including the PINGP 1 and 2 site. At this time, Elden Johnson returned to PINGP 1 and 2 to conduct archaeological investigations for the modification of the cooling discharge canal. Sites potentially impacted by the proposed modification were the NSP II Mound Group (21GD59) and the 21GD148 habitation site (Hildebrandt 2008). A new site, 21GD207, an artifact scatter, was also identified during this survey. Johnson completed his final report in December 1980. Site 21GD148 was nominated to the NRHP though it did not make the list. Also in 1980, but unrelated to the canal survey work, another new site (21GD149) was discovered eroding out of a river bank by NSP biologists on land owned by the USACE and leased by NSP. In 1991, 1994, and 2005 archaeological surveys and testing continued on the PINGP 1 and 2 property, with no artifacts recovered.

In 1999, the PIIC hired The 106 Group, Ltd., to perform an archaeological reconnaissance survey and Geographic Information Systems (GIS) inventory of archaeological sites on and in the vicinity of the PIIC. Survey efforts during the inventory were unable to field verify the Vergil Larson II Mound Group (21GDI). No subsurface testing was attempted in the area out of respect for the potential burials interred in the mounds (Abel et al. 1999).

Xcel Energy (Xcel) contracted with The 106 Group, Ltd., in 2008 to conduct a cultural resources assessment of archaeological sites located on and in the immediate vicinity (within 1 mi [0.6 km]) of the PINGP 1 and 2 site (Boden 2008). Xcel recently partnered with Minnesota State University, Mankato, to conduct archaeological excavations of the Bartron Village Site (Hildebrandt 2008).

Traditional Cultural Properties

Traditional cultural properties are cultural resources that are historically important for a community to maintain its cultural heritage. Examples of traditional cultural properties include gathering areas, plant material, a sacred mountain and/or landscape that is crucial to a community's identity, or burial locations that, for example, connect American Indians with their ancestors. Most traditional cultural properties can be identified only through consultation with members of these communities. Identifying traditional cultural properties is an important part of the Section 106 consultation under the National Historic Preservation Act (NHPA).

While no traditional cultural properties have been identified at the PINGP 1 and 2 site, there is the potential for these properties to exist. The PIIC has also expressed concern about invasive plants on Prairie Island displacing native species that are culturally significant to the PIIC. Many of these plants are used as medicines and in religious ceremonies by members of the PIIC. A 2008 survey conducted by the PIIC found 22 invasive plant species on tribal lands. Work is underway to remove buckthorn and purple loosestrife from some areas (PIIC 2009).

Because of concerns about declining native plant species, the PIIC conducted an inventory of medicinal and culturally important plant species on tribal lands. The inventory, which was conducted in the fall of 2008 and spring/summer of 2009, is a follow-up to an inventory conducted in 1998 (PIIC 2009). According to the 1998 inventory, 70 percent of the original native medicinal and culturally significant plant species have been lost during the last generation. Of the 189 medicinal or culturally important plant species historically present on Prairie Island and used by tribal members, only 52 were identified in the 1998 field survey. The 1998 study also discussed the findings of past plant studies conducted by NSP within the boundaries of PINGP 1 and 2 since 1975. Medicinal and culturally important plant species found to be present in both the Xcel/NSP and Prairie Island studies included: yarrow, ragweed, big milkweed, lamb's quarter, wild strawberry, sunflower, sweet clover, sand primrose, Virginia creeper, goldenrod, and pennyroyal. (PIIC 2009)

As part of the 2008/2009 inventory, Tribal elders were interviewed to gain a historical perspective on the locations and uses of these plants on the PIIC Reservation. Some elders stated that medicinal plants they have used in the past were not as strong or abundant as they once were. All of the elders interviewed agreed that conducting periodic surveys is important and that the PIIC should develop some kind of management plan to protect species, enhance growing conditions, and educate PIIC members about native plant species and their uses. (PIIC 2009)

2.3 Related Federal and State Activities

The NRC staff reviewed the possibility that activities of other Federal agencies might impact the renewal of the operating license for PINGP 1 and 2. Any such activity could result in cumulative environmental impacts and the possible need for a Federal agency to become a cooperating agency in the preparation of the PINGP 1 and 2 SEIS.

The NRC staff has determined that there are no Federal projects that would make it desirable for another Federal agency to become a cooperating agency in the preparation of the SEIS. Federal facilities and National Parks within 50 mi (80 km) of PINGP 1 and 2 are listed below.

- St. Anthony Falls Lock and Dam
- Lower St. Anthony Falls Lock and Dam
- Lock and Dam 1
- Lock and Dam 2
- Lock and Dam 3
- Mississippi National River and Recreation Area
- Fort McCoy (U.S. Military Installation)
- Army National Guard Family Assistance Center
- Minneapolis-St. Paul Air Reserve Station

The NRC has entered into a Memorandum of Understanding (MOU) with the PIIC for the PINGP 1 and 2, license renewal application review, which is described in more detail in Section 1.6. The American Indian lands listed below lie within 50 mi (80 km) of PINGP 1 and 2. Tribal agencies contacted during the environmental review in addition to those listed below are listed in Section 1.8 of this draft SEIS.

- Prairie Island Indian Community, Welch, Minnesota
- Shakopee Mdewakanton Sioux Community, Prior Lake, Minnesota

NRC is required under Section 102(2)(c) of the National Environmental Policy Act of 1969 (NEPA) to consult with and obtain the comments of any Federal agency that has jurisdiction by law or special expertise with respect to any environmental impact involved. NRC has consulted with the American Council on Historic Preservation and the FWS. Federal Agency consultation correspondence and comments on the SEIS are presented in Appendix D.

2.4 References

10 CFR 20. *Code of Federal Regulations*, Title 10, *Energy*, Part 20, "Standards for Protection Against Radiation."

10 CFR 50. *Code of Federal Regulations*, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

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3.0 ENVIRONMENTAL IMPACTS OF REFURBISHMENT

Facility owners or operators may need to undertake or, for economic or safety reasons, may choose to perform refurbishment activities in anticipation of license renewal or during the license renewal term. The major refurbishment class of activities characterized in the *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (GEIS) (NRC 1996; 1999) is intended to encompass actions that typically take place only once in the life of a nuclear plant, if at all. Examples of these activities include, but are not limited to, replacement of boiling-water reactor recirculation piping and replacement of pressurized-water reactor steam generators. As noted in the GEIS, refurbishment activities could result in environmental impacts beyond those that occur during normal plant operations. For issues that meet Category 1 criteria, no additional plant-specific analysis is required in this draft supplemental environmental impact statement (SEIS) unless new and significant information is identified. Category 2 issues are those that do not meet criteria for Category 1 and, therefore, additional plant-specific review of these issues is required. Refurbishment activities may affect a variety of environmental issues as listed in Table 3-1 below.

Table 3-1. Issues Related to Refurbishment at PINGP 1 and 2

Issues	Category
Surface Water Quality, Hydrology, and Use	
Impacts of refurbishment on surface water quality	1
Impacts of refurbishment on surface water use	1
Aquatic Ecology	
Refurbishment	1
Terrestrial Resources	
Refurbishment impacts	2
Threatened and Endangered Species	
Threatened and Endangered Species	2
Ground Water Use and Quality	
Impacts of refurbishment on ground water use and quality	1
Air Quality	
Air quality during refurbishment (nonattainment and maintenance areas)	2
Land Use	
Onsite land use	1
Human Health	
Radiation exposures to the public during refurbishment	1

Issues	Category
Occupational radiation exposures during refurbishment	1
Socioeconomics	
Public Services: Public Safety, Social Services, and Tourism and Recreation	1
Aesthetic Impacts (refurbishment)	1
Housing Impacts	2
Public Services: Education (refurbishment)	2
Public Services: Public Utilities	2
Public Services: Transportation	2
Historic and Archaeological Resources	2
Environmental Justice	
Environmental Justice	Uncategorized

Northern State Power Co. (NSP) plans to replace the two steam generators at Prairie Island Nuclear Generating Plant, Unit 2 with new, once-through, enhanced steam generators to support plant operations through the renewed license period. Steam generators would only be replaced on Unit 2 as the Unit 1 steam generators were replaced in 2004. Accordingly, NSP and the U.S. Nuclear Regulatory Commission (NRC) have analyzed steam generator replacement as a refurbishment activity, pursuant to Title 10, Section 51.53(c)(3)(ii), of the *Code of Federal Regulations* (10 CFR 51.53(c)(3)(ii)). Unless otherwise noted, the discussion of the refurbishment activities is adapted from the Environmental Report (ER) (NMC 2008) or information gathered during NRC's site audit.

3.1 Refurbishment Activities at PINGP 1 and 2

Steam generator replacement activities will take approximately 80 days to complete. The replacement steam generators would be manufactured by AREVA in Chalon Saint-Marcel, located in central Eastern France and will be delivered in April-June 2013 and will be installed in August-October 2013 (AREVA 2008). The steam generator replacement will be coordinated with scheduled outage maintenance and refueling. The replacement steam generators will be transported via barge across the Atlantic Ocean and up the Mississippi River. The barge will pass through Lock and Dam 3 and be offloaded at the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2) barge landing, which was used previously for the Unit 1 steam generator replacement in 2004. For transportation within the United States, NSP will be required to meet all Federal, State, and local requirements, such as those that may be applicable to dredge or fill activities. The U.S. Army Corps of Engineers (USACE) will regulate such work pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 if any of the work is performed in "navigable waters."

Once on site, the steam generators will be moved via a self-propelled transporter to a temporary building, which will house the replacement steam generators until they are ready for installation. No onsite road improvements would be required to offload the steam generators. Several additional temporary buildings will be constructed, including office space for construction contractors and a decontamination building. This temporary construction area will be located approximately 100 yds (91 m) northwest of the turbine building. Warehouses will be built for storage purposes during the steam generator replacement and will remain after the steam generator replacement is complete. No construction will take place on previously-undisturbed land. The old steam generators will be transported offsite via rail car for disposal.

NSP estimates that additional 750 workers would be required to complete the combined maintenance and refueling and steam generator replacement during the September 2013 outage.

3.2 Environmental Impacts of Refurbishment

The following sections discuss the Category 2 issues associated with refurbishment activities at PINGP 1 and 2. Any environmental impacts from refurbishment will be in addition to those associated with continued operation of PINGP 1 and 2 for the period of license renewal; Chapter 4 of this report discusses those issues.

3.2.1 Terrestrial Resources – Refurbishment Impacts

The terrestrial resources on and in the vicinity of the PINGP 1 and 2 site are described in Section 2.2.7 of this draft SEIS. Unless otherwise noted, the discussion of the impacts of refurbishment to terrestrial ecology is adapted from the ER (NMC 2008), or information gathered during NRC's site audit.

The Unit 2 steam generators replacement project would likely require laydown areas and the construction of temporary structures. An area located approximately 300 ft (90 m) from the turbine building would be used for temporary construction. Temporary construction would include a facility to house the steam generators before the replacement, office space for construction contractors, and a decontamination building. Any warehouses constructed for materials storage would likely remain after the steam generator replacement outage. No permanent storage building would be built because the old steam generators would be disposed of after being removed from Unit 2. All construction activities associated with refurbishment would occur on site and would not impact any previously undisturbed areas. Any ground-disturbing activities that take place would require the appropriate permits from local, state, and Federal agencies.

No road improvements would be required for delivery of the steam generators to PINGP 1 and 2 as delivery of the new steam generators would not require extensive overland travel. The new steam generators would be offloaded from a barge to a transporter directly onto the PINGP 1 and 2 site.

Some noise and construction impacts may impact edge species and wildlife for the period of onsite activity, but these effects will likely be minimal and short term as the proposed refurbishment outage would last a total of approximately 80 days.

Based on information from the staff's independent review of NSP's ER for the PINGP 1 and 2 proposed license renewal, the staff's site visit, the scoping process, and evaluation of other reports and information, impacts to terrestrial resources during the proposed Unit 2 steam generator replacement would be SMALL. A few mitigation measures that could reduce impacts to the terrestrial environment during construction of the temporary facilities include silt fences to minimize sediment transport, the use of best management practices, and revegetation of cleared land remaining after completion of construction. These mitigation measures could reduce impacts by reducing erosion and minimizing the movement of sediment, nutrients, and pollutants.

3.2.2 Threatened and Endangered Species

3.2.2.1 *Terrestrial Species*

The threatened and endangered terrestrial species on or in the vicinity of the PINGP 1 and 2 site or along the in-scope transmission line ROWs are described in Section 2.2.7.2 of this draft SEIS. Unless otherwise noted, the discussion of the impacts of refurbishment to threatened and endangered terrestrial species is adapted from the ER (NMC 2008) or information gathered during NRC's site audit.

As described in Section 3.2.1 above, all construction activities associated with refurbishment would occur on site and would not impact any previously undisturbed land, and no overland travel or associated road improvements would be required for transportation of the new steam generators to the PINGP 1 and 2 site.

Minimal noise and construction impacts may impact edge species and wildlife for the period of onsite activity; however no threatened or endangered species will likely be impacted as a result of refurbishment activities. Though bald eagles (*Haliaeetus leucocephalus*) are known to nest within the vicinity of the PINGP 1 and 2 site, the species is not likely to be impacted by refurbishment activities because these activities will be confined to the PINGP 1 and 2 site. The pair of peregrine falcons (*Falco peregrineus*) that nest on Unit 1 are not likely to be affected by the proposed Unit 2 steam generator replacement because the nest is far enough from the ground. In addition, the steam generator replacement is not expected to cause significant noise or other types of disturbance to the birds. Additionally, NSP would undertake the proposed steam generator replacement outside of the falcon breeding period, which generally lasts from March through July.

Based on information from the staff's independent review of NSP's ER for the PINGP 1 and 2 proposed license renewal, the staff's site visit, the scoping process, and evaluation of other reports and information, impacts to threatened and endangered terrestrial species during the proposed Unit 2 steam generator replacement would be SMALL. A few mitigation measures that could reduce impacts to threatened and endangered terrestrial species include undertaking the steam generator replacement outside of the peregrine falcon breeding season, and minimizing activities that may cause significant noise during midday hours when peregrine falcons are more likely to hunt for food.

3.2.2.2 *Aquatic Species*

The threatened and endangered aquatic species in the vicinity of the PINGP 1 and 2 site are described in Section 2.2.7.1 of this draft SEIS. Unless otherwise noted, the discussion of the impacts of refurbishment to aquatic threatened and endangered species is adapted from the ER (NMC 2008), or information gathered during NRC's site audit.

As described above, Unit 2 will be receiving replacement steam generators, transported up the Mississippi River by barge, and offloaded directly onto the PINGP 1 and 2 site. Because of the Lock and Dam system on the Mississippi River, designed to allow barges to navigate up the river, no changes to the river or dams are anticipated. Because there is already a cement pad on the shoreline where the steam generators will be offloaded from the barge onto the plant site, there will be little to no change to the shoreline.

Based on information from the staff's independent review of NSP's ER for the PINGP 1 and 2 proposed license renewal, the staff's site visit, the scoping process, and evaluation of other reports and information, impacts to aquatic resources during the proposed Unit 2 steam generator replacement would be SMALL. An example of a mitigation measure that could reduce impacts to the aquatic threatened and endangered species during transport and offloading of the steam generators include ensuring that the barges do not approach the site of the Higgins eye relocation project, described in Section 2.2.7.

3.2.3 Air Quality During Refurbishment (Non-Attainment and Maintenance Areas)

Air quality during refurbishment (nonattainment and maintenance areas) is a Category 2 issue. Table B-1 of Appendix A to Subpart B, "Environmental Effect of Renewing the Operating License of a Nuclear Power Plant," of 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," notes the following:

> Air quality impacts from plant refurbishment associated with license renewal are expected to be small. However, vehicle exhaust emissions could be cause for concern at locations in or near nonattainment or maintenance areas. The significance of the potential impact cannot be determined without considering the compliance statutes of each site and the numbers of workers expected to be employed during the outage.

Specifically, 10 CFR 51.53(c)(3)(ii)(F) requires the following:

> If the applicant's plant is located in or near a nonattainment or maintenance area, an assessment of vehicle exhaust emissions anticipated at the time of peak refurbishment work force must be provided in accordance with the Clean Air Act (CAA) as amended.

The GEIS states the following:

> The 1990 CAA amendments include a provision that no federal agency shall support any activity that does not conform to a state implementation plan designed to achieve the National Ambient Air Quality Standards (NAAQS) for criteria pollutants (sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter less than 10 μm in diameter). On November 30, 1993, the U.S. Environmental Protection Agency (EPA) issued a final rule (58 FR 63214) implementing the new statutory requirements, effective January 31, 1994. The final rule requires that federal agencies prepare a written conformity analysis and determination for each pollutant where the total of direct and indirect emissions caused by proposed federal action would exceed established threshold emission levels in a nonattainment or maintenance area. An area is designated "nonattainment" for a criteria pollutant if it does not meet the NAAQS for the pollutant. A maintenance area has been redesignated by a State from nonattainment to attainment; the State must submit to EPA a plan for maintaining the NAAQS as a revision to its State Implementation Plan.

The steam generator replacement project would result in minor air quality impacts for the duration of the approximately 80-day period needed to complete refurbishment activities. The main sources of air quality impacts would be fugitive dust from construction activities associated with the project, and exhaust emissions from motorized equipment, and vehicles of temporary workers.

Although NSP plans to use the existing buildings and structures from the previously completed PINGP 1 and 2, Unit 1 steam generator replacement, some additional temporary structures would be built. These include a facility for preparing the steam generators. The construction of this facility may result in some minor, temporary air quality impacts due to emissions and fugitive dust from operation of earth-moving and material handling equipment. NSP would use best management practices to minimize fugitive dust and emissions resulting from construction activities. (NMC 2008)

NSP indicated that an additional 750 temporary employees would be needed for the steam generator replacement project which is estimated to take 80 days to complete. NSP assumed that the additional temporary workforce would commute from areas within PINGP 1 and 2's 50-miles radius. This would result in an additional 37,500 vehicle miles travelled within the county, which is approximately 2.12 percent of the 1,771,899 average vehicles miles per day for the Goodhue County in 2007. (NMC 2008)

Dakota County, located 12 miles northwest of the plant, is the closest maintenance area for lead, sulfur dioxide (SO_2) and carbon monoxide (CO). Olmsted County, located 35 miles south of the PINGP 1 and 2 site, is a maintenance area for sulfur dioxide (SO_2) and PM_{10}. Since temporary workforce would be coming from all over the 50-mile region, the additional 37,500 vehicle miles travelled would represent 0.35 percent of the total miles traveled in the Dakota County per day and approximately 1 percent of the total miles traveled in the Olmsted County per day, which is a very small fraction of the total miles travelled in these two counties each day.

The NRC staff concludes that the impact on air quality of vehicle exhaust emissions and construction activities during the PINGP Unit 2 steam generator replacement project would be SMALL. The NRC staff identified a variety of measures that could mitigate potential air quality impacts resulting from the PINGP 1 and 2, Unit 2, steam generator replacement project. These include the use of the best management practices and implementation of dust control plan to minimize emissions from construction activities, the use of multi-person vans and the implementation of shift changes for the workforce to reduce the number of vehicles on the road at any given time. The NRC staff did not identify any cost-benefit studies applicable to these mitigation measures.

3.2.4 Housing Impacts

Housing impacts during refurbishment is a Category 2 issue. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, notes that:

> Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures that limit housing development are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development.

NSP estimates that steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days at PINGP 1 and 2. Approximately 750 workers would be needed to the perform PINGP 1 and 2, Unit 2, steam generator replacement project activities in addition to the normal number of refueling outage workers (NMC 2008).

The number of additional workers would cause a short-term increase in the demand for temporary (rental) housing units in the region beyond what is normally experienced during a refueling outage at PINGP 1 and 2. Since PINGP 1 and 2 are located in a high population area (see Section 2.2.8.5) and the number of available housing units has kept pace or exceeded changes in county populations (see Section 2.2.8.1), any changes in employment would have no noticeable effect on the availability of housing in the socioeconomic region of influence (ROI). Because of the short duration of the steam generator replacement activity and the availability of housing in the region, employment-related housing impacts would have no noticeable impact.

3.2.5 Public Services – Education (Refurbishment)

Education is a Category 2 refurbishment issue. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, notes that "[m]ost sites would experience impacts of small significance but larger impacts are possible depending on site- and project-specific factors."

As discussed in Section 3.2.4, NSP estimates that the PINGP 1 and 2, Unit 2, steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days at the PINGP 1 and 2 site (NMC 2008). Because of the short duration of the steam generator replacement activity, workers would not be expected to bring families and school-age children with them; therefore, there would be no impact on educational services during this extended refueling outage.

3.2.6 Public Services – Public Utilities

Public utilities refurbishment is a Category 2 issue. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, notes that "[a]n increased problem with water shortages at some sites may lead to impacts of moderate significance on public water supply availability."

Since there is no water shortage in the region and the public water systems in Goodhue County, Dakota County, and Pierce County have excess capacity, any changes in PINGP 1 and 2 employee water usage would have little noticeable affect on public water supply availability in these counties.

As discussed in Section 3.2.4, NSP estimates that the PINGP 1 and 2, Unit 2, steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days at the PINGP 1 and 2 site (NMC 2008). The additional number of refueling outage workers needed to replace the steam generators would cause a short-term increase in the amount of public water and sewer services used in the immediate vicinity of PINGP 1 and 2. Since the region has excess water supply capacity with no restrictions, this replacement activity would create no noticeable impact.

3.2.7 Public Services – Transportation

Transportation is a Category 2 refurbishment issue. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, notes that:

> Transportation impacts (level of service) of highway traffic generated during plant refurbishment and during the term of the renewed license are generally expected to be of small significance.
>
> However, the increase in traffic associated with additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites.

As previously discussed in Section 2.2.8.2, the primary access road to PINGP 1 and 2 is County Road 18, which is mostly rural and uncongested. PINGP 1 and 2 has one plant access road via Sturgeon Lake Road and County Road 18. County Road 18 and Sturgeon Lake Road are also access routes to the Prairie Island Indian Community's (PIIC) residential areas, government offices, health clinics, and gaming enterprise, Treasure Island Resort and Casino, located just off Sturgeon Lake Road east of the plant access road (PIIC 2009). NSP employees have the option of exiting the site via Wakonade Drive or the plant access road to Sturgeon Lake Road and County Road 18. Traffic at the intersections of the plant access road and Sturgeon Lake Road, Wakonade Drive and Sturgeon Lake Road, and Sturgeon Lake Road and County Road 18 are controlled by stop signs. Steam generator replacement and refueling outage workers would use the same entrance and exit roads as current PINGP 1 and 2 employees.

County Road 18 and Sturgeon Lake Road currently have the capacity to handle the additional volume of traffic. However, due to the lack of timed traffic signals, there could be problems with traffic flow along Sturgeon Lake Road during the PINGP 1 and 2 site refueling outage shift changes. Increased traffic volumes during refueling outages at the PINGP 1 and 2 site, occurring approximately every 20 months, has affected the level of service capacity on Sturgeon Lake Road for short periods of time.

Based on this information and because of the short duration of the steam generator replacement activity (up to 80 days), transportation (level of service and noise) impacts in the vicinity of PINGP 1 and 2 would be SMALL to MODERATE and would mostly occur during shift changes. During periods of high traffic volume (i.e., morning and afternoon shift changes), NSP could stagger work schedules and use NSP employees and/or local police officials to direct traffic entering and leaving PINGP 1 and 2 to minimize level of service impacts on Sturgeon Lake Road. In addition, NSP could work with the PIIC to establish additional mitigation measures, such as developing an agreement to coordinate shift changes, coordinate event schedules, identify days where traffic volume will be high, or to use traffic control staff (PIIC 2009).

3.2.8 Offsite Land Use (Refurbishment)

Offsite land use is a Category 2 refurbishment issue. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, notes that "impacts may be of moderate significance at plants in low population areas."

Since PINGP 1 and 2 are located in a high population area, any changes in the PINGP 1 and 2 employment would have little noticeable affect on land use in the region. Because of the short duration of the steam generator replacement activity, the additional number of refueling outage workers would not cause any permanent population- and tax revenue-related land use changes in the immediate vicinity of PINGP 1 and 2.

3.2.9 Historic and Archaeological Resources

Historic and archaeological resources are a Category 2 refurbishment issue. Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, notes that:

> Generally, plant refurbishment and continued operation are expected to have no more than small adverse impacts on historic and archaeological resources. However, the National Historic Preservation Act requires the Federal agency to consult with the State Historic Preservation Officer to determine whether there are properties present that require protection.

Continued operation of PINGP 1 and 2 during the license renewal term would have a MODERATE impact on archaeological resources at the PINGP 1 and 2 site (see section 4.4.5 for a detailed discussion). NSP has no plans to alter the PINGP 1 and 2 site for license renewal. Should plans change, further consultation would be initiated by NSP with the NRC, Minnesota Historical Society (MNHS), and the PIIC. Any land disturbing activities would be carried out under corporate procedures.

NSP is in the process of revising its corporate procedures to improve its protection of archaeological resources. Specifically, NSP has proposed to include in its corporate procedures detailed instructions for its employees to follow in the case of unexpected discovery of archaeological resources (Xcel 2009). NSP is currently seeking comment from the MNHS, the Bureau of Indian Affairs, the Office of the State Archaeologist, and the PIIC on its revised procedures.

NSP has indicated that the PINGP 1 and 2, Unit 2, steam generators would be replaced. The steam generator replacement project would take place in an area that was previously disturbed by the construction of PINGP 1 and 2. All construction will take place within the existing developed industrial portions of the plant site. Undisturbed areas of the plant site would not be affected (NMC 2008). NSP has contacted the MNHS and the PIIC to inform them of this refurbishment activity. For a map of potentially affected areas, refer to Figure 3.1.

Ground disturbing activities associated with the project would include the excavation of previously disturbed areas in the vicinity of PINGP 1 and 2 (NMC 2008). Several temporary buildings would be built, including a facility for preparing the steam generators, office space for construction contractors, and a decontamination building. Warehouse(s) would also be built within the developed portions of the plant to temporarily house the replaced steam generators and would remain after the steam generator replacement outage (NMC 2008). No road improvements would be required because the steam generators would arrive via barge and be offloaded to a self-propelled nuclear transporter capable of traveling on existing site roads without damage. The transporter will move along an existing dirt service road that extends from the barge landing to PINGP 1 and 2, Unit 2. The service road area was previously heavily disturbed during construction of PINGP 1 and 2. Most activities would be temporary and localized. According to NSP, permits and approvals would be obtained from the appropriate Federal, State, and local agencies prior to the movement of the steam generators.

Because any refurbishment work done would primarily be on previously disturbed land, the impacts associated with the replacement of the PINGP 1 and 2, Unit 2, steam generator are not expected to adversely impact historic or archaeological sites located in the vicinity of PINGP 1 and 2. Therefore, the potential impacts from this activity on historic or archaeological resources would be SMALL. However, should archaeological resources be encountered during construction, work would cease until NSP environmental personnel perform an evaluation and consider possible mitigation measures through consultation with the NRC, MNHS, and the PIIC.

3.2.10 Environmental Justice

Environmental justice is a category 2 refurbishment issue and requires an impact assessment.

Due to its close proximity to PINGP 1 and 2, the PIIC could be disproportionately affected by steam generator replacement activities. The effects could include transportation and noise impacts during shift changes and the removal of the old steam generators via rail across the community's only access road to the reservation (Sturgeon Lake Road). As stated in section 3.2.8 of this draft SEIS, transportation impacts from refurbishment would be SMALL to MODERATE. These impacts could disproportionately effect the PIIC. The PIIC could also experience the effects of increased noise levels from steam generator replacement activities. However, these impacts are of short duration and are not expected to be high.

3.3 Evaluation of New and Potentially Significant Information on Impacts of Refurbishment

For all Category 1 issues related to refurbishment, the NRC staff has not identified any new and significant information during its review of the PINGP 1 and 2 ER, the staff's environmental site audit, the scoping process, or the evaluation of other available information, including the site audit during the week of August 18, 2008, during which NSP's refurbishment plans were discussed. Therefore, the NRC staff adopts the findings in the GEIS for Category 1 issues associated with refurbishment, and concludes that there would be no environmental impacts during the renewal term beyond those discussed in the GEIS for these issues.

3.4 Summary of Impacts of Refurbishment

For the nine Category 2 issues and environmental justice, the impacts of refurbishment at PINGP 1 and 2 range from no impact to a MODERATE impact. For the refurbishment issues Public Services: Education, Offsite Land Use, and Environmental Justice, the NRC staff concludes that there would be a SMALL to MODERATE impact. For the refurbishment issues Terrestrial Ecology, Threatened or Endangered Species, Air Quality (Nonattainment and Maintenance Areas), Housing Impacts, Public Services: Public Utilities, Public Services: Transportation, and Historic and Archeological Resources, the NRC staff concludes that the potential environmental effects are SMALL to MODERATE.

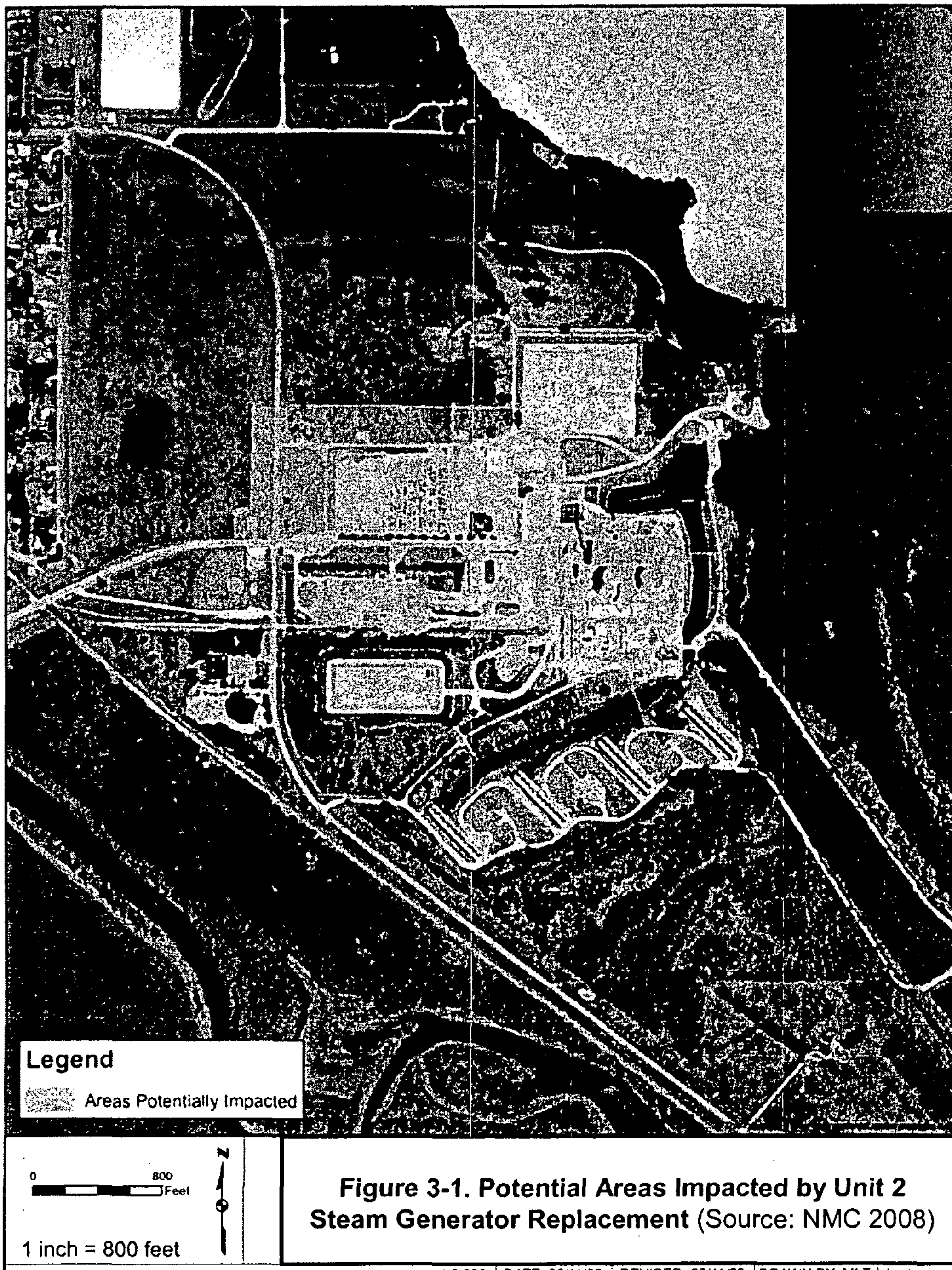

Figure 3-1. Potential Areas Impacted by Unit 2 Steam Generator Replacement (Source: NMC 2008)

3.5 References

10 CFR 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

40 CFR 51.850. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 51, "Requirements for Preparation, Adoption, and Submittal of Implementation Plans."

58 FR 63214. U.S. Environmental Protection Agency. Final General Conformity Regulations. November 30, 1993.

AREVA. 2006. "Press Release: AREVA Wins Contract for Two Replacement Steam Generators at Prairie Island Nuclear Generating Plant." Available URL: http://www.areva-np.com/scripts/press/publigen/content/templates/show.asp?P=795&L=US (accessed November 25, 2008). ADAMS No. ML083310148.

NMC (Nuclear Management Company, LLC). 2008. Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application, Appendix E – Applicant's Environmental Report, License Renewal Operating Stage. Redwing, Minnesota. April 2008. ADAMS Nos. ML081130677, ML081130681, and ML081130684.

NRC (U.S. Nuclear Regulatory Commission). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. NUREG-1437, Volumes 1 and 2, Washington, D.C. ADAMS Nos. ML040690705 and ML040690738.

NRC (U.S. Nuclear Regulatory Commission). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report*, "Section 6.3-Transportation, table 9.1, Summary of Findings on NEPA Issues for License Renewal of Nuclear Power Plants, Final Report." NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

PIIC (Prairie Island Indian Community). 2008. Information provided by the Prairie Island Indian Community (PIIC) will aid NRC staff in the preparation of the Supplemental EIS (SEIS). PIIC Supplemental Information. Non-public reference per 36 CFR 800.11(c).

PIIC (Prairie Island Indian Community). 2009. Information provided by the Prairie Island Indian Community (PIIC). PIIC Supplemental Information. Non-public reference per 36 CFR 800.11(c).

Xcel (Xcel Energy). 2009. Letter from M. Wadley, Site Vice President, Prairie Island Nuclear Generating Plant, Units 1 and 2, Welch, Minnesota, to U.S. Nuclear Regulatory Commission, Washington, D.C. Subject: Reply to Revisions to Environmental Report Regarding Application for Renewed Operating Licenses. March 4, 2009. ADAMS No. ML090750915

4.0 ENVIRONMENTAL IMPACTS OF OPERATION

This chapter addresses potential environmental impacts related to the period of extended operation of Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2). These impacts are grouped and presented according to resource. Generic issues (Category 1) rely on the analysis provided in the *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (GEIS) prepared by the U.S. Nuclear Regulatory Commission (NRC) (NRC 1996; 1999) and are discussed briefly. NRC staff analyzed site-specific issues (Category 2) for PINGP 1 and 2 and assigned them a significance level of SMALL, MODERATE, or LARGE. Some remaining issues are not applicable to PINGP 1 and 2 because of site characteristics or plant features. Section 1.4 of this report explains the criteria for Category 1 and Category 2 issues and defines the impact designations of SMALL, MODERATE, and LARGE.

4.1 Land Use

Land use issues are listed in Table 4-1. The staff did not identify any Category 2 issues for land use. The staff also did not identify any new and significant information during the review of the applicant's environmental report (ER) (NMC 2008), the site audit, or the scoping process. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the GEIS concludes that the impacts are SMALL, and additional site-specific mitigation measures are not likely to be warranted.

Table 4-1. Land Use Issues. *Section 2.2.1 of this report describes the land use around PINGP 1 and 2.*

Issues	GEIS Section	Category
Onsite land use	4.5.3	1
Power line right-of-way	4.5.3	1

4.2 Air Quality

The air quality issue applicable to PINGP 1 and 2 is listed in Table 4-2. The staff did not identify any Category 2 issues for air quality. The staff also did not identify any new and significant information during the review of the applicant's ER (NMC 2008), the site audit, or the scoping process. Therefore, there are no impacts related to this issue beyond those discussed in the GEIS. For these issues, the GEIS concludes that the impacts are SMALL, and additional site-specific mitigation measures are not likely to be warranted.

Table 4-2. Air Quality Issue. *Section 2.2.2 of this report describes air quality in the vicinity of PINGP 1 and 2.*

Issue	GEIS Section	Category
Air quality effects of transmission lines	4.5.2	1

4.3 Ground Water

The following sections discuss the Category 2 ground water issues applicable to PINGP 1 and 2, which are listed in Table 4-3.

Table 4-3. Ground Water Use and Quality Issues. *Section 2.2.3 of this report discussed ground water use and quality at PINGP 1 and 2.*

Issues	GEIS Section	Category
Ground Water use conflicts (potable and service water, plants using >100 gpm)	4.8.1.1	2
Ground Water use conflicts (plants using cooling towers withdrawing make-up water from a small river)	4.8.1.3	2

4.3.1 Ground Water Use Conflicts (plants using >100 gpm)

NRC specifies as issue 33 in 10 CFR 51, Subpart A, Appendix B, Table B-1, that "[if] the applicant's plant...pumps more than 100 gallons [6.3×10^{-3} m^3/day] (total onsite) of groundwater per minute (gpm), an assessment of the impact of the proposed action on groundwater use must be provided." The NRC further states in 10 CFR 51.53(c)(3)(ii)(C), that "plants that use more than 100 gpm may cause groundwater use conflicts with nearby groundwater users." This applies to PINGP 1 and 2 because, as discussed in section 2.2.3.1 of this report, though PINGP 1 and 2 averaged 92 gpm (5.8×10^{-3} m^3/s) annually from 2000 to 2005, in 2005, PINGP 1 and 2 pumped 118 gpm (7.4×10^{-3} m^3/day).

A groundwater withdrawal rate of over 100 gpm (6.3×10^{-3} m^3/day) has the potential to create a cone of depression large enough to affect offsite wells and groundwater supplies, limiting the amount of groundwater available for the plant's surrounding areas. To determine potential impacts, the drawdown rate of 2005 groundwater use was calculated as if it were pumped from a single onsite well. Using conservative values for recharge, a drawdown of 0.4 ft (0.1 m) for a 2100 ft (640 m) radius during the plant's first 10 operating years was calculated. No additional drawdown would occur during the license renewal period. (TtNUS 2006)

In addition to these calculations, most nearby offsite wells draw water from the Mount Simon aquifer in the Dresbach formation, while PINGP 1 and 2 draws water from the much shallower alluvial aquifer. The Cowdery (1999) study indicates these aquifers have minimal water exchange, so water drawn from the surficial aquifer is not expected to impact water drawn from the Mount Simon aquifer.

After reviewing the information provided by the applicant as well as the drawdown calculations, which show no effect on nearby groundwater wells during the license renewal period, the impacts on nearby groundwater users will be SMALL.

4.3.2 Ground Water Use Conflicts (make-up from a small river)

NRC specifies in 10 CFR 51.53(c)(3)(ii)(A) that "if the applicant's plant utilizes cooling towers or cooling ponds and withdraws makeup water from a river whose annual flow rate is less than 3.15×10^{12} cubic feet per year (ft^3/yr) [99,885 cubic feet per second (cfs)]... [t]he applicant shall also provide an assessment of the impacts of the withdrawal of water from the river on alluvial aquifers during low flow." For water use conflicts, the NRC further states as issue 34 in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, that "...[w]ater use conflicts may result from surface water withdrawals from small water bodies during low flow conditions which may affect aquifer recharge, especially if other groundwater or upstream surface water users come online before the time of license renewal..." This issue is applicable to PINGP 1 and 2 because the plant uses cooling towers, and makeup water for its cooling systems is withdrawn from the Mississippi River, which has an annual mean flow of approximately 18,380 cfs (5.8×10^{11} ft^3/yr; 8.25×10^6 gpm), thus meeting the NRC's definition of a small river (TtNUS 2006). Flow is monitored at the Prescott U.S. Geological Survey (USGS) Station, upstream of the PINGP 1 and 2 site.

Consumptive water losses at PINGP 1 and 2 comprise a small fraction of the Mississippi River flow at Lake Sturgeon where PINGP 1 and 2 is situated. PINGP 1 and 2 withdraws surface water at an average rate of 381,031 gpm (849 cfs; 24 m^3/s), which is about 11 percent of the lowest annual mean flow of the Mississippi River and approximately 4.6 percent of the average river flow. The rate of consumptive water use at the plant is 39 cfs (1.1 m^3/s), which is the recorded difference between the plant's surface water withdrawal and the blowdown discharge from the plant back to the Mississippi. The consumptive use of PINGP 1 and 2 is only 0.2 percent of the average annual flow of the Mississippi River, and 0.5 percent of the lowest annual mean recorded at the Prescott USGS monitoring station. (TtNUS 2006)

After reviewing the information provided by the applicant as well as the consumptive use calculations above, the NRC staff concludes that the impacts from consumptive water use on groundwater would be SMALL.

4.4 Surface Water

The following sections discuss the surface water quality issues applicable to PINGP 1 and 2, which are listed in Table 4-4. For the Category 1 issues, the staff did not identify any new and significant information during the review of the applicant's ER (NMC 2008), the site audit, or the scoping process. Therefore, no impacts are related to these issues beyond those discussed in the GEIS. For these issues, the GEIS concludes that the impacts are SMALL, and additional site-specific mitigation measures are not likely to be warranted.

Table 4-4. Surface Water Quality Issues. *Section 2.2.4 of this report describes surface water quality conditions at PINGP 1 and 2.*

Issues	GEIS Section	Category
Altered current patterns at intake and discharge structures	4.2.1.2.1	1
Altered salinity gradients	4.2.1.2.2	1
Temperature effects on sediment transport capacity	4.2.1.2.3	1
Scouring caused by discharged cooling water	4.2.1.2.3	1
Eutrophication	4.2.1.2.3	1
Discharge of chlorine or other biocides	4.2.1.2.4	1
Discharge of sanitary wastes and minor chemical spills	4.2.1.2.4	1
Discharge of other metals in wastewater	4.2.1.2.4	1
Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	4.3.2.1; 4.4.2.1	2

4.4.1 Water Use Conflicts

NRC specifies in 10 CFR 51.53(c)(3)(ii)(A) that "if the applicant's plant uses cooling towers or cooling ponds and withdraws makeup water from a river whose annual flow rate is less than 3.15×10^{12} t^3/yr (99,885 cfs), an assessment of the impact of the proposed action on the flow of the river and related impacts on instream and riparian ecological communities must be provided." For water use conflicts, the NRC further states as issue 13 in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, "[the] issue has been a concern at nuclear power plants with cooling ponds and at plants with cooling towers. Impacts on instream and riparian communities near these plants could be of moderate significance in some situations." This issue is applicable to PINGP 1 and 2 because the plant uses a cooling tower-based heat dissipation system, and makeup water to replace that lost to evaporation in the cooling system is withdrawn from the Mississippi River, which has an annual mean flow of approximately 18,380 cfs (5.8×10^{11} ft^3/yr; 8.25×10^6 gpm), thus meeting the NRC's definition of a small river (TtNUS 2006).

The GEIS considered surface water use conflicts to be a Category 2 issue for two separate reasons:

1) Consumptive water use can adversely affect riparian vegetation and instream aquatic communities in the stream. Reducing the amount of water available to either the riparian zones or instream communities could result in impacts to threatened and endangered species, wildlife, and recreational uses of the water body. In addition, riparian vegetation performs several important ecological functions, included stabilizing channels and floodplains, influencing water temperature and quality, and providing habitat for aquatic and terrestrial wildlife.

2) Continuing operation of these facilities depends on the availability of water within the river from which they are withdrawing water. For facilities that are located on small bodies of water, the volume of water available is expected to be susceptible to droughts and to competing water uses within the basin. In cases of extreme drought, these facilities may be required to curtail operations if the volume of water available is not sufficient.

An additional potential effect of the withdrawal of water from a small river is that withdrawal may have an impact on groundwater levels and, therefore, result in groundwater use conflicts (NRC 1996). This is considered to be a separate Category 2 issue and is evaluated in Section 4.3.2 of this report.

Withdrawal from PINGP 1 and 2 is about 11 percent of the lowest annual mean flow of the Mississippi River and approximately 4.6 percent of the average river flow. The rate of consumptive water use is only 0.2 percent of the average annual flow of the Mississippi River and 0.5 percent of the lowest annual mean recorded at the Prescott USGS monitoring station. These consumptive losses are insignificant relative to the flow in the Mississippi River and would not be expected to impact the river's aquatic and riparian ecological communities or the alluvial water bearing material (aquifers).

The NRC staff reviewed available information, including that provided by the applicant, additional Minnesota Department of Natural Resources (MNDNR) data, information gathered at the site audit and through the scoping process, and other available sources. Considering PINGP 1 and 2's small consumptive water use relative to the flows in the Mississippi River, the NRC staff concludes that the impact of water use on the Mississippi River at PINGP 1 and 2 would be SMALL.

4.5 Aquatic Resources

The Category 1 and Category 2 issues related to aquatic resources applicable to PINGP 1 and 2 are discussed below and listed in Table 4-5.

Table 4-5. Aquatic Resources Issues. *Section 2.1.6 of this report describes the PINGP 1 and 2 cooling water system; Section 2.2.5 describes the aquatic resources.*

Issues	GEIS Section	Category
For All Plants		
Accumulation of contaminants in sediments or biota	4.2.1.2.4	1
Entrainment of phytoplankton and zooplankton	4.2.2.1.1	1
Cold shock	4.2.2.1.5	1
Thermal plume barrier to migrating fish	4.2.2.1.6	1
Distribution of aquatic organisms	4.2.2.1.6	1
Premature emergence of aquatic insects	4.2.2.1.7	1
Gas supersaturation (gas bubble disease)	4.2.2.1.8	1
Low dissolved oxygen in the discharge	4.2.2.1.9	1
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	4.2.2.1.10	1
For Plants with Once-Through Heat Dissipation Systems		
Entrainment of fish and shellfish in early life stages	4.3.3	2
Impingement of fish and shellfish	4.3.3	2
Heat shock	4.3.3	2

4.5.1 Generic Aquatic Ecology Issues

The NRC staff did not identify any new and significant information related to Category 1 aquatic issues during the review of the applicant's ER (NMC 2008), the site audit, or the scoping process. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the GEIS concludes that the impacts are SMALL, and additional site-specific mitigation measures are not likely to be warranted.

4.5.2 Entrainment and Impingement

For power plants with once-through cooling systems, the impingement of fish and shellfish on screens associated with plant cooling systems and the entrainment of fish and shellfish in early life stages by plant cooling systems are considered Category 2 issues, which require a site-specific assessment before license renewal. PINGP 1 and 2 operate in a closed-cycle mode part of the year, during which time impingement and entrainment are considered a Category 1 issue. The helper-cycle mode is not discussed in the GEIS (NRC 1996), nor is it classified as either a Category 1 or 2 issue. To be conservative, the NRC staff considered impingement and entrainment at PINGP 1 and 2 as a Category 2 issue and undertook an assessment of impingement and entrainment for the entire year under all three operating modes. To perform this evaluation, the NRC staff reviewed the applicant's ER (NMC 2008) and related documents, including the Clean Water Act (CWA) Section 316 demonstrations (NUS Corporation 1976; Xcel

Energy Environmental Services 2006) and visited the PINGP 1 and 2 site. The NRC staff also reviewed the applicant's most recent National Pollutant Discharge Elimination System (NPDES) Permit No. MN0004006 issued on June 30, 2006, by the Minnesota Pollution Control Agency (MPCA).

Section 316(b) of the CWA requires that the location, design, construction, and capacity of the cooling water intake structures reflect the best technology available for minimizing adverse environmental impacts (33 USC 1326). Impingement and entrainment of fish and shellfish by the cooling water system is a potential adverse environmental impact that can be minimized by the use of the best technology available.

The original 316(b) demonstration for PINGP 1 and 2 was submitted to MPCA in 1976 (NUS Corporation 1976). At this time, the plant was designed to operate in the three cooling modes (closed, helper, open), but only operated in closed-cycle mode "to the maximum extent practicable" (AEC 1973). Additionally, the original design used only coarse mesh traveling screens. MPCA issued the NPDES permit No. MN0004006 in 1981, dictating changes to the cooling system technology and operation (MPCA 1981).

Changes to the cooling system technology included the alteration or replacement of the cooling water intake structure to minimize entrainment and impingement mortality; the installation of fine mesh screens, fish buckets, and a fish return system; and design criteria limiting the screen face velocity to 0.5 fps at a discharge rate of 800 cubic fps while the fine mesh screens were in use. The applicant completed the modifications to the cooling system by 1983 (NMC 2008).

Changes to the operation of the cooling system included limits on plant flow and withdrawal between April 1 and June 30, after completion of the new cooling water intake structure; the use of the fine mesh screens from April 16 to August 31 (although the current permit sets the start date as April 1); and the implementation of studies to evaluate the effectiveness of the new cooling system (NMC 2008; MPCA 2006). The NPDES permit also specifies the conditions for the three different cooling system modes, which will be discussed in Section 4.5.5.

On July 9, 2004, the U.S. Environmental Protection Agency (EPA) published a final rule in the *Federal Register* (69 FR 41575) that addresses cooling water intake structures at existing power plants, including PINGP 1 and 2, where flow levels exceed a minimum threshold value of 50 million gpd. The rule is Phase II in the EPA's development of CWA 316(b) regulations that establish national requirements applicable to the location, design, construction, and capacity of cooling water intake structures at existing facilities that exceed the threshold values for water withdrawals. The national requirements, which were to be implemented through the NPDES permitting process, minimize the adverse environmental impacts associated with the continued use of the intake systems.

Under the Phase II rule, licensees would have been required to demonstrate compliance with the Phase II performance standards at the time of renewal of the NPDES permit. As part of the NPDES renewal, licensees may have been required to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures to comply with this regulation. The new performance standards were designed to significantly reduce impingement mortality and entrainment due to water withdrawals associated with cooling water intake structures used for power production. Any additional site-specific mitigation required as a result of the 316(b) Phase II reviews would result in less impact from impingement and entrainment during the license renewal period.

Effective July 9, 2007, the EPA suspended the Phase II rule (72 FR 37109). As a result, all permits for Phase II facilities should include conditions under Section 316(b) of the CWA that are developed on a Best Professional Judgment basis, rather than best technology available.

Best Professional Judgment is used by the NPDES permit writers to develop technology-based permit conditions on a case-by-case basis using all reasonably available and relevant data. Any site-specific mitigation required under the NPDES permitting process would result in a reduction in the impacts of continued plant operations.

When the current NPDES permit was issued in 2006, the 316(b) Phase II rule was still in effect, and the permit required Northern States Power Co. (NSP) to submit documents including a comprehensive demonstration study to characterize entrainment and impingement mortality and show that the changes to technology and operation of the cooling system satisfied the performance standards of the Phase II rule. NSP submitted the required documents on time; however, as described above, the Phase II rule was suspended in 2007 before MPCA issued a 316(b) determination for PINGP 1 and 2. At the time this draft was published, EPA had not put in place new regulations, and until it does, it is unlikely that MPCA will review the submitted documents. PINGP 1 and 2 will continue to operate under the existing 2006 NPDES permit, unless otherwise directed by the State of Minnesota.

Baseline monitoring for impingement was conducted three days a week from 1973 through 1980 at PINGP 1 and 2; from 1981 through 1984, the samples were taken three days every other week. Samples were taken by emptying the trash baskets, separating out debris, and counted based on taxonomy. Both living and dead organisms were included in the impingement totals, and counts were doubled for years 1981 to 1984 to account for the biweekly collection (Table 4-6). Based on the table presented in the Impingement Mortality and Entrainment Characterization Study (Xcel Energy Environmental Services 2006), the total annual impingement at PINGP 1 and 2 during the years before the changes to equipment and operation took effect ranged from approximately 24,967 fish (in 1979) to 554,590 fish (in 1977); the average impingement over those 12 years was 164,629 fish per year. Gizzard shad had the highest impingement, comprising an average of about 80 percent of the total number impinged (Xcel Energy Environmental Services 2006). Neither the original 316(b) demonstration (NUS 1976) nor the Impingement Mortality and Entrainment Characterization Study (Xcel Energy Environmental Services 2006) provide the mortality rates from these baseline studies, except to note that live impinged organisms were counted and returned to the river.

Table 4-6. Estimated Number of Fish Impinged at PINGP 1 and 2, 1973-1984

Year	Total Number	Gizzard Shad	Percent Gizzard Shad
1973	69,226	65,000	93.90
1974	146,063	136,667	93.57
1975	93,324	70,506	75.55
1976	261,295	152,878	58.51
1977	554,590	456,949	82.39
1978	105,983	93,895	88.59
1979	24,967	9,381	37.57
1980	110,764	97,840	88.33
1981	54,376	47,966	88.21
1982	121,896	67,338	55.24
1983	222,478	171,972	77.30
1984	210,590	203,956	96.85

TOTAL	1,975,552	1,574,348	79.69

Source: Adapted from Xcel Energy Environmental Services 2006

The baseline studies for entrainment were conducted in 1974 and 1975. Abundance was estimated for larval fish and eggs in the vicinity of Prairie Island, although the individual species were not identified. NUS Corporation conducted entrainment monitoring in 1975 from May into September and estimated that PINGP 1 and 2 entrained 8,371,000 fish eggs and 61,645,00 larval and juvenile fish were entrained during the sample period (NUS 1976). The authors of the study concluded that the entrainment of these eggs and larvae represented a loss of 2,830,000 adult fish, an overwhelming percentage of which were forage fish. (Xcel Energy Environmental Services 2006)

The new screenhouse was installed in 1983 and, in the spring of 1984, the fine-mesh screens were placed into operation. Because of the finer mesh, the eggs, larvae, small juveniles, and even some smaller adults, which in previous years would have been entrained, were now impinged on the screens, washed into the fish return system, and discharged into the river. Increased impingement meant that entrainment rates were dramatically reduced. In 1984, samples were taken from the back wash of the fine-mesh screens and compared to the impingement samples. The Impingement Mortality and Entrainment Characterization Study found that, based on this data, the front spray wash was over 98 percent effective in minimizing entrainment (Xcel Energy Environmental Services 2006). However, this reduction in entrainment translates to a dramatic increase in impingement, as described below.

The impingement verification study was conducted by sampling the impingement on the fine-mesh screens from 1984 through 1988, April through August. A quarter of the screen wash water was diverted into collection tanks in the environmental lab to assess the number impinged, determine taxonomy and age of impinged fish, and monitor initial and latent survival. Based on the data from the verification studies, estimates for the weekly and annual number of impinged organisms were extrapolated. In 1984, the estimated impingement during the months April through August was 492.8 million organisms. However, the group responsible for the 1984 sampling hypothesized that this was a gross overestimate of impingement, due to a sampling equipment design – the pipe from the screenhouse was not flushed before samples were taken, allowing any organisms in the pipe prior to sampling to be included in the counts. This meant that the sample counts included organisms that were not entrained during the sampling time period, and when these counts were extrapolated to daily totals, the estimate was unrealistically high (NSP 1985). Therefore, the sampling equipment was redesigned in 1985. The following years showed a 10-fold decrease in the estimated impingement levels: 42.5 million (1985), 62.7 million (1986), 77.1 million (1987), and 67.2 million (1988). The estimated impingement during the months April though August of 1984 through 1988, based on the verification studies, is presented in Table 4-7 and is broken down into life stages. (Xcel Energy Environmental Services 2006)

The average of the estimated number of eggs impinged during the spring and summer months when the fine mesh screens were in place, excluding data from 1984, was about 12.5 million, and the average level of impingement for larvae (prolarvae and postlarvae combined) per year was approximately 46 million. In the 1975 baseline study for entrainment, NUS estimated just over 8 million eggs and 61.5 million larvae were entrained. Annual fluctuations in impingement levels, as shown in Tables 4-6 and 4-7, suggest that the difference between the baseline and verification studies could be due to annual changes in the number of eggs and larvae present in the river, and in fact, more eggs were impinged on average during the verification studies than had been entrained during the baseline study.

Numbers of adults impinged by the fine mesh screens are far lower than the total number of fish impinged during the baseline studies, although from the data, the NRC staff could not determine what percentage of the baseline impinged fish were adults, as some juveniles would have been impinged as well. Likewise, staff found it difficult to compare the numbers of impinged juveniles from the verification studies to the impingement totals from the baseline studies. However, staff assumed that many juveniles that had head-on dimensions smaller than 3/8 in. would have been entrained prior to the installation of fine mesh screens.

For the impingement mortality and entrainment characterization study, Xcel Energy Environmental Services (2006) calculated the survivorship of the impinged fish using only the juvenile or larger fish that would have been impinged on the coarse mesh screens. The total survivorship based on the study years 1984 through 1988 was 71.5 percent. When adjusted to account for sampling-induced mortality, Xcel Energy Environmental Services calculated that the survivorship rises to 80 percent. The original intake structure had no fish return system, only trash baskets, and therefore impingement survivorship can be assumed to have been zero, although the characterization study does note that organisms that were alive when collected for impingement monitoring were released to the river.

Table 4-7. Estimated Number and Percent Composition of Fish Life Stages Impinged on Fine Mesh Screens April through August, 1984-1988

	1984		1985		1986		1987		1988	
Life Stage	**Number**	**Percent in year**	**Number**	**Percent in year**	**Number**	**Percent in year**	**Number**	**Percent in year**	**Number**	**Percent in year**
eggs	11,882,792	2.41	17,534,761	41.27	6,504,222	10.36	14,271,422	18.50	12,221,440	18.19
prolarvae	100,116,592	20.32	16,405,893	38.61	40,908,477	65.19	31,886,239	41.33	32,137,280	47.83
postlarvae	17,311,818	3.51	5,326,535	12.54	13,283,595	21.17	28,844,661	37.39	15,944,768	23.73
juveniles	363,039,236	73.67	3,096,336	7.29	1,963,864	3.13	2,125,830	2.76	6,567,904	9.78
adults	396,573	0.08	2,688	0.01	8,848	0.01	16,548	0.02	315,840	0.47
unidentified	71,624	0.01	120,816	0.28	84,045	0.13	0.00	0.00	0.00	0.00
TOTAL	492,818,635[a]	100.00	42,487,029	100.00	62,753,051	100.00	77,144,700	100.00	67,187,232	100.00

[a]Data from 1984 was an overestimate due to sampling equipment design (Xcel Energy Environmental Services 2006).

Source: Adapted from Xcel Energy Environmental Services 2006

Based on the changes to PINGP 1 and 2's cooling system since the mid-1980s, the use of fine-mesh screens during sensitive times of year, the use of closed- and helper-cycle cooling modes, and the reduction in flows from April through June, as well as the data presented in the CWA Section 316 demonstrations, which show a reduction in impingement mortality and entrainment after the installation of new intake structures (NUS Corporation 1976; Xcel Energy Environmental Services 2006), the NRC staff determined that the potential impacts of impingement and entrainment of fish and shellfish by the PINGP 1 and 2 cooling system during the 20-year renewal period would be SMALL. PINGP 1 and 2 currently employ a number of mitigation measures, including using closed and helper cycle cooling, fine-mesh screens, and flow limitations. Additional mitigative measures that PINGP 1 and 2 could add include operating in closed cycle more often, using the fine-mesh screens for a longer period of time, reducing intake velocities, and operating under reduced intake flows. The staff did not identify any cost benefit studies applicable to these mitigation measures. It is the responsibility of the MPCA to impose any restrictions or modifications to the cooling system to reduce the impact of entrainment and impingement under the NPDES permitting process.

4.5.3 Heat Shock

The NRC defines heat shock as acute thermal stress caused by exposure to a sudden elevation of water temperature that adversely affects the metabolism and behavior of fish and can lead to death. At power plants, heat shock is most likely to occur when an offline unit returns to service or when a station has a discharge canal that effectively traps heated water in a smaller area then would a discharge point directly on a river or lake. For plants with once-through cooling systems, the impacts of heat shock are listed as a site specific, or Category 2 issue, and require a plant-specific evaluation before license renewal, because of continuing concerns about acute thermal-discharge impacts and the possible need to modify thermal discharges in the future in response to changing environmental conditions (NRC 1996). PINGP 1 and 2 operate in a closed-cycle mode part of the year, during which time heat shock is categorized as a Category 1 issue. The helper-cycle mode is not discussed in the GEIS (NRC 1996), nor is it classified as either a Category 1 or 2 issue. To be conservative, the NRC staff considered heat shock at PINGP 1 and 2 as a Category 2 issue and undertook an assessment of heat shock for the entire year under all three operating modes.

To perform this evaluation, the NRC staff reviewed the applicant's ER (NMC 2008) and related documents, including the CWA Section 316 demonstrations (HDR 1978), and visited the PINGP 1 and 2 site. The NRC staff also reviewed the applicant's most recent NPDES Permit No. MN0004006 issued on June 30, 2006, by the MPCA (MPCA 2006).

Section 316(a) of the CWA establishes a process by which a discharger can demonstrate that the established thermal discharge limitations are more stringent than necessary to protect balanced, indigenous populations of fish and wildlife and obtain facility-specific thermal discharge limits (33 USC 1326). In 1978, Henningson, Durham, and Richardson, Inc., provided MPCA with a Section 316(a) demonstration that addressed compliance with the thermal effluent limitations of the NPDES permit and environmental impacts of the thermal discharge (HDR 1978).

For the demonstration, Henningson, Durham, and Richardson, Inc., modeled the thermal plume for typical and extreme environmental conditions, including both two- and three-dimensional models. In 13 of the 61 cases modeled, the plume exceeded the NPDES thermal limits that had been proposed, and 11 of these cases were for "typical" environmental conditions. Therefore, the 316(a) demonstration stated that a variance to the proposed NPDES permit would be necessary to meet thermal criteria, or else the plant would have to be derated. The suggested variance was an extension of the mixing zone boundary from October through March. The summary conclusion of the 316(a) was that the thermal discharge of PINGP 1 and 2 would not "cause appreciable harm to any aquatic biota and the protection and propagation of a balance, indigenous biota has been maintained." (HDR 1978)

In response to the 316(a) demonstration, MPCA issued the NPDES permit in 1981 for PINGP 1 and 2. The permit stated that PINGP 1 and 2 required a new discharge structure. It also specified changes to the operation of PINGP 1 and 2, including that the cooling towers be operated to the maximum extent practicable from April 1 to November 30, new thermal limits for the spring and summer months and fall and winter months, that the operators of PINGP 1 and 2 minimize to the extent practicable abrupt temperature changes, and that the river temperature below Lock and Dam 3 be monitored continuously. The requirements of the current NPDES permit are summarized in Section 2.1.6.3. (NMC 2008)

The new discharge structure was completed in 1983, along with the new intake structure as described in Section 4.5.2. The design of the new discharge had several goals: promote mixing of discharged and receiving waters, eliminate recirculation of heated discharge into intake, minimize cold shock potential, and prevent fish from entering discharge pipes (discharge rate is 8 to 10 fps) (Stone and Webster 1983).

During the spring and summer months (from April 1 through the fall trigger point, when the daily average upstream river temperature falls below 43 °F [6 °C]) the cooling towers are operated so that the water temperature below Lock and Dam 3 is not raised more than 5 degrees above ambient temperature and does not exceed a daily average of 86 °F (30 °C). During the fall and winter months (from the fall trigger point through March 31), the water temperature below Lock and Dam 3 cannot exceed 43 °F (6 °C) "for an extended period of time." (MPCA 2006)

Table 4-8 presents the upper lethal threshold for six common species of fish that occur in the vicinity of PINGP 1 and 2. The summer daily average limit of 86 °F (30 °C) imposed by the NPDES permit is protective of these species of fish, and is based on the fisheries data available. The MPCA has updated the thermal limits in past NPDES permits to account for changes in fishery data, and NRC assumes that MPCA will continue to apply the best information available to future NPDES permits,

Table 4-8. Upper Lethal Thresholds of Common Fish Species Occurring in the Vicinity of PINGP 1 and 2

Species	Upper Lethal Threshold	Life Stage
Walleye (Sander vitreus)	31.6 °C (88.8 °F)	Juvenile
Channel catfish (Ictalurus punctatus)	38.3 °C (100.9 °F)	Juvenile
	33.5 °C (92.3 °F)	Adult
Northern pike (Esox lucius)	33.3 °C (91.9 °F)	Juvenile
Gizzard shad (Dorosoma cepedianum)	36.5 °C (97.7 °F)	Juvenile
Carp (Cyprinidae)	41 °C (105.8 °F)	Juvenile
	36 °C (96.8 °F)	Adult
Black crappie (Pomoxis nigromaculatus)	33 °C (91.4 °F)	Juvenile

Source: Adapted from HDR 1978

Based on the applicant's ER (NMC 2008), the current NPDES permit (MPCA 2006), and the 316(a) demonstration (HDR 1978), the NRC staff determined that heat shock at PINGP 1 and 2 during the 20-year renewal period is unlikely because of the design and operation of the PINGP 1 and 2 cooling system. Therefore, the NRC staff concludes that the potential impact to fish and shellfish due to heat shock during the renewal term is SMALL. PINGP 1 and 2 currently employ a number of mitigation measures, including using closed and helper cycle cooling and flow limitations. Additional mitigative measures that PINGP 1 and 2 could add include operating in closed cycle more often and operating under reduced intake flows. The staff did not identify any cost benefit studies applicable to these mitigation measures. It is the responsibility of the MPCA to impose any restrictions or modifications to the cooling system to reduce the impact of heat shock under the NPDES permitting process.

4.5.4 Total Impacts on Aquatic Resources

Impingement, entrainment and heat shock all act on the same populations of aquatic resources. The purpose of this section is to provide perspective on the total impact of cooling system operation on fish and other aquatic resources. The MPCA, not the NRC, is responsible for issuing and enforcing NPDES permits. NRC assumes that MPCA will continue to apply the best information available to future NPDES permits. Because the NRC level of impact associated with impingement and entrainment is small and the level of impact associated with thermal impacts is small, NRC staff believes that the total impact from all of these sources together on aquatic resources would also be SMALL through the period of license renewal.

4.6 Terrestrial Resources

The issues related to terrestrial resources applicable to PINGP 1 and 2 are listed in Table 4-9. There are no Category 2 issues related to terrestrial resources.

Regarding bird collisions with power lines, the GEIS (NRC 1996) notes that "no relatively high collision mortality is known to occur along transmission lines associated with nuclear power plants in the United States other than the Prairie Island plant in Minnesota." The GEIS also notes that PINPG 1 and 2 may be the only nuclear facility for which surveys have been completed to determine the number and composition of birds that collide with offsite lines. Goddard (1977; 1978; 1979) conducted a 5-year survey of Xcel-owned transmission lines at PINGP 1 and 2. Data was gathered by walking several transmission line right-of-way (ROW) transects on a weekly basis from April 22 through May 27 of 1974 through 1978. The transects spanned from the substation just north of PINGP 1 and 2 to transmission line towers nearest the Vermillion River along a portion of transmission lines that run perpendicular to the Mississippi Flyway. A total of 453 birds were found over the entire 5-year period of observation, and most collisions were found to occur during inclement weather (Goddard 1979). The study found that a greater number of collisions occurred on transects that were perpendicular to flyways; however, transmission lines only resulted in greater collisions for a few species. The majority of bird carcasses identified were mourning doves, starlings, red-winged blackbirds, common grackle, brown-headed cowbirds, ring-necked pheasants, American coots, and sora rails; no raptors were found (Goddard 1979). No further formalized studies have been conducted on or near the PINGP 1 and 2 site.

PINGP 1 and 2 associated transmission lines have marking devices on lines near waterways and certain areas with a known history of avian collision. These marking devices are staggered to divert bird flight paths and minimize the risk of collision with transmission lines. In a study conducted in Lower Crab Creek, Washington, and Bybee Lake in Portland, Oregon, Beaulaurier (1981) found that transmission line marking reduced collision mortality about as effectively as groundwire removal where comparisons were possible. Effectiveness of reducing collisions for certain species may vary by type and color of marking device, though marking devices, in general, reduce bird collision rates when compared to unmarked portions of transmission lines (Janss and Ferrer 1998).

In 2002, Xcel Energy voluntarily entered into a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service (FWS) in order to ensure the company's compliance with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (USDOJ 2002). The MOU covers Xcel Energy transmission lines in 12 U.S. states. As a result of the MOU, Xcel Energy is in the process of creating Avian Protection Plans (APPs) for each of these 12 states. Xcel Energy completed a plan for Colorado in 2004, which was subsequently approved by FWS, and Xcel Energy is currently drafting APPs for Wisconsin and Minnesota. A draft of Minnesota's APP was submitted to FWS at the end of the 2008 calendar year. The MOU also requires semi-annual reports of avian injury and mortality along Xcel Energy transmission lines, which are submitted to FWS in February and July of each year. Since these reports began in 2002, only one transmission line-related incident has been reported at PINGP 1 and 2, which entailed a cormorant that was found dead near the PINGP 1 and 2 substation in October of 2002. Xcel Energy provides training to its staff members that maintain transmission line ROWs to ensure that the conditions of the MOU are met. Additionally, Xcel Energy established company-wide Avian Protection Standards in 2006.

The NRC did not identify any new and significant information during the review of the applicant's ER (NMC 2008), the staff's site audit, the scoping process, or the evaluation of other available information. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the GEIS concluded that the impacts are SMALL, and additional site-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation.

Table 4-9. Terrestrial Resources Issues. *Section 2.2.6 provides a description of the terrestrial resources at PINGP 1 and 2 and in the surrounding area.*

Issues	GEIS Section	Category
Cooling tower impacts on crops and ornamental vegetation	4.3.4	1
Cooling town impacts on native plants	4.3.5.1	1
Bird collisions with cooling towers	4.3.5.2	1
Power line right-of-way management (cutting herbicide application)	4.5.6.1	1
Bird collisions with power lines	4.5.6.1	1
Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	4.5.6.3	1
Floodplains and wetland on power line right-of-way	4.5.7	1

4.7 Threatened or Endangered Species

Table 4-10. Threatened or Endangered Species. *Section 2.2.7 describes the threatened or endangered species on or near PINGP 1 and 2.*

Issue	GEIS Section	Category
Threatened or endangered species	4.1	2

This site-specific, or Category 2 issue requires consultation with the appropriate agencies to determine whether threatened or endangered species are present and whether they would be adversely affected by continued operation of PINGP 1 and 2 during the license renewal term. The characteristics and habitats of threatened and endangered species in the vicinity of the PINGP 1 and 2 site are discussed in Sections 2.2.6 and 2.2.7 of this draft SEIS.

The NRC contacted the FWS on July 22, 2008, regarding threatened and endangered species at the PINGP 1 and 2 site (NRC 2008b). A description of the site and the in-scope transmission lines and a preliminary assessment of the Federal threatened, endangered, and candidate species potentially occurring on or near the PINGP 1 and 2 site was provided in this letter. In response, on August 13, 2008, the FWS indicated that the Higgins eye pearlymussel (*Lampsilis higginsii*) is present in Upper Mississippi River within the vicinity of PINGP 1 and 2, though no designated critical habitat is present for the species in Goodhue County (FWS 2008). No terrestrial Federally listed species were included in the letter.

Although the NRC does not believe that license renewal would adversely affect the Federally listed species, the Higgins eye pearlymussel, the NRC has prepared a Biological Assessment for FWS, as part of the Section 7 consultation under the Endangered Species Act of 1973 (ESA), to document its review. This biological assessment is provided in Appendix E of this draft SEIS.

The NRC contacted the MNDNR on July 22, 2008, to request data from the Minnesota Natural Heritage Information System in order to determine which State-listed species may be affected by continued operations and maintenance procedures at the PINGP 1 and 2 site and associated transmission line ROWs (NRC 2008a). The MNDNR provided natural heritage data in the vicinity of PINGP 1 and 2 in their response to the NRC staff dated August 26, 2008 (MNDNR 2008a).

4.7.1 Aquatic Species

As described in Section 2.2.7, two Federally listed endangered species and two candidate species for Federal listing are known to exist within Goodhue County or within Dakota, Scott, and/or Washington Counties, through which the in-scope transmission lines traverse. The winged mapleleaf (*Quadrula fragosa*) is listed as endangered, and the spectaclecase (*Cumberlandia monodonta*) and the sheepnose (*Plethobasus cyphyus*) are both candidates for Federal listing; however, these three mussels are not known to be present in the vicinity of the PINGP 1 and 2 site or within the transmission line ROWs.

The Higgins eye pearlymussel (*Lampsilis higginsii*) is the only Federally listed species that occurs within the vicinity of the PINGP 1 and 2 site. As described in Section 2.2.6, State and Federal agencies, including the FWS, determined that an area within Pool 3, which is located 0.5 mi (0.8 km) upstream of the PINGP 1 and 2 intake structure, was a suitable habitat for a subadult Higgins eye relocation project. In 2002, the U.S. Army Corps of Engineers (USACE), in cooperation with the Mussel Coordination Team, prepared an environmental assessment for the relocation plan for the Higgins eye, in which they report "good recovery of mussels" following the relocation of 100 adult Higgins eye by MNDNR, WDNR, and the FWS (USACE 2002). The environmental assessment also states that the location was identified as a good relocation site based on the 2000 Minnesota 305(b) water quality status report, which listed Pool 3 as having "full support" for aquatic life (USACE 2002). As of a 2005 status report, over 4000 sub-adults have been relocated to the Sturgeon Lake section of Pool 3 (Mussel Coordination Team 2005). The Mussel Coordination Team (2005) reported "good recovery" for Pool 3 subadults after conducting monitoring in 2003.

The cooling water intake structure of a power plant can pose a threat to aquatic species because fish and shellfish have the potential to be impinged on screens or entrained by the cooling system. However, the life cycle of the Higgins eye pearly mussel makes it unlikely that individuals of this species would be at risk of impingement or entrainment.

Fertilized Higgins eye eggs are carried by a gravid female until they mature into glochidia, a microscopic larval stage of large freshwater mussel species. The female uses a lure to attract host fish and then releases the glochidia into the water column, where they can attach to the gills of the fish. If they fail to attach to the host, they have a low likelihood of attaching later, and will, therefore, not mature into juveniles. Once attached to the host fish's gills, the glochidia mature into juveniles and then drop to the river bottom where they settle. Once settled on suitable substrate, the juveniles are sessile until maturation to adulthood. Because juveniles are not present in the water column, the likelihood of entrainment during this life stage is very low.

The larval stage of the Higgins eye life cycle is the most likely to be affected by the cooling system. Because glochidium attach to a host fish, if the host fish is impinged and killed on the screens of the cooling system, the glochidium would be unlikely to be able to mature into a juvenile. If the glochidium had reached maturity and dropped off the fish while the fish was impinged, it would be swept into the cooling system and would be entrained.

Suitable fish hosts for Higgins eye glochidia include freshwater drum (*Aplodinotus grunniens*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca falvescens*), sauger (*Stizostedion canadense*), and walleye (*Stizostedion vitreum vitreum*); marginal fish hosts include northern pike (*Esox lucius*), bluegill (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*) (FWS 2004).

Freshwater drum are in the Sciaedae family, which were not identified among the adults impinged during the 316(b) demonstration study that Xcel Energy conducted between April and August of 1984 through 1988. Largemouth bass, smallmouth bass, bluebill, and green sunfish are members of the Centrarchidae family. The 316(b) demonstration indicated that an estimated 672 adults from this family were impinged in 1987, indicating a very low probability of adults of this family being impinged by the PINGP 1 and 2 cooling system. Yellow perch, sauger, and walleye are all members of the Percidae family. In 1984, an estimated 43,680 adults were impinged, and in 1987, an estimated 1,176 adults were impinged. Again, the 316(b) demonstration indicates that there is a low probability of adults from the Percidae family being impinged by the PINGP 1 and 2 cooling system. (Xcel Energy Environmental Services 2006).

In order to assess the potential impact to the Higgins eye pearlymussel, the NRC staff considered the life cycle of the Higgins eye, the limited time the mussel spends in the water column during which it could be subject to entrainment, and the low probability of the primary fish hosts being impinged. In addition, the NRC recognizes that the FWS determined that the area just upstream of the PINGP 1 and 2 intake structure was a suitable site for the Higgins eye relocation project. Therefore, the NRC staff concludes that the species is unlikely to be adversely affected during the renewal period. If the Higgins eye relocation project is successful in establishing a reproducing population during the renewal term of the licenses and if impingement and entrainment at PINGP 1 and 2 of suitable fish hosts would appear to adversely affect that mussel population, NRC might have to re-assess the potential for adverse effects in the future. Attached to this draft SEIS is the biological assessment performed by the NRC for the review of the FWS.

The NRC staff reviewed information from the applicant's ER (NMC 2008), the staff's site audit, the scoping process, and reports from FWS, USACE, and the Mussel Coordination Team. The NRC staff concludes that the continued operation of PINGP 1 and 2 during the license renewal term is not likely to adversely affect any Federally listed aquatic species. Thus, the staff concludes that the impact on threatened or endangered aquatic species from an additional 20 years of operation would be SMALL.

The NRC staff did not identify any mitigation measures except those discussed in Section 4.5.2, which include operating in closed cycle more often, using the fine-mesh screens for a longer period of time, and operating under reduced intake flows, each of which could potentially reduce the overall impacts of entrainment and impingement on all species of fish and shellfish. The staff did not identify any cost benefit studies applicable to these mitigation measures. The FWS could issues a Biological Opinion (BO) for the Higgins eye pearlymussel in response to the NRC staff's Biological Assessment. The FWS evaluates whether there are reasonable and prudent measures to further minimize the impact of the PINGP 1 and 2 cooling system on the Higgins eye, and these measures would be specified in the terms and conditions of the BO.

4.7.2 Terrestrial Species

Currently, no Federally listed threatened or endangered terrestrial species are known to occur on the PINGP 1 and 2 site or within the in-scope transmission line ROWs. The State-listed peregrine falcon (*Falco peregrineus*) and bald eagle (*Haliaeetus leucocephalus*) are known to nest in the vicinity of the PINGP 1 and 2 site; however, these species are not expected to be adversely affected by continued operation of PINGP 1 and 2. Operation of PINGP 1 and 2 and its associated transmission lines are not expected to adversely affect any threatened or endangered terrestrial species during the license renewal term.

The NRC staff encourages NSP, Xcel Energy, and Great River Energy to report the existence of any Federally or State-listed endangered or threatened species within or near the transmission line ROWs to the MNDNR and/or FWS if any such species are identified during the renewal term. In particular, if any evidence of injury or mortality of migratory birds or threatened or endangered species is observed within the corridor during the renewal period, NRC encourages NSP, Xcel Energy, and/or Great River Energy to promptly report this to the appropriate wildlife management agencies.

The NRC staff concludes that adverse impacts to threatened or endangered terrestrial species during the license renewal term would be SMALL

4.8 Human Health

The human health issues applicable to PINGP 1 and 2 are discussed below and listed in Table 4-11 for Category 1, Category 2, and uncategorized issues.

Table 4-11. Human Health Issues. *Table B-1 of Appendix B to Subpart A of 10 CFR Part 51 contains more information on these issues.*

Issues	GEIS Section	Category
Microbiological organisms (occupational health)	4.3.6	1
Microbiological organisms (public health, for plants using small rivers)	4.3.6	2
Noise	4.3.7	1
Radiation exposures to public (license renewal term)	4.6.1, 4.6.2	1
Occupation radiation exposures (license renewal term)	4.6.3	1
Electromagnetic fields – acute effects (electric shock)	4.5.4.1	2

Issues	GEIS Section	Category
Electromagnetic fields – chronic effects	4.5.4.2	Uncategorized

4.8.1 Generic Human Health Issues

No new and significant human health information was identified during the review of the applicant's ER (NMC 2008), the site audit, or the scoping process. The following discussions focus on the radiological environmental impacts and the dose impacts to the public and environment in and around the PINGP 1 and 2 site.

The NRC staff reviewed historical data on radiological releases from PINGP 1 and 2 presented in the Annual Radiological Environmental Monitoring Program (REMP) Reports (NMC 2004b; 2005b; 2006b; 2007b; 2008b) and Annual Radioactive Effluent Reports (NMC 2004a; 2005a; 2006a; 2007a; 2008a) during the period from 2003 through 2007. The resultant dose calculations demonstrate that the doses to a maximally exposed individual in the vicinity of PINGP 1 and 2 were a small fraction of the limits and standards specified in 10 CFR Part 20, Appendix I to 10 CFR Part 50, and 40 CFR Part 190. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the GEIS concluded that the impacts are SMALL, and additional site-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

PINGP 1 and 2 conducts an annual REMP report in which radiological impacts to the employees, the public, and the environment in and around the PINGP 1 and 2 sites are monitored, documented, and compared to the appropriate standards. The objectives of the REMP are to:

- Measure and evaluate the levels of radiation and radioactive material in the environs around the PINGP 1 and 2 site to assess the radiological impacts, if any, of plant operation in the environment.
- Supplement the results of the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive material and levels of radiation are not higher than expected based on the measurement of radioactive effluents and modeling for the applicable exposure pathways.
- Demonstrate compliance with the requirements of applicable Federal regulatory agencies.

PINGP 1 and 2 radiological releases and the resultant environmental and dose impacts are summarized in two kinds of reports: the annual REMP reports and Annual Radioactive Effluent Reports. Limits for all radiological releases are specified in the PINGP 1 and 2 Offsite Dose Calculation Manual, which is used to meet Federal limits and standards. The REMP includes monitoring of the waterborne environment (surface and sediment from shoreline); airborne environment (radioiodine and particulates and direct radiation); and ingestion pathways (milk, fish, and food products). Direct radiation pathways include radiation from buildings and plant structures, airborne material that may be released from the plant, cosmic radiation, fallout, and the naturally occurring radioactive materials in soil, air and water. Thermoluminescent dosimeters are used to measure direct radiation. The airborne pathway includes measurements of radioiodine and particulates in air samples. The waterborne pathway consists of Mississippi River water, drinking water, upstream and downstream collection of fish and sediment from the shoreline near the discharge point for liquid radioactive effluents.

The PINGP 1 and 2 environmental monitoring program was initiated in May 1970 (prior to plant operation) with the purpose of environmental monitoring for radioactivity in the site's vicinity. The monitoring system is based on the indicator-control concept, which includes collection of samples at both indicator locations (nearby, downwind, or downstream) and at control locations (distant, upwind, or upstream). PINGP 1 and 2 compiles the results of their REMP in the Annual Radiological Environmental Operating Reports.

In addition to the routine REMP, PINGP 1 and 2 has a tritium sampling program, which was established after the detection of tritium in a residential well in the vicinity of PINGP 1 and 2 in 1989. The program is designed to monitor the onsite environment for indication of leaks from plant systems and pipes carrying liquids with radioactive material. The results of the program are reported in an appendix to the REMP report entitled "Special Well and Surface Water Samples" (NMC 2007c; 2008c). Samples are taken from the onsite and offsite wells in the vicinity of the PINGP 1 and 2 site. Since the beginning of this special sampling program, a downward trend in the annual tritium level averages have been observed. In 2006, results of tritium sampling showed that levels of tritium in well and ground water were at or near expected natural background levels, except for one onsite well, which had levels fluctuating from 432 picocuries per liter [pCi/L] to 3773 pCi/L, though this range is well below the EPA drinking water standard of 20,000 pCi/L (NMC 2007c). In 2007, two additional monitoring wells were sampled and sampling frequency was increased. The 2007 results indicate that levels of tritium in the well and ground water were at or near expected natural background levels (NMC 2008c). Levels of tritium in the onsite well with fluctuating levels in 2006 as well as the two additional monitoring wells fluctuated from 390 pCi/L in February to 2258 pCi/L in November 2007 (NMC 2007c). In the report, the applicant indicated that the elevated tritium levels in the three onsite monitoring wells might be due to prior leakage from the PINGP 1 and 2 liquid radwaste discharge pipe, which was replaced in 1992, or as a result of the turbine building sump water discharge into a landlocked area (NMC 2008c).

The Radiation Control Unit of the Minnesota Department of Health (MDH) monitors environmental radioactivity in Minnesota. Monitoring allows the MDH to develop a database on radioactivity within the state that can be used as a baseline during emergencies. As part of the MDH radiological environmental program, gamma radiation samples are collected near PINGP 1 and 2 and Monticello Nuclear Generating Plant, located in Wright County. The MDH Public Health Laboratory performs radiochemical analysis to estimate doses emitted from the plants. Surveys of spent fuel storage casks are also performed as part of this program. The MDH Environmental Radiation Data Report for 2006 states that, "In 2006, no Federal or state standards or guidelines were exceeded anywhere in the state of Minnesota, including near the nuclear power generating plants" (MDH 2006). Data from this program indicates that levels of Strontium-90 in milk (an aftermath of historic above ground nuclear testing and the Chernobyl Nuclear Power Plant accident in Ukraine), are low and now below the detection limit of isotopic analysis equipment; levels of Strontium-90 in the environment will continue to decline with isotopic decay. MDH also monitors levels surrounding the Independent Spent Fuel Storage Installation (ISFSI) at PINGP 1 and 2. MDH data indicates that neutron levels increased between 2006 and 2007, which is attributed to the addition of two casks to the ISFSI in 2006. Monthly reports for the PINGP 1 and 2 ISFSI are prepared by MDH Radiation Control Unit and provide data on radiation levels surrounding the PINGP 1 and 2 ISFSI (MDH 2008).

In addition to MDH's monitoring program, Wisconsin Public Health Statute §254.41 mandates the Department of Health Services to conduct environmental radiation monitoring around nuclear power facilities that impact Wisconsin in collaboration with the Radiation Protection Section of the Wisconsin Department of Health Services (WIDHS), the Division of Public Health, and the Bureau of Environmental Health. Therefore, the Wisconsin Department of Health

Services conducts an extensive environmental monitoring program around PINGP 1 and 2. The program includes collection of various types of samples from air, water and terrestrial exposure pathways. Air, precipitation, ambient gamma radiation, surface water, fish, soil, milk, well water, and vegetation samples are collected from selected locations at regular intervals (WIDHS 2008a; 2008b).

The NRC staff reviewed the PINGP 1 and 2 REMP reports for 2003 through 2007 (NMC 2004b; 2005b; 2006b; 2007b; 2008b) to identify any significant impacts to the environment. During 2007, there were no plant-related activation or fission products detected in airborne particulate or radioiodine filters, milk, drinking water, surface water, fish, shoreline sediment samples, or grassy or broadleaf vegetation. However, tritium was detected in groundwater samples. All reported data on the tritium levels measured in the environmental samples were below applicable NRC reporting levels and EPA drinking water standards (NMC 2008c).

Historical data on releases from PINGP 1 and 2 and the resultant dose calculations demonstrate that the amount of radiation received by a maximally exposed individual in the vicinity of PINGP 1 and 2 would be a small fraction of the limits specified in 10 CFR Part 20, the as low as is reasonably achievable (ALARA) dose design objectives in Appendix I to 10 CFR 50, and EPA radiation standards contained in 40 CFR 190. In 2007, dose values were calculated based on actual liquid and gaseous effluent release data and conservative models to simulate the transport mechanisms. The results are described in the 2007 Annual Radioactive Effluent Release Report (NMC 2008a). A summary of the calculated maximum dose to an individual located at the PINGP 1 and 2 site boundary from liquid and gaseous effluents released during 2007 is as follows:

- The 2007 calculated maximum total body dose to an offsite member of the general public from liquid effluents in 2007 was 0.86E-03 mrem (0.86E-5 mSv) from each PINGP 1 and 2 unit. These doses are well below the 3 mrem (0.03 mSv) dose design objective in Appendix I to 10 CFR Part 50.
- The 2007 calculated maximum organ (adult GI tract) dose to an offsite member of the general public from liquid effluents in 2007 was 1.25E-03 mrem (1.25E-05 mSv) from each PINGP 1 and 2 unit. These doses are well below the 10 mrem (0.10 mSv) dose design objective in Appendix I to 10 CFR Part 50.
- The 2007 calculated maximum gamma air dose at the site boundary from noble gas discharges was 3.285E-06 mrad (3.285E-8 mGy) for each PINGP 1 and 2 unit. These doses are well below the 10 mrad (0.10 mGy) dose design objective in Appendix I to 10 CFR Part 50.
- The 2007 calculated maximum beta air dose at the site boundary from noble gas discharges was 1.025E-04 mrad (1.025E-6 mGy) for each PINGP 1 and 2 unit. These doses are well below the 20 mrad (0.20 mGy) dose design objective in Appendix I to 10 CFR Part 50.

The NRC staff conclude that the PINGP 1 and 2 2007 radiological data are consistent, with reasonable variation due to operating conditions and outages, with the five year historical radiological effluent releases and resultant doses. These results confirm that PINGP 1 and 2 is operating in compliance with Federal radiation protection standards contained in Appendix I to 10 CFR Part 50, 10 CFR Part 20, and 40 CFR Part 190. Continued compliance with regulatory requirements is expected during the license renewal term; therefore, the impacts from radioactive effluents are not expected to change.

Based on the applicant's assertion of planned refurbishment activities, slightly higher doses to members of the public, with minimal resultant environmental impacts, are expected from PINGP 1 and 2 during the refurbishment period. However, based on past regulatory compliance and experience, the dose to a maximally exposed individual in the vicinity of PINGP 1 and 2 for the refurbishment period is expected to continue to be a small fraction of the limits and standards specified in 10 CFR Part 20, Appendix I to 10 CFR Part 50, and 40 CFR Part 190. Refurbishment is addressed in Chapter 3 of this draft SEIS.

4.8.2 Microbiological Organisms – Public Health

Table B-1 of Appendix B to Subpart A of 10 CFR Part 51 lists the effects of thermophilic microbiological organisms on human health as a Category 2 issue, requiring a plant-specific evaluation before license renewal for those plants using cooling towers that are located on a small river. NRC specifies in 10 CFR 51.53(c)(ii)(G) that small rivers are those with an average annual flow rate less than $3.15x10^{12}$ ft^3/yr ($9x10^{10}$ m^3/yr). The average annual flow rate of the Mississippi River at the nearest measuring station to PINGP 1 and 2 is $5.8x10^{11}$ ft^3/yr ($1.64x10^{10}$ m^3/yr), therefore the Mississippi River at PINGP 1 and 2 is considered a small river (NMC 2008). Recreational uses of the Mississippi River in the vicinity of PINGP 1 and 2, which include boating, fishing, and swimming, create the potential for human exposure to thermophilic microbiological organisms (NMC 2008). Consequently, the effects of PINGP 1 and 2 thermal discharge on microbiological organisms must be addressed for license renewal.

The Category 2 designation is based on the magnitude of the potential public health impacts associated with thermal enhancement of enteric pathogens such as *Salmonella* spp. and *Shigella* spp., the *Pseudomonas aeruginosa* bacterium, the pathogenic strain of the free-living amoebae *Naegleria* spp., and a number of species from the *Legionella* genus (NRC 1996). Thermophilic microbiological organisms generally occur at temperatures of 77 to 176 degrees Fahrenheit (°F; 25 to 80 degrees Celsius [°C]), with optimal growth occurring at temperatures from 122 to 150 °F (50 to 66 °C), and a minimum temperature tolerance of 68°F (20 °C) (Joklik and Willett 1976). However, thermal preference and tolerances vary across the bacterial family. In the GEIS, the NRC staff noted that impacts of nuclear plant thermal discharges are considered to be of small significance if they do not enhance the presence of microorganisms that are detrimental to water quality and public health (NRC 1996).

P. aeruginosa is an opportunistic pathogen that causes serious and sometimes fatal infections in immunocompromised individuals by producing and releasing toxins. It has an optimal growth temperature of 99 °F (37 °C) (Todar 2007). The *Legionella* genus consists of at least 46 species and 70 serogroups and is responsible for Legionnaires' disease, with the onset of pneumonia in the first 2 weeks of exposure. Risk groups for *Legionella* spp. include the elderly, cigarette smokers, persons with chronic lung or immunocompromising diseases, and persons receiving immunosuppressive drugs. *Legionella* spp. grows best at 90 to 105 °F (32 to 41 °C) (CDC 2007a). *Salmonella typhimurium* and *S. enteritidis* are two of the more common species of Enterobacteriaceae, which cause fever, abdominal cramps, and diarrhea. *Salmonella* spp. can occasionally establish localized infection (e.g., septic arthritis) or can progress to sepsis. All ages of individuals can be affected, but groups at greatest risk for severe or complicated disease include infants, the elderly, and immunocompromised persons. *Salmonella* spp. occurs at temperatures between 50 and 120 °F (10 and 49 °C) (CDC 2007b), with optimal growth occurring at 95 to 99 °F (35 to 37 °C) (ESR 2002). The pathogenic amoeba flagellate *Naegleria fowleri* is the causative agent of a rapidly fatal form of encephalitis, primary amoebic meningoencephalitis (PAM). *Naegleria* spp. is ubiquitous in nature and can be enhanced in thermally-altered water bodies at temperatures ranging from 95 to 106 °F (35 to 41 °C) or higher. This organism is rarely found in water cooler than 95 °F (35 °C), and infection rarely occurs at these water temperatures (Tyndall et al. 1989). It is estimated that individual annual risks to swimmers from PAM caused by the free-living *N. fowleri* are very low (approximately 4×10^{-6}); however, there have been reported cases of fatal *Naegleria* infections associated with power plant cooling towers (NRC 1996).

As discussed in Chapter 2, the PINGP 1 and 2 circulating water system dissipates heat from the reactors to the Mississippi River by using one of three modes: open cycle (once-through cooling, with no cooling towers in operation), helper cycle (once-through cooling, with mechanical draft cooling towers in operation), and closed cycle (using cooling towers to recirculate up to 95 percent of the cooling water). The mode of cooling operation is selected by the applicant to ensure compliance with the thermal limits of PINGP 1 and 2 NPDES permit No. MD0004006 (MPCA 2006; NMC 2008).

The PINGP 1 and 2 NPDES permit specifies that during the warmer part of the year — from April 1 through the date when the daily average upstream ambient river temperature falls below 43 °F (6 °C) for five consecutive days (the Fall Trigger date) —cooling towers must be operated as necessary so that:

- Receiving water is not raised by more than 5 °F (2.8 °C) above ambient temperature;
- Cooling water discharge does not exceed a daily average temperature of 86 °F (30 °C); and
- If the daily average ambient temperature reaches 78 °F (26 °C) for two consecutive days, all cooling towers shall be operated to the maximum extent practicable (MPCA 2006).

To comply with these NPDES permit limitations, PINGP 1 and 2 monitors Mississippi River water temperature at five locations: the discharge canal, the intake structure, the main river channel (upstream), Sturgeon Lake (upstream), and immediately downstream of Lock and Dam 3. From 2000 through 2005, the highest ambient river water temperature upstream of the discharge canal was 86.0 °F (30 °C), measured in August 2001. The highest temperature downstream of the discharge canal was 86.4 °F (30.2 °C), measured on the same day. The highest temperature measured at the PINGP 1 and 2 discharge canal was 99 °F (37.2 °C), in August 2003 (NMC 2008).

Maximum temperatures in the discharge canal could allow for the presence of thermophilic microbiological organisms. However, because the growth rate for microbiological organisms is measured in hours and days (Hendricks 1972), it is not expected that the short period of time in which the heated discharge water moves through the discharge canal would allow for any noticeable impact on growth rates of microbiological organisms. As such, potential thermophilic microbiological organisms present in the discharge canal would likely be in limited numbers and would not be expected to cause a significant risk to public health. Furthermore, the PINGP 1 and 2 discharge canal and adjacent portions of the Mississippi River are within the plant's exclusion area boundary (see Figure 2-2 in Chapter 2), and there is no public access to these areas. Beyond the discharge canal, maximum ambient river water temperatures are well outside the optimal temperature range for growth and reproduction of thermophilic microbiological organisms.

Available data assembled by the U.S. Center for Disease Control and Prevention (CDC) for the years 1978 through 2006 report no occurrence of waterborne disease outbreaks in Minnesota resulting from the operation of PINGP 1 and 2 (CDC 2008). During the most recent two-year reporting summary (2005 to 2006), Minnesota reported nine waterborne-disease outbreaks, the highest number of outbreaks reported by any state (followed by New York and Florida each reporting seven outbreaks, and Wisconsin reporting six). The etiological agents responsible for these outbreaks were *P. aeruginosa*, pool chemicals or disinfection by-products, *Cryptosporidium hominis* (an obligate parasite that colonizes the human gastrointestinal tract), *Legionella pneumophilla*, elevated *Escherichia coli* levels, *Shigella sonnei*, Norovirus, and an unidentified *Vibrio* species. All waterborne-disease outbreaks reported during 2005 to 2006 summary period resulted from the use of a hotel or private pool or spa (treated water), or a recreational beach (untreated water) (CDC 2008).

The staff independently reviewed the applicant's ER (NMC 2008) and the applicant's Minnesota NPDES permit (MPCA 2006). Based on the evaluation presented above, the staff concludes that thermophilic microbiological organisms are not likely to present a public health hazard as a result of PINGP 1 and 2 discharges to the Mississippi River, and the staff classifies the expected impacts on public health from thermophilic microbiological organisms from continued operation of PINGP 1 and 2 in the license renewal period as SMALL. In addition to maintaining the current plant exclusion zone to restrict access to the Mississippi River shores in the vicinity of the plant discharge canal, the staff identified one additional measure that could mitigate potential thermophilic microbiological organism impacts resulting from continued operation of PINGP 1 and 2. Periodic monitoring for thermophilic microbiological organisms in the water and sediments in and near the discharge canal could reduce human health impacts by minimizing the potential for public exposures to these organisms. The staff did not identify any cost-benefit studies applicable to this mitigation measure.

4.8.3 Electromagnetic Fields – Acute Shock

Based on the GEIS, the Commission found that electric shock resulting from direct access to energized conductors or from induced charges in metallic structures has not been a problem at most operating plants and generally is not expected to be a problem during the period of extended operation. However, a site-specific review is required to determine the significance of the electric shock potential along the portions of the transmission lines within the scope of the SEIS.

The GEIS states that it is not possible to determine the significance of the electric shock potential without a review of the conformance of each nuclear plant transmission line with the National Electrical Safety Code (IEEE 2007) criteria. Evaluation of individual plant transmission lines is necessary because the issue of electric shock safety was not addressed in the licensing process for some plants. For other plants, land use in the vicinity of transmission lines may have changed, or power distribution companies may have chosen to upgrade line voltage. To comply with 10 CFR 51.53(c)(3)(ii)(H), the applicant must provide an assessment of the potential shock hazard if the transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the National Electric Safety Code for preventing electric shock from induced currents.

All transmission lines associated with PINGP 1 and 2 were constructed in accordance with National Electric Safety Code and industry guidance in effect at that time (AEC 1973). The transmission facilities are maintained to ensure continued compliance with current standards. Routine ground inspections and aerial patrols are performed in order to identify any ground clearance problems and the integrity of the transmission lines structures (NMC 2008). Since the lines were constructed, a new criterion has been added to the National Electric Safety Code for power lines with voltages exceeding 98 kV. This criterion requires that the minimum clearance for a line must limit induced currents due to static effects to 5 mA. NSP has reviewed the transmission lines for compliance with this criterion and indicated that all transmission lines within the scope of this review have been reviewed and results show there are no locations under the transmission lines that have the capacity to induce more than 5 mA in a vehicle parked beneath the line (NMC 2008). No induced shock hazard to the public should occur, since the lines are operating within original design specifications and meet current National Electric Safety Code clearance standards.

The NRC staff has reviewed the available information, including the applicant's evaluation and computational results. Based on this information, the NRC staff evaluated the potential impacts for electric shock resulting from operation of PINGP 1 and 2 and its associated transmission lines. The NRC staff concludes that the potential impacts from electric shock during the renewal period would be SMALL. The NRC staff identified a variety of measures that could mitigate potential acute electromagnetic field impacts resulting from continued operation of the PINGP 1 and 2's transmission lines. These mitigation measures would include erecting barriers along the length of the transmission line to prevent unauthorized access to the ground beneath the conductors, installing road signs at road crossings, and raising the elevation of the lowest energized conductor to increase the distance between it and a potentially exposed individual directly beneath it. These mitigation measures could reduce human health impacts by minimizing public exposures to electric shock hazards. The NRC staff did not identify any cost benefit studies applicable to the mitigation measures mentioned above.

4.8.4 Electromagnetic Fields – Chronic Effects

The NRC specifies in 10 CFR 51, Subpart A, Appendix B, Table B-1, that "biological and physical studies of 60-Hz electromagnetic fields have not found consistent evidence linking harmful effects with field exposure. However, research is continuing in this area and a consensus scientific view has not been reached." The GEIS did not designate the chronic effects of 60-Hz electromagnetic fields from power lines as Category 1 or 2; such a designation will not occur until a scientific consensus is reached on the health implications of these fields.

The potential for chronic effects from these fields continues to be studied and is not known at this time. The National Institute of Environmental Health Sciences (NIEHS) directs related research through the U.S. Department of Energy (DOE). The report by NIEHS (1999) contains the following conclusion, which is supported by the recently published World Health Organization (2007) Environmental Health Criteria Monograph No.238:

> The NIEHS concludes that ELF-EMF [extremely low frequency-electromagnetic field] exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

This statement is not sufficient to cause the NRC staff to change its position with respect to the chronic effects of electromagnetic fields. This position is expressed in Footnote 5 to Table B-1 of Appendix B to Subpart A of 10 CFR Part 51 as follows:

> If in the future, the Commission finds that, contrary to current indications, a consensus has been reached by appropriate Federal health agencies that there are adverse health effects from electromagnetic fields, the Commission will require applicants to submit plant-specific reviews of these health effects as part of their license renewal applications. Until such time, applicants for license renewal are not required to submit information on this issue.

The NRC staff considers the GEIS finding of "Uncertain" still appropriate and will continue to follow developments on this issue.

4.9 Socioeconomics

The socioeconomic issues applicable to PINGP 1 and 2 follow in Table 4.12 for Category 1, Category 2, and uncategorized issues.

Table 4-12. Socioeconomic Issues. *Section 2.2.9 of this report describes the socioeconomic conditions near PINGP 1 and 2.*

Issues	GEIS Section	Category
Housing Impacts	4.7.1	2
Public Services: public safety, social services, and tourism and recreation	4.7.3; 4.7.3.3; 4.7.3.4; 4.7.3.6	1
Public Services: public utilities	4.7.3.5	2
Public Services: education (license renewal term)	4.7.3.1	1
Offsite Land Use (license renewal term)	4.7.4	2
Public Services: transportation	4.7.3.2	2
Historic and Archaeological Resources	4.7.7	2
Aesthetic Impacts (license renewal term)	4.7.6	1
Aesthetic impacts of transmission lines (license renewal term)	4.5.8	1
Environmental Justice	Not addressed(a)	Ucategorized(a)

[a]Guidance related to environmental justice was not in place at the time the GEIS and the associated revisions to 10 CFR Part 51 were prepared. Therefore, environmental justice must be addressed in plant-specific reviews.

4.9.1 Generic Socioeconomic Issues

The NRC staff reviewed and evaluated the PINGP 1 and 2 ER, scoping comments, other available information, and visited the PINGP 1 and 2 site. The NRC staff did not identify any new and significant information that would change the conclusions presented in the GEIS. Therefore, it is expected that there would be no impacts related to the Category 1 issues during the period of extended operation beyond those discussed in the GEIS. For PINGP 1 and 2, the staff incorporates the GEIS conclusions by reference. Impacts for Category 2 and uncategorized issues are discussed in Sections 4.9.2 through 4.9.7, below.

4.9.2 Housing Impacts

Appendix C, Section C.1.4, of the GEIS presents a population characterization method based on two factors, sparseness and proximity. Sparseness measures population density within 20 mi (32 km) of the site, and proximity measures population density and city size within 50 mi (80 km). Each factor has categories of density and size (GEIS, Table C.1). A matrix is used to rank the population category as low, medium, or high (GEIS, Figure C.1).

According to the 2000 Census, approximately 107,131 people lived within 20 mi (32 km) of PINGP 1 and 2, which equates to a population density of 85 persons per mi^2 (142 persons per km^2) (NMC 2008). This density translates to the less sparse GEIS Category 3 (60 to 120 persons per mi^2 [100 to 200 persons per km^2] or less than 60 persons per mi^2 [100 persons per km^2] with at least one community with 25,000 or more persons within 20 mi [32 km]). Approximately 2,733,326 people live within 50 mi (80 km) of PINGP 1 and 2 (NMC 2008). This equates to a population density of 349 persons per mi^2 (582 persons per km^2). Applying the GEIS proximity measures, this density is classified as proximity Category 4 (greater than or equal to 190 persons per mi^2 [317 persons per km^2] within 50 mi [80 km]). Therefore, according to the sparseness and proximity matrix presented in the GEIS, the rankings of sparseness (Category 3) and proximity (Category 4) result in the conclusion that PINGP 1 and 2 are located in a high population area.

Table B-1 of Appendix B to Subpart A of 10 CFR Part 51 states that impacts on housing availability are expected to be of small significance in high-density population areas where growth control measures are not in effect. Since the PINGP 1 and 2 site is located in a high population area, and Goodhue and Dakota Counties, Minnesota, and Pierce County, Wisconsin, are not subject to growth control measures that would limit housing development, any changes in employment at PINGP 1 and 2 would have little noticeable effect on housing availability in these counties. Since NSP has no plans to add non-outage employees during the license renewal period, employment levels at PINGP 1 and 2 would remain relatively constant with no additional demand for permanent housing during the license renewal term. In addition, the number of available housing units has kept pace with or exceeded the increase in area population. Based on this information, there would be no impact on permanent housing during the license renewal term beyond what has already been experienced.

However, NSP indicated in their environmental report that the PINGP, Unit 2, steam generators would be replaced prior to the license renewal term. NSP estimates that steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days at PINGP 1 and 2 (NMC 2008). These additional workers would create an additional demand for temporary (rental) housing in the immediate vicinity of PINGP 1 and 2. The impacts of the PINGP, Unit 2, steam generator replacement are discussed in Chapter 3 of this draft SEIS.

4.9.3 Public Services: Public Utility Impacts

Impacts on public utility services are considered SMALL if there is little or no change in the ability of the system to respond to demand and thus there is no need to add capital facilities. Impacts are considered MODERATE if service capabilities are overtaxed during periods of peak demand. Impacts are considered LARGE if services (e.g., water, sewer) are substantially degraded and additional capacity is needed to meet ongoing demand. In the absence of new and significant information to the contrary, the only impacts on public utilities that could be significant would be impacts on public water supplies.

Analysis of impacts on the public water systems considered both plant demand and plant-related population growth. Section 2.1.3 of this SEIS describes the permitted withdrawal rate and actual use of water for reactor cooling for PINGP 1 and 2.

Since NSP has no plans to add non-outage employees during the license renewal period, employment levels at PINGP 1 and 2 would remain relatively unchanged with no additional demand for public water and sewer services. Public water systems in the region would be adequate to meet the demands of residential and industrial customers in the area. Therefore, there would be no additional impact to public water and sewer services during the license renewal term beyond what is currently being experienced.

As discussed in Section 4.9.2, NSP indicated in their environmental report that the PINGP 1 and 2, Unit 2, steam generators would be replaced prior to the license renewal term (NMC 2008). The additional number of refueling outage workers needed to replace the steam generators would cause a short-term increase in the amount of public water and sewer services used in the immediate vicinity of PINGP 1 and 2. These impacts are discussed in Chapter 3 of this draft SEIS.

4.9.4 Offsite Land Use – License Renewal Period

Offsite land use during the license renewal term is a Category 2 issue (10 CFR 51, Subpart A, Appendix B, Table B-1). Table B-1 of 10 CFR 51 Subpart A, Appendix B notes that "significant changes in land use may be associated with population and tax revenue changes resulting from license renewal."

Section 4.7.4 of the GEIS defines the magnitude of land-use changes as a result of plant operation during the license renewal term as follows:

SMALL - Little new development and minimal changes to an area's land-use pattern.

MODERATE - Considerable new development and some changes to the land-use pattern.

LARGE - Large-scale new development and major changes in the land-use pattern.

Tax revenue can affect land use because it enables local jurisdictions to provide the public services (e.g., transportation and utilities) necessary to support development. Section 4.7.4.1 of the GEIS states that the assessment of tax-driven land-use impacts during the license renewal term should consider (1) the size of the plant's payments relative to the community's total revenues, (2) the nature of the community's existing land-use pattern, and (3) the extent to which the community already has public services in place to support and guide development. If the plant's tax payments are projected to be small relative to the community's total revenue, tax-driven land-use changes during the plant's license renewal term would be SMALL, especially where the community has pre-established patterns of development and has provided adequate public services to support and guide development. Section 4.7.2.1 of the GEIS states that if tax payments by the plant owner are less than 10 percent of the taxing jurisdiction's revenue, the significance level would be SMALL. If the plant's tax payments are projected to be medium to large relative to the community's total revenue, new tax-driven land-use changes would be MODERATE. If the plant's tax payments are projected to be a dominant source of the community's total revenue, new tax-driven land-use changes would be LARGE. This would be especially true where the community has no pre-established pattern of development or has not provided adequate public services to support and guide development.

Population-related Impacts

Since NSP has no plans to add non-outage employees during the license renewal period, there would be minimal plant operations-driven population increase in the vicinity of PINGP 1 and 2. Therefore, there would be minimal population-related land use impacts during the license renewal term beyond what has already been experienced.

As discussed in Section 4.9.2, NSP indicated in their environmental report that the PINGP, Unit 2, steam generators would be replaced prior to the license renewal term (NMC 2008). Due to the short amount of time needed to replace the steam generators, the additional number of refueling outage workers would not cause any permanent population-related land use changes in the immediate vicinity of PINGP 1 and 2. These impacts are discussed in Chapter 3 of this draft SEIS.

Tax-Revenue-Related Impacts

As previously discussed in Chapter 2, NSP pays annual real estate taxes to Goodhue County, City of Red Wing, and School District 256. For the three-year period from 2003 through 2005, tax payments to Goodhue County represented 17 to 21 percent of the County's total annual property tax revenues, and payments to the City of Red Wing represented approximately 36 to 42 percent of the City's total annual property tax revenues. NSP's tax payments to School District 256, for the period 2003 through 2005, represented 28 to 36 percent of the District's total annual property tax revenues.

Since NSP started making payments to local jurisdictions, population levels and land use conditions in Goodhue County and the City of Red Wing have not changed significantly, which might indicate that these tax revenues have had little or no effect on land use activities within the county or city. Given that NSP has no plans to add non-outage employees during the license renewal period, employment levels at PINGP 1 and 2 would remain relatively unchanged. The assessed value of PINGP 1 and 2 is not expected to increase, and annual property tax payments to Goodhue County, City of Red Wing, and School District 256 are expected to remain relatively unchanged throughout the license renewal period. Based on this information, there would be no significant land use impacts related to tax revenue during the license renewal term beyond what has already been experienced.

As discussed in Section 4.9.2, NSP indicated in their ER that the PINGP, Unit 2, steam generators would be replaced prior to the license renewal term (NMC 2008). The replacement of the existing steam generators would not likely increase the assessed value of PINGP 1 and 2, and property tax payments would remain unchanged. These impacts are discussed in Chapter 3 of this draft SEIS.

4.9.5 Public Services: Transportation Impacts

Table B-1 of 10 CFR Part 51 states: "Transportation impacts (level of service) of highway traffic generated...during the term of the renewed license are generally expected to be of small significance. However, the increase in traffic associated with additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites." All applicants are required by 10 CFR 51.53(c)(3)(ii)(J) to assess the impacts of highway traffic generated by the proposed project on the level of service of local highways during the term of the renewed license.

Since NSP has no plans to add non-outage employees during the license renewal period, there would be no noticeable change in traffic volume and levels of service on roadways in the vicinity of PINGP 1 and 2. Therefore, there would be minimal transportation impacts during the license renewal term beyond what is currently being experienced.

As discussed in Section 4.9.2, NSP indicated in their environmental report that the PINGP 1 and 2, Unit 2, steam generators would be replaced prior to the license renewal term (NMC 2008). The additional number of refueling outage workers and truck material deliveries needed to support the replacement of the steam generators would cause a short-term transportation impact on access roads in the immediate vicinity of PINGP 1 and 2. These impacts are discussed in Chapter 3 of this draft SEIS.

Prairie Island Indian Community

The following information was provided by the PIIC (PIIC 2008).

> As stated in Chapter 2 and 3, the Tribe is concerned about PINGP 1 and 2-related traffic impacts on the Tribe's residential area (60 homes), the casino (guests and employees) and the tribal government offices, especially the increased volume of traffic that occurs during plant outages. Sturgeon Lake Road provides the only access to the Tribe's residential area, its government center, and its business. PINGP 1 and 2 full-time employees and outage workers also heavily use Sturgeon Lake Road.

4.9.6 Historic and Archaeological Resources

The National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of their undertakings on historic properties. Historic properties are defined as resources that are eligible for listing on the NRHP. The criteria for eligibility are listed in Title 36, "Parks, Forests, and Public Property," Part 60, Section 4, "Criteria for Evaluation," of the *Code of Federal Regulations* (36 CFR Part 60.4) and include (1) association with significant events in history; (2) association with the lives of persons significant in the past; (3) embodies distinctive characteristics of type, period, or construction, and (4) or sites or places that have yielded or is likely to yield important information (ACHP 2008). The historic preservation review process (Section 106 of the NHPA) is outlined in regulations issued by the Advisory Council on Historic Preservation (ACHP) in Title 36, "Parks, Forests, and Public Property," Part 800, "Protection of Historic Properties," of the *Code of Federal Regulations* (36 CFR Part 800).

The issuance of a renewed operating license for a nuclear power plant is a federal action that could possibly affect either known or undiscovered historic properties located on or near the plant site and its associated transmission lines. In accordance with the provisions of the NHPA, the NRC is required to make a reasonable effort to identify historic properties in the area of potential effect. The area of potential effect for a license renewal action is the area at the power plant site and its immediate environs that may be impacted during land-disturbing operations or projected refurbishment activities associated with the proposed action. If no historic properties are present or affected, the NRC is required to notify the State Historic Preservation Office before proceeding. If it is determined that historic properties are present, the NRC is required to assess and resolve possible adverse effects of the undertaking.

NSP contacted the MNHS in April 2007 to request information on historic and archaeological resources in the vicinity of the PINGP 1 and 2 site and describe the proposed action (license renewal) (NMC 2007a). The MNHS responded requesting additional information about the license renewal process, and NSP provided additional information in March 2008 (NMC 2008a). In response to NSP's request, the MNHS stated, in a letter dated April 29, 2008, that many known archaeological sites are located on and in the vicinity of PINGP 1 and 2. MNHS noted that many of these sites had been disturbed by the construction of PINGP 1 and 2. MNHS also requested that NSP implement effective and proactive cultural resource management practices during the license period, and that a programmatic agreement be negotiated (MNHS 2008).

NSP contacted the PIIC in July 2007 to request the PIIC's participation in the license renewal application process (NMC 2007b). The PIIC submitted a letter to NSP detailing concerns regarding the past treatment of historic and archaeological resources and other environmental issues at PINGP 1 and 2 (PIIC 2008a).

In accordance with 36 CFR 800.8(c), the NRC contacted the MNHS (NRC 2008a), the ACHP (NRC 2008b), the PIIC (2008c) and other Federally-recognized Native American Tribes to initiate consultation regarding the Section 106 consultation process. These letters are listed in Appendix D.

On April 14, 2008, the NRC received a letter from the PIIC requesting participation as a cooperating agency in the license renewal environmental review for PINGP 1 and 2. On June 17, 2008, the NRC and the PIIC entered into a Memorandum of Understanding (MOU) to establish a framework for the NRC and the PIIC to work together to review potential environmental impacts of the proposed license renewal. The MOU establishes a cooperating agency relationship between the NRC and the PIIC for the preparation of the PINGP 1 and 2 SEIS.

As discussed in Section 2.2.9, a search of the MNHS, Bureau of Indian Affairs (BIA), and Office of the State Archaeologist (OSA) site files identified nine archaeological sites, including seven known and recorded archaeological sites, one reported site (Vergil Larson II Mound Group site [21GDI]), and one unrecorded site (Prairie Island District 132 Schoolhouse) (see Table 2.25) at the PINGP 1 and 2 site. The following is a brief description of the known archaeological sites.

Several surveys and archaeological excavations have been conducted over the years at the Bartron village site (21GD02). This multi-component site contains intact features which could contribute to the understanding of the cultural history of Prairie Island. The Bartron site extends onto the PINGP 1 and 2 site. The Bartron village site contains intact features and should be avoided.

The Birch Lake Mound Group (21GD58/61) dates to the Mississippian period. Five out of eight mounds in this group were excavated as part of Elden Johnson's survey work in 1968. Human remains and funerary objects were recovered from this site. The MNHS, Minnesota Indian Affairs Council, and Hamline University are working on the repatriation of these remains. Portions of this site could still be intact and should be avoided.

The NSP II Mound Group (21GD59) consists of six burial mounds and dates to the Mississippian period. This mound group was located in the vicinity of the PINGP 1 and 2 cooling towers. Prior to construction, it was noted that some of the mounds had been impacted by cultivation. In 1968 and 1969, two of the six mounds were excavated. Survey reports noted that the mounds did not yield significant amounts of cultural artifacts (Johnson, Peterson, and Streiff 1969). The four remaining mounds were either covered with fill or leveled during grading activities for the PINGP 1 and 2 cooling towers. Aerial photos show heavy ground disturbance on and in the vicinity of the NSP II Mound Group during the construction of the cooling towers. A portion of 21GD59 may not have been leveled and could be buried under fill. The exact degree of preservation of this site is unknown. Portions of this site could still be intact and should be avoided.

A single elongated mound (21GD62) was excavated in July 1969 by Elden Johnson. This mound site has been disturbed by years of cultivation and could have been impacted by railroad construction. The impact on this particular site from construction of PINGP 1 and 2 was minimal because it was located outside the PINGP 1 and 2 site construction area. Portions of this site could still be intact and should be avoided.

In 1980, site 21GD148 (a Late Woodland habitation site) and site 21GD207 (a Late Woodland artifact scatter) were identified and excavated during Johnson's survey for the modification of the cooling discharge canal. Portions of these sites are still intact and should be avoided.

Also, in 1980, site 21GD149 was discovered eroding out of a river bank by NSP biologists on land owned by the USACE and leased by NSP. This site was discovered when water levels were lowered (drawdown) in the pool above Lock and Dam No. 3 by the USACE. Site 21GD149 is listed as a possible earthwork, mound, or habitation site dating to the Late

Woodland and Mississippian periods. This site has the potential to yield important information regarding the relationships between these cultures. This site has been heavily eroded by the Mississippi River and is mostly under water (Hildebrandt 2008). NSP intends to survey this site if future drawdown occurs.

The Vergil Larson II Mound Group (21GDI), a group of three mounds, was discovered in the 1980s, and was likely impacted by farming at one time. A reconnaissance survey was conducted in 1998 and 1999. However, no subsurface testing was conducted out of respect for potential burials interred in the reported mounds. This site has not been field verified, but will be revisited as part of the Phase I Reconnaissance Field Survey (Xcel 2009).

One potential historic resource is the Prairie Island (District 132) Schoolhouse. The schoolhouse was operational from 1873 through 1953 (Hildebrandt 2008). This one room schoolhouse was attended by children who were both local members of the PIIC as well as non-Indian children who are not members (PIIC 2008). It was torn down for construction of PINGP 1 and 2, however, the foundation remains preserved underneath a mowed area. This site has never been formally investigated. This area should be avoided and investigated in the event of any ground disturbing activities.

NSP has indicated no plans to alter the PINGP 1 and 2 site for license renewal. Nevertheless, because there is a high potential for additional archaeological resources to be discovered at the PINGP 1 and 2 site, NSP should make sure that these resources are not affected by continued operations and maintenance activities.

NSP is in the process of revising its corporate procedures to improve its protection of archaeological resources. NSP has proposed the following four new license renewal commitments to address the protection of archaeological, historical and cultural resources. These commitments are stated exactly as they were issued by the applicant, (reference in the text to NSPM, Xcel, NSP Minnesota and NSP are all referring to the applicant, NSP).

New Preliminary Commitment Number 37

> NSPM will revise procedures for excavation and trenching controls and archaeological, cultural and historic resource protection to identify sensitive areas and provide guidance for ground-disturbing activities. The procedures will be revised to include drawings and illustrations to assist users in identifying culturally sensitive areas, and pictures of artifacts that are prevalent in the area of the Plant site. The revised procedures will also require training of the Site Environmental Coordinator and other personnel responsible for proper execution of excavation or other ground-disturbing activities (NSP 2009).

New Preliminary Commitment Number 38

> NSPM will conduct a Phase I Reconnaissance Field Survey of the disturbed areas within the Plant's boundaries. In addition, NSPM will conduct Phase I field surveys of areas of known archaeological sites to precisely determine their boundaries. NSPM will use the results of these surveys to designate areas for archaeological protection (NSP 2009).

New Preliminary Commitment Number 39

> NSPM will prepare, maintain and implement a Cultural Resources Management Plan (CRMP) to protect significant historical, archaeological, and cultural resources that may currently exist on the Plant site. In connection with the preparation of the CRMP, NSPM will conduct botanical surveys to identify

> culturally and medicinally important species on the plant site, and incorporate provisions to protect such plants into the CRMP (NSP 2009).

New Preliminary Commitment Number 40

> NSPM will consult with a qualified archaeologist prior to conducting any ground-disturbing activity in any area designated as undisturbed and in any disturbed area that is described as potentially containing archaeological resources (as determined by the Phase I Reconnaissance Field Survey discussed in New Preliminary Commitment Number 38) (NSP 2009).

NSP is currently seeking comment from the MNHS, BIA, the OSA, and the PIIC on its revised procedures.

During the environmental site audit, NRC staff discovered that Excavation and Trenching Control procedures were not consistently applied. An excavation was found near an existing archaeological site, and NSP's procedures had not been followed. NSP has initiated corrective actions including the training of employees and staff (NSP 2009). In addition, as previously discussed in Chapter 2 of this draft SEIS, NSP will conduct a Phase I Reconnaissance Field Survey of disturbed areas and known archaeological sites (Xcel 2009).

Based on the review of MNHS, OSA, and BIA files, information from the PIIC; archaeological surveys, assessments, and other information; the potential impacts of continued operations and maintenance of PINGP 1 and 2 on historic, archaeological, and cultural resources could be MODERATE. NSP could mitigate MODERATE impacts by training NSP staff in the Section 106 consultation process and cultural awareness training to ensure that informed decisions are made when considering the effects of continued operations and maintenance on historic and archaeological resources. In addition, NSP would also develop a cultural resources management plan which would coordinate procedures, policies, and effectively manage and protect the archaeological sites and resources on the PINGP 1 and 2 site. The cultural resources management plan should be developed in consultation with the NRC, PIIC, OSA, BIA, and MHS. NSP should also establish a point of contact to facilitate open communication with the PIIC regarding activities that could impact historic and archaeological resources.

Subsequent to the issuance of this draft SEIS, NSP has committed to conduct a Phase I Reconnaissance Field Survey of the disturbed areas within the PINGP 1 and 2 site boundaries (Xcel 2009). In addition, NSP will conduct Phase I field surveys of areas of known archaeological sites to delineate their boundaries (Xcel 2009). NSP will use the results of these reconnaissance field surveys to designate areas for archaeological protection at the PINGP 1 and 2 site (Xcel 2009).. Lands that have not been surveyed should be investigated by a qualified archaeologist prior to any ground disturbing activity.

As discussed in Chapter 3, NSP plans to replace the PINGP 1 and 2, Unit 2, steam generators. Warehouse(s) will be constructed on the site to house the replaced generators (NMC 2008). All construction will take place within the existing developed industrial portions of the plant site. Undisturbed areas of the plant site will not be affected (NMC 2008). The environmental impacts of PINGP 1 and 2, Unit 2, steam generator replacement project are addressed in Chapter 3 of this draft SEIS.

Prairie Island Indian Community

The following information was provided by the PIIC (PIIC 2008).

> All of the archaeological sites on Prairie Island (including those within the boundaries of PINGP 1 and 2) are considered by Tribal members to be sacred sites. NSP and the tribe have begun to work in a cooperative manner to ensure

that all archaeological sites are protected during refurbishment and the extended period of operation. In addition, NSP is conducting a medicinal and cultural plant inventory within the boundaries of the PINGP 1 and 2. The results of the NSP plant inventory will be compared with the Tribe's 2008/2009 plant inventory.

Because of past damage to archaeological sites within the PINGP 1 and 2 site boundaries, NSP is considering the Prairie Island Indian Community's suggestion that a "healing ceremony" be held. During the summer of 2008, a tribal member was allowed to cut down a ceremonial tree (for the Sun Dance) on land within the PINGP 1 and 2 site boundaries.

The Tribe recommends that NSP conduct a Traditional Cultural Property (TCP) survey of the PINGP 1 and 2 site to document past or lost use of cultural sites and materials. Tribal members should be allowed access to burial sites for ceremonial purposes, and procedures should be established for protecting all archaeological sites within the PINGP 1 and 2 site.

4.9.7 Environmental Justice

Under Executive Order 12898 (59 FR 7629), Federal agencies are responsible for identifying and addressing potential disproportionately high and adverse human health and environmental impacts on minority and low-income populations. In 2004, the Commission issued a Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040), which states, "[t]he Commission is committed to the general goals set forth in Executive Order 12898 (EO), and strives to meet those goals as part of its NEPA review process."

The Council of Environmental Quality (CEQ) provides the following information in Environmental Justice: Guidance Under the National Environmental Policy Act (NEPA) (1997):

Disproportionately High and Adverse Human Health Effects. Adverse health effects are measured in risks and rates that could result in latent cancer fatalities, as well as other fatal or nonfatal adverse impacts on human health. Adverse health effects may include bodily impairment, infirmity, illness, or death. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for a minority or low-income population is significant (as defined by NEPA) and appreciably exceeds the risk or exposure rate for the general population or for another appropriate comparison group (CEQ 1997).

Disproportionately High and Adverse Environmental Effects. A disproportionately high environmental impact that is significant (as defined by NEPA) refers to an impact or risk of an impact on the natural or physical environment in a low-income or minority community that appreciably exceeds the environmental impact on the larger community. Such effects may include ecological, cultural, human health, economic, or social impacts. An adverse environmental impact is an impact that is determined to be both harmful and significant (as defined by NEPA). In assessing cultural and aesthetic environmental impacts, impacts that uniquely affect geographically dislocated or dispersed minority or low-income populations or American Indian tribes are considered (CEQ 1997).

The environmental justice analysis assesses the potential for disproportionately high and adverse human health or environmental effects on minority and low-income populations that could result from the operation of PINGP 1 and 2 during the renewal term. In assessing the impacts, the following CEQ (1997) definitions of minority individuals and populations and low-income population were used:

Minority individuals. Individuals who identify themselves as members of the following population groups: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, or two or more races meaning individuals who identified themselves on a Census form as being a member of two or more races, for example, Hispanic and Asian.

Minority populations. Minority populations are identified when (1) the minority population of an affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Low-income population. Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports, Series PB60, on Income and Poverty.

Minority Population in 2000

According to 2000 Census data, 16.6 percent of the population (approximately 2,743,000 persons) residing within a 50-mi (80-km) radius of PINGP 1 and 2 identified themselves as minority individuals. The largest minority group was Black or African American (185,000 persons or 6.7 percent), followed by Asian (140,000 persons or about 5.1 percent) (USCB 2003). About 3.9 percent of the Goodhue County population identified themselves as minorities, with American Indian and Alaska Native the largest minority group (1.3 percent) followed by Hispanic or Latino (1.1 percent) (USCB 2008) (see Table 2.2.8.5–2).

The 50-mi (80-km) radius around PINGP 1 and 2 includes 25 counties, 17 of which are in Minnesota and 8 of which are in Wisconsin. The geographic area includes any census block group with all or part of its area within the 50-mi (80-km) radius. Of the 2,197 census block groups located wholly or partly within the 50-mi (80-km) radius of PINGP 1 and 2, 312 block groups were determined to have high density minority population percentages that exceeded the state average by 20 percentage points or more (NMC 2008). The largest number of high density minority block groups was Black or African American, with 131 block groups that exceed the state average 20 percent or more. These block groups are concentrated in urban areas with high population densities. The greatest number of high density block groups with minority populations is located in two Minnesota counties (Hennepin and Ramsey). The closest high density minority population to PINGP 1 and 2 is located in Minneapolis. Based on 2000 Census data, Figure 4-2 shows the location of high density minority block groups within a 50-mi (80-km) radius of PINGP 1 and 2.

The NRC staff has designated the Prairie Island Indian Community (PIIC) as a minority population within a 50-mi (80-km) radius of PINGP 1 and 2. Figure 4-1 shows the boundary of the PIIC in relation to the PINGP 1 and 2 site.

Low-Income Population in 2000

According to 2000 Census data, approximately 32,000 families and 99,000 individuals (approximately 4.7 and 7.2 percent, respectively) residing within a 50-mi (80-km) radius of PINGP 1 and 2 were identified as living below the Federal poverty threshold in 1999 (USCB 2003). The 1999 Federal poverty threshold was $17,029 for a family of four.

According to Census data estimates, the median household income for Minnesota in 2005-2007 was $55,616, with 9.6 percent of the state population living below the Federal poverty threshold. For the same time period, Goodhue County had a slightly lower median household income average ($55,098) and a lower percentage (7.9 percent) of individuals living below the poverty level when compared to the state average. Dakota County had much higher median household income ($72,393) and a lower percentage (5.3 percent) of individuals living below the poverty level when compared to the state and Goodhue County. The median household income for Wisconsin in 2005-2007 was $50,309, with 10.8 percent of the state population living below the Federal poverty threshold. For the same time period, Pierce County had a higher median household income average ($58,011) and a lower percentage (6.9 percent) of individuals living below the poverty level when compared to the state average (USCB 2008).

Census block groups were considered high density low-income block groups if the percentage of households below the Federal poverty threshold exceeded the state average by 20 percent or more. Based on 2000 Census data, there were 89 block groups within the 50-mi (80-km) radius of PINGP 1 and 2 that exceeded the state average for low income households by 20 percent or more. The majority of census block groups with low-income populations were located in two counties, Hennepin County (61 block groups) and Ramsey County (23 block groups) in Minnesota. The nearest high density low-income population to PINGP 1 and 2 is located in Minneapolis-St. Paul, Minnesota (NMC 2008). Figure 4-3 shows the location of high density low-income census block groups within a 50-mi (80-km) radius of PINGP 1 and 2.

Analysis of Impacts

As Cooperating Agencies, the NRC staff consulted with the PIIC during its environmental review of the proposed license renewal for PINGP 1 and 2 to develop analyses of certain impacts. As a result of such consultation, the information presented in this section represents the two different approaches used by the NRC staff and PIIC in conducting their independent analyses of environmental justice.

The NRC Staff's Analysis of Environmental Justice

As discussed earlier, the NRC addresses environmental justice matters for license renewal through (1) identification of any low income and/or minority populations that may be disproportionately affected by the proposed license renewal, and (2) examining any disproportionately high and adverse human health or environmental effects on such populations.

The discussion and figures above indentifies the minority and low-income populations who reside within a 50-mi (80-km) radius of PINGP 1 and 2. This area of impact is consistent with the impact analysis for public and occupational health and safety, which also focuses on populations within a 50-mi (80-km) radius of the plant. The PIIC, which is considered a minority population in this analysis, is located immediately north and adjacent to the NSP property within 1-mi (1.6-km) of PINGP 1 and 2. Because of its proximity to the plant and the uniqueness of the community, NRC staff acknowledges that there may be the potential for disproportionate impacts to the PIIC. However, as discussed in the previous sections of Chapter 4 of this SEIS, the analyses of impacts for all resource areas (e.g., land, air, water, ecology, human health, and socioeconomics), with the one exception of historic and archaeological resources, indicated that the impact from license renewal would be SMALL. As discussed in Section 4.9.6, the MODERATE finding of impacts on historic and archaeological resources is based on the known proximity of the site to cultural resources and the high potential for future discovery of additional resources. However, given the applicant's proposed mitigation strategies, as outlined in Section 4.9.6, the staff believes that adequate measures are in place to address such potential future impacts to historic and archaeological resources.

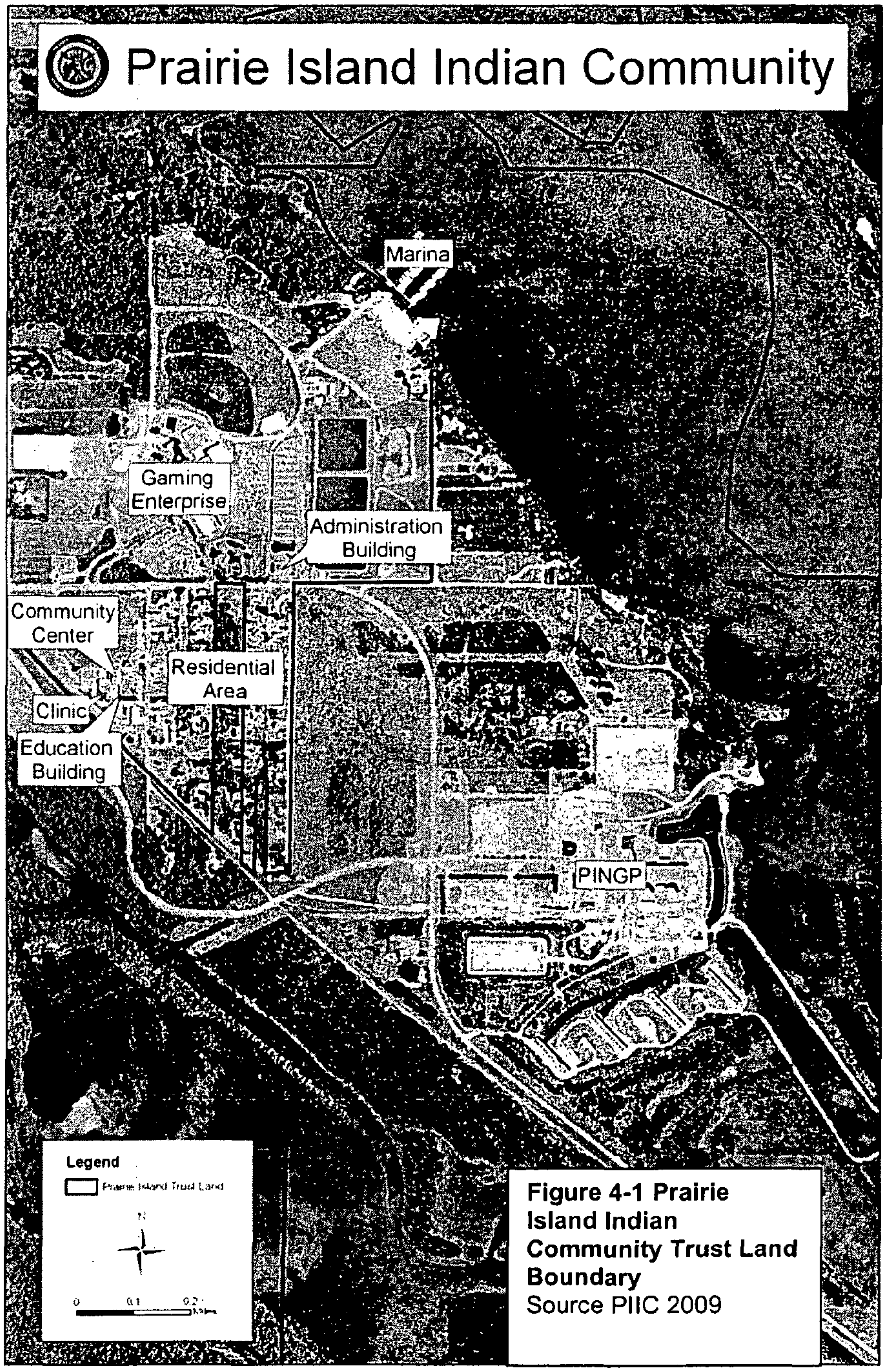

Figure 4-1 Prairie Island Indian Community Trust Land Boundary
Source PIIC 2009

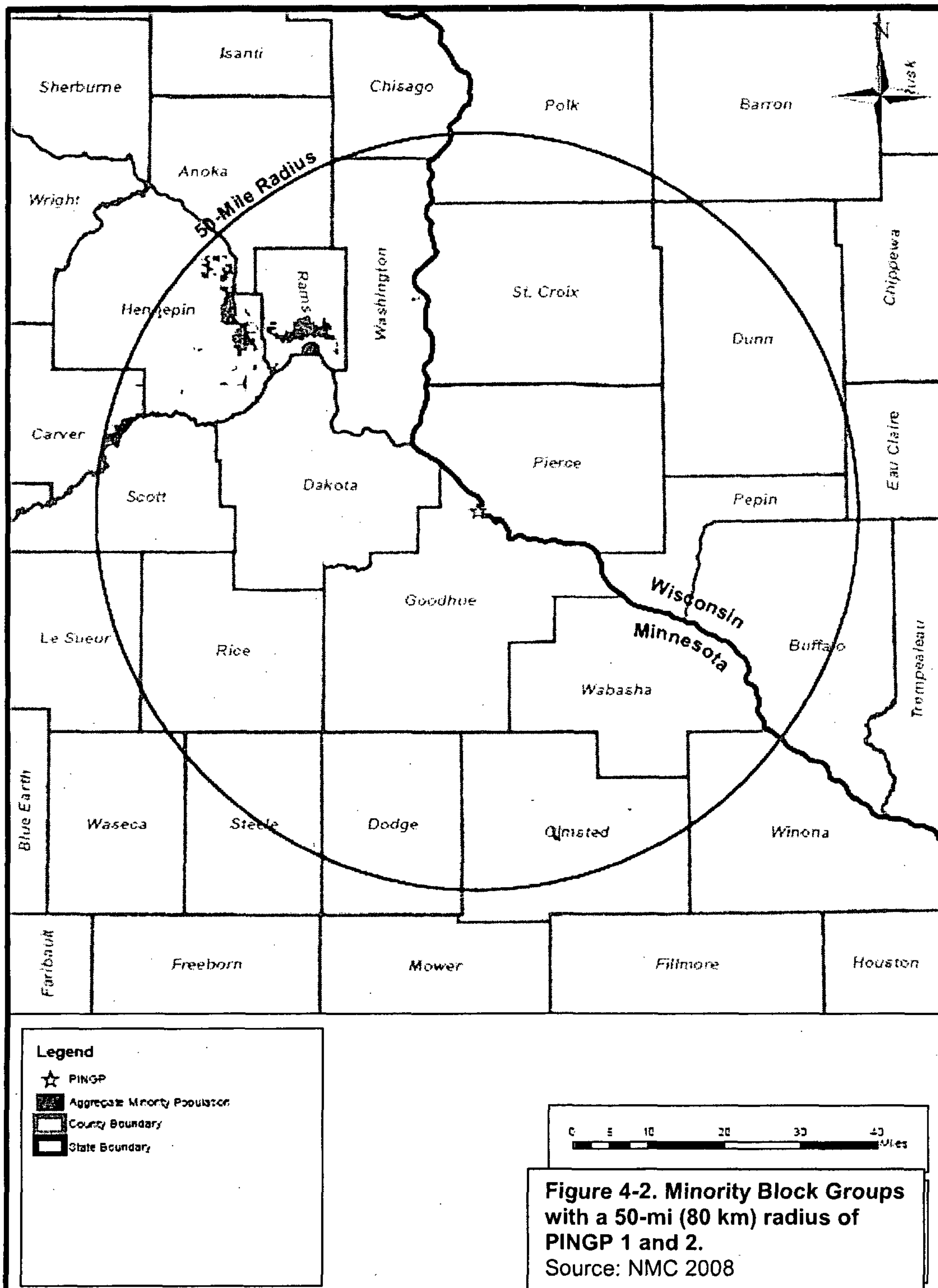

Figure 4-2. Minority Block Groups with a 50-mi (80 km) radius of PINGP 1 and 2.
Source: NMC 2008

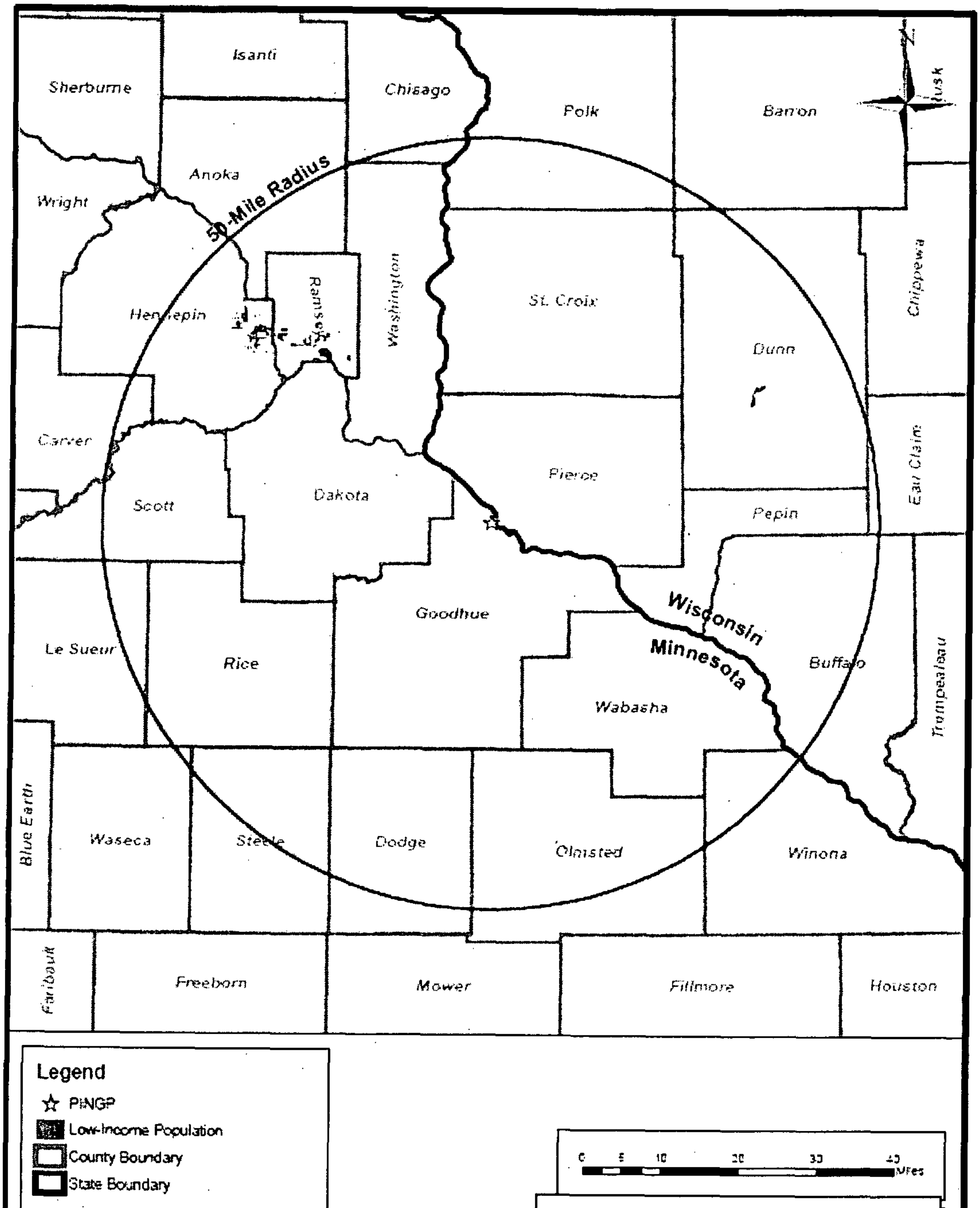

Figure 4-3. Low-income Block Groups with a 50-mi (80 km) radius of PINGP 1 and 2.
Source: NMC 2008

Further, Chapter 5 of this SEIS discusses the both the environmental impacts and environmental justice impacts from postulated accidents that might occur during the period of extended operation for PINGP 1 and 2, which include design basis accidents. The Commission has generically determined that impacts associated with such accidents are SMALL because the plants were designed to successfully withstand design basis accidents.

In addition, Chapter 3 of this SEIS discusses the environmental justice impacts of refurbishment activities at PINGP 1 and 2. As discussed above, NSP has indicated that PINGP, Unit 2, steam generators would be replaced prior to the license renewal term. NSP estimates that steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days at PINGP 1 and 2 site (NMC 2008). Additionally, section 3.2.8 of this draft SEIS concludes that the steam generator replacement would have a SMALL to MODERATE impact on transportation. The NRC staff evaluated whether such an increase in the workforce could have a disproportionate effect on the PIIC, and whether these effects could be considered adverse. It is important to note that these impacts are of short duration, and are not expected to be high.

Therefore, based on the overall findings discussed in Chapters 3, 4, and 5 of this SEIS, and a further examination to see if any of the resource impacts could present a unique adverse impact to an affected population, the staff concludes that there exists no disproportionately high and adverse impacts to the PIIC or any other minority and low-income populations from the continued operation of PINGP 1 and 2 during the license renewal period.

As part of addressing environmental justice associated with license renewal, the NRC staff also analyzed the risk of radiological exposure through the consumption patterns of special pathway receptors, including subsistence consumption of fish, native vegetation, surface waters, sediments, and local produce; absorption of contaminants in sediments through the skin; and inhalation of plant materials. As discussed below, the special pathway receptors analysis is important to the environmental justice analysis because consumption patterns may reflect the traditional or cultural practices of minority and low-income populations in the area.

Subsistence Consumption of Fish and Wildlife

Section 4-4 of Executive Order 12898 (1994) directs Federal agencies, whenever practical and appropriate, to collect and analyze information on the consumption patterns of populations that rely principally on fish and/or wildlife for subsistence and to communicate the risks of these consumption patterns to the public. In this SEIS, NRC considered whether there were any means for minority or low-income populations to be disproportionately affected by examining impacts to American Indian, Hispanic, and other traditional lifestyle special pathway receptors. Special pathways that took into account the levels of contaminants in native vegetation, crops, soils and sediments, surface water, fish, and game animals on or near PINGP 1 and 2 were considered.

NSP has an ongoing comprehensive Radiological Environmental Monitoring Program (REMP) at PINGP 1 and 2 to assess the impact of site operations on the environment. To assess the impact of the plant on the environment, the radiological monitoring program at PINGP 1 and 2 uses indicator-control sampling. Samples are collected at nearby indicator locations downwind and downstream from the plant and at distant control locations upwind and upstream from the plant. A plant effect would be indicated if the radiation level at an indicator location was significantly larger than at the control location. The difference would also have to be greater than could be accounted for by typical fluctuations in radiation levels arising from other naturally-occurring sources.

Samples are collected from the aquatic and terrestrial pathways in the vicinity of PINGP 1 and 2. The aquatic pathways include fish, Mississippi River surface water, groundwater, and sediment. The terrestrial pathways include airborne particulates, milk, and food product garden (leaf) vegetation, and direct radiation. During 2007, analyses performed on collected samples of environmental media showed no significant or measurable radiological impact from PINGP 1 and 2 site operations (NMC 2008b).

Aquatic sampling in the vicinity of PINGP 1 and 2 consists of semi-annual upstream and downstream collections of fish, periphyton (algae) or invertebrates, and bottom sediments. Shoreline sediment is collected semi-annually from one location. All samples are analyzed for gamma-emitting isotopes. River water is collected weekly at two locations, one upstream of the plant and one downstream. Monthly composites are analyzed for gamma-emitting isotopes. Quarterly composites are analyzed for tritium. Drinking water is collected weekly from the City of Red Wing well. Monthly composites are analyzed for gross beta, iodine-131, and gamma-emitting isotopes. Quarterly composites are analyzed for tritium (NMC 2008b).

Fish were collected in May and October 2007, and analyzed for gamma emitting isotopes. Only naturally-occurring potassium-40 was detected, and there was no significant difference between upstream and downstream results. There was no indication of an effect from plant operations (NMC 2008b).

Tritium activity was below the lower level of detection in all drinking water samples taken from the City of Red Wing well, and no measurable tritium activity was detected in river water. Well water data for 2007 showed no radiological effects from plant operation (NMC 2008b).

Upstream and downstream recreational area shoreline sediments were sampled and analyzed for isotopes. With the exception of naturally occurring potassium-40, all gamma-emitting isotopes were below their respective detection limits. There was no indication of a plant effect (NMC 2008b).

According to PINGP 1 and 2 REMP, milk samples are collected monthly from six farms (five indicator and one control) and analyzed for iodine-131 and gamma-emitting isotopes. The milk is collected biweekly during the growing season (May - October), when milk animals may be on pasture. Green leafy vegetables (cabbage) are collected annually and analyzed for gamma-emitting isotopes, including iodine-131. Corn is collected annually only if fields are irrigated with river water and analyzed for gamma-emitting isotopes. Well water and ground water are collected quarterly from four locations near the plant and analyzed for tritium and gamma-emitting isotopes (NMC 2008b).

Iodine-131 and cesium-137 results were below the lower levels of detection in all milk samples. No other isotopes, except naturally-occurring potassium-40, were detected. The milk sampling data for 2007 is consistent with previous results and show no radiological effects from plant operation (NMC 2008b).

Three samples of broadleaf vegetation, cabbage leaves, were collected and analyzed for gamma-emitting isotopes, including iodine-131. With the exception of naturally-occurring potassium-40, all other isotopes were below their respective detection limits. There was no indication of a plant effect (NMC 2008b).

The results of the 2007 REMP demonstrate that the routine operation at PINGP 1 and 2 had no significant or measurable radiological impact on the environment. No elevated radiation levels were detected in the offsite environment as a result of plant operations and the storage of radioactive waste. The results of the REMP continue to demonstrate that the operation of PINGP 1 and 2 did not result in a significant measurable dose to a member of the general population or adversely impact the environment as a result of radiological effluents. The REMP continues to demonstrate that the dose to a member of the public from the operation of PINGP 1 and 2 remains significantly below the federally required dose limits specified in 10 CFR 20, 10 CFR 72, and 40 CFR 190.

The Minnesota Department of Health (MDH), Radioactive Materials Unit in the Indoor Environments and Radiation Section monitors environmental radioactivity in Minnesota. Minnesota has maintained a radioactivity monitoring program since 1953. The MDH Radiation Control Unit currently maintains off-site environmental radiation monitoring programs around two nuclear power plants in Minnesota including PINGP 1 and 2.

Each year, MDH's Radiation Control Unit collects dosimetry, air, river water, milk, food crop, and sediment samples in the vicinity of PINGP 1 and 2. Samples of apples and cow feed were collected by MDH in the vicinity of PINGP 1 and 2 from 2004 through 2006. MDH found no reactor-related radioisotopes in milk and food crop samples collected from 2004 through 2006 (MDH Undated).

Based on recent monitoring results, concentrations of contaminants in native leafy vegetation, soils and sediments, surface water, and fish in areas surrounding PINGP 1 and 2 have been quite low (at or near the threshold of detection) and seldom above background levels. Consequently, no disproportionately high and adverse human health impacts would be expected in special pathway receptor populations in the region as a result of subsistence consumption of fish and wildlife.

The Prairie Island Indian Community's Analysis of Environmental Justice

As discussed in Chapter 1, the PIIC is a Cooperating Agency for developing four areas of the PINGP 1 and 2 SEIS: historic and archaeological resources, socioeconomics, land use, and environmental justice. While these four areas are important to the Tribe, a tenet of Dakota culture is the belief that all things are related, "Mitakuye Oyasin," and that one cannot separate one aspect of the environment from another. Mitakuye Oyasin, literally translated, means "to all my relations" or "we are all related." Mitakuye Oyasin is a prayer, an acknowledgement that honors the sacredness of all people and of all life. In other words, the community's health and well-being and culture are dependent upon the health of the natural environment—the water, the fish, the birds, the air, the plants, cultural sites, that are all interrelated as part of an ecosystem that is Prairie Island.

The following discussion is provided by the PIIC (PIIC 2008).

> Most members of the Prairie Island Indian Community believe that PINGP 1 and 2 was built at its location because, at that time, the Tribe was in no position to fight it. In the late 1960s members of the tribe were quite poor and totally disenfranchised. The City of Red Wing fully supported the $200 million project, as the city would benefit tremendously from it. The city quickly annexed the-then NSP land (exclusive of the Prairie Island Indian Community) so that PINGP 1 and 2 would become part of its tax base. Jobs were promised, but very few Tribal members have ever worked at PINGP 1 and 2.

> PINGP 1 and 2 were built right next to the Tribe's land. This land was acquired for the Prairie Island Indian Community by the United States government for the common benefit of all tribal members, in perpetuity. This was the only land the tribe had, the land promised to them by the Federal government, the land that would allow the Prairie Island Indian Community to maintain its traditions and culture. If members started leaving, how could the Prairie Island Indian Community continue to function as an Indian tribe?

The Tribal Council believes that the impacts to Tribal members are disproportionately high and adverse. That is, the Tribe assumes all of the risks associated with the operation of PINGP 1 and 2, including the Independent Spent Fuel Storage Installation (ISFSI) and the high-voltage transmission lines, and receives virtually no benefit. The Prairie Island Indian Community is subjected to a number of impacts that have a potential integrated and cumulative effect:

Human health impacts

Due to the Prairie Island Indian Community's close proximity to PINGP 1 and 2 (within 0.5 mi [0.8 km]), Tribal members believe that they are at an increased risk for health effects (such as increased cancer vulnerability). The Tribal Council believes that the health of tribal members has not been adequately studied.

Members of the Prairie Island Indian Community may have exposure pathways (water, food, air) that may be different from the typical or "average" consumer, thereby placing the tribal consumer at a greater risk. For example, many tribal members consume native plants for traditional purposes (direct consumption, medicines, teas, ceremonies) that are not typically part of the Radiological Environmental Monitoring Program (REMP). Many of our Tribal members have been living on Prairie Island since the plant went on-line. Tribal members typically do not move in and out of the community. We are concerned about the human health effects from 60 years of low-level exposure, as many of our tribal members already have compromised health.

The annual REMP reports and Radioactive Effluent Reports are insufficient to establish baselines for radiological effluent releases, exposure pathways, and dose estimates. Consequently, the analysis of the cumulative and integrated impacts on the Tribe, its members and its environment caused by the PINGP's operation is deficient.

The following paragraph is from the National Academy of Sciences Institute of Health, Toward Environmental Justice: Research, Education, and Health Policy Needs (National Academy Press 1999), p. 11.

"The premise of environmental justice is that communities with high concentrations of racial or ethnic minorities or low-income families are disproportionately exposed to a variety of environmental burdens and hazards. Of particular interest for this report is the specific claim that such exposures produce adverse health outcomes that are also borne disproportionately by these populations. An assessment of baseline data is therefore essential to ascertaining the relative role of environmental exposure in determining the health of a population."

Just one of the radioactive nuclides released by the PINGP, tritium, can be analyzed as a tracer for all radioactive emissions. Based on available information, annual liquid tritium emissions at PINGP have steadily increased during the 35 years of plant operation by approximately 1.2 Ci per year, with a peak liquid tritium emission of 800 Ci in 2006 (2006 PINGP Annual Radioactive Effluent Report).

Tritium has also been found in the Tribe's drinking water. In the late-1980 through early-1990 time frame, above-normal background levels of tritium were detected in wells around PINGP 1 and 2. Although the detected levels of tritium were below the EPA standard of 20,000 picocuries per liter (pCi/L), the range detected (1,300 – 1,500pCi/L) was above what was detected in other wells (300 – 400 pCi/L). At that time, all community members were utilizing individual wells. In response, the Community developed its current central water system in 1992, which utilizes a deep well (500 ft [150 m]). The detected tritium levels are below the EPA drinking water standard of 20,000 pCi/L. The BEIR VII 2006 on radiation health effects, however, states that the Linear-No-Threshold standard should apply to chronic low dose exposure for potential cause of cancer and other radiation-induced diseases.

Review and analysis of PINGP's Annual Radioactive Effluent Reports reveals the results of the ongoing efforts to monitor tritium, including disturbing spikes and fluctuations. For example, the 2006 Annual Radioactive Effluent Report (May 2007) disclosed tested tritium levels for the year in Well P-10 fluctuating from a low of 432 pCi/L to a peak of 3,773 pCi/L in September 2006. The 2008 Annual Radioactive Effluent Report (May 2009) showed that there were abnormal releases of tritium from the turbine building sump water discharge in July of 2008. As well, there seem to be corresponding increases in tritium detected in nearby (on-site) monitoring wells (2008 PINGP REMP Report). The detected level in July 2008 sample (at well P-10) was 2,060 pCi/L, when most other samples were <19 to 112 pCi/L; one sample contained 412 pCi/L. The abnormal spikes and fluctuations have not been satisfactorily explained, and the problem of tritium entering the groundwater does not seem to have been resolved.

Radiological releases from PINGP 1 and 2 and gamma radiation from the ISFSI are a concern to tribal members. Tribal members reside within 600 yds (550 m) of the PINGP 1 and 2 site. The Tribal Council is concerned about the health impacts from chronic exposure to low levels of radiation. Moreover, the proposed extended power uprate for PINGP 1 and 2 is expected to increase radiological releases by 10 percent.

Most tribal members believe that the spent fuel stored at PINGP 1 and 2 will never leave. Each day the "temporary" waste storage at PINGP 1 and 2 becomes more permanent. It is expected that up to 98 casks will be in use at PINGP 1 and 2, once the plant is decommissioned. Furthermore, under proposed changes to the waste confidence rule, the 98 casks could conceivably be on Prairie Island until 2094. This is an unacceptable and untenable situation.

In 2005, we commissioned a public health study (conducted by the University of Minnesota), which documented that many of our youth experience increased levels of stress and anxiety because of health and safety fears related to the power plant. These are the same youth who will be our future leaders, the people with whom future NSP and NRC representatives will be working over the re-licensing period (McGovern, et al. 2006). We do not believe that children in any other communities worry about whether they will have a home to go to, if an accident were to occur.

There are a number of homes within 100 ft (30 m) of the north-south 345 Kv transmission lines coming from PINGP 1 and 2. The lines are located on the east side of Edoka Street and the homes are located on the west side of Edoka Street. We understand that there is no consensus among scientists whether the electromagnetic energy emanating from the power lines would have a measurable human health impact. Some studies suggest exposure to EMF's increases the risk for certain diseases.

Since there is no scientific consensus on whether human health is compromised, however, the Tribe believes that there is NO assurance that there are NO adverse health effects (i.e., chronic health effects, increased risks to cancer).

There have been accidents or events at PINGP 1 and 2 that have undermined our confidence in plant operations. In 1979, there was an accident at PINGP 1 and 2 which released radioactive gas into the atmosphere. The cause of the accident was a rupture of a 1-in (2.54-cm) tube in Unit 1's steam generator. The accident happened at 2:30 in the afternoon; no one from the Community was notified of the event nor told to shelter in place. It was not until community members noticed workers from the PINGP 1 and 2 site leaving the island, or later, watching the news, did any one from the tribe know about the event.

After NSP loaded its first dry cask (after a very controversial and protracted State approval process) in the spring of 1995, the cask was left dangling over the spent fuel pool for several hours because of a malfunctioning crane. In addition, a Notice of Violation (NOV) was issued to NSP by the NRC because of problems with the manufacturing of the first casks.

In 2006, several outage workers were unexpectedly exposed to radiation. This was not reported to the media or anyone else. A journalist with one of the local papers spotted the notice of the event on the NRC's website. The Governor of Minnesota had not been informed of the event and learned about it through the media. In fact, the Tribal Council President and the Governor were at the same meeting when the news broke.

Most recently, the NRC has identified declining human performance as substantive cross cutting issue at the PINGP 1 and 2. This was noted by the NRC during the May 2009 Performance Assessment meeting and the September 1, 2009 Mid-Cycle Performance Review letter. That the PINGP is also in the NRC's Regulatory Response Column instead of the Licensee Response column is also cause for concern. These recent developments are sending us a troubling signal about future performance at the PINGP.

These recent developments only serve to heighten existing concerns regarding the future performance and safety at the PINGP 1 and 2. At a time when Xcel is seeking approval from the NRC to extend the operation of the PINGP 1 and 2 another 20 years, and also seeking approval from the Minnesota Public Utilities Commission to increase the output of PINGP 1 and 2 by 10%, the declining human performance finding is especially disconcerting. The public, and especially PINGP's closest neighbors, have significant concerns about the operation of PINGP's aging systems and equipment at increased temperatures, pressures, stresses and tolerances for an additional 20 years when human performance is declining.

Socioeconomic impacts

As discussed above, the Prairie Island Indian Community bears the greatest risk, yet receives virtually no benefit from the operation of PINGP 1 and 2. As discussed in Chapter 2, the tribe signed an agreement with NSP in 2003, but the amount of funding received by the Tribe pales in comparison to the amount that has been provided to the City of Red Wing or Goodhue County, via taxes, since PINGP 1 and 2 went on-line.

The Tribe has spent substantial amounts of money in legal and consultant fees in order to protect its interests and participate in various NSP proceedings at either the State or Federal level. There is no other governmental entity (e.g., City of Red Wing, Goodhue County, or the State of Minnesota) that participates in these proceedings at the same level as the Tribe. This is money that could be used for other community purposes; the Tribe believes that this impact must be considered.

There is only one primary access route (Sturgeon Lake Road) to and from the reservation. Sturgeon Lake Road is also crossed by railroad lines. Twenty to thirty trains (and their hazardous commodities) and maintenance equipment (and crews) cross this intersection daily and occasionally block this only access road for up to 30 minutes. Many people are fearful that, in the vent of a radiological emergency, tribal members would be trapped on the island.

As discussed in Chapter 3, there will be traffic impacts to the Community during the refurbishment period. NSP will hire as many as 750 additional workers for PINGP 1 and 2, Unit 2, steam generator replacement project. The NRC staff has determined that the Prairie Island Indian Community will be disproportionately impacted by the project, because of the Community's proximity to the PINGP 1 and 2 site.

The tribe has also had to develop its own radiological emergency preparedness (REP) program, with little outside financial assistance. As mentioned previously, the tribe has only recently begun to receive limited funding from NSP for REP planning, but it can only be used for training, travel, and supplies. The tribe covers salary and related costs.

Subsistence Consumption of Fish and Wildlife

Most members of the Community do not consume fish from the Mississippi River (Sturgeon Lake) because of pollution concerns (either from PINGP 1 and 2 or from other upstream dischargers). There are tribal members who hunt on tribal lands, but to the best of our knowledge, there are no longer any subsistence-level consumers.

In addition, the tribe does not have any information pertaining to wildlife or game sampling or testing conducted by state agencies either before or after the plant was constructed.

In the past, the tribe has collaborated with the US Fish and Wildlife Service (USFWS) and the US Environmental Protection Agency (US EPA) to collect and test Sturgeon Lake fish and turtle samples for heavy metals, PCB's and radionuclides.

Because of the aforementioned impacts, the PIIC believes that environmental and human health impacts to the PIIC from the relicensing of PINGP 1 and 2 are disproportionately high and adverse. Further, the PIIC believes that no other minority or low income community will be affected by these issues over the 20 year extended operating period.

Environmental Justice Summary

As previously stated, the views presented in the sections above represent the different analyses used by the NRC staff and PIIC in addressing environmental justice. The NRC staff based its determination on, among other considerations, the individual impact analyses discussed in Chapter 4 of this DSEIS, particularly regarding Radiological Impacts (Section 4.8.1), Electromagnetic Fields (Sections 4.8.4), Socioeconomics (Section 4.9), and Historic and Archeological Resources (Section 4.9.6) to conclude that there exists no disproportionate high and adverse impacts to the PIIC or any other minority and low-income populations from the continued operation of PINGP 1 and 2 during the license renewal period.

4.10 Evaluation of New and Potentially Significant Information

New and significant information is (1) information that identifies a significant environmental issue not covered in the GEIS and codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, or (2) information that was not considered in the analyses summarized in the GEIS and that leads to an impact finding that is different from the finding presented in the GEIS and codified in 10 CFR Part 51.

In preparing to submit its application to renew the PINGP 1 and 2 operating license, NSP developed a process to ensure that information not addressed in or available during the GEIS evaluation regarding the environmental impacts of license renewal for PINGP 1 and 2 would be properly reviewed before submitting the ER, and to ensure that such new and potentially significant information related to renewal of the operating license for PINGP 1 and 2 would be identified, reviewed, and assessed during the period of NRC review. NSP reviewed the Category 1 issues that appear in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, to verify that the conclusions of the GEIS remained valid with respect to PINGP 1 and 2. This review was performed by personnel from PINGP 1 and 2 and its support organization who were familiar with NEPA issues and the scientific disciplines involved in the preparation of a license renewal ER.

The NRC staff also has a process for identifying new and significant information. That process is described in detail in NUREG-1555, Supplement 1, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal* (NRC 2000). The search for new information includes (1) review of an applicant's ER and the process for discovering and evaluating the significance of new information; (2) review of records of public comments; (3) review of environmental quality standards and regulations; (4) coordination with Federal, state, and local environmental protection and resource agencies; and (5) review of the technical literature. New information discovered by the NRC staff is evaluated for significance using the criteria set forth in the GEIS. For Category 1 issues where new and significant information is identified, reconsideration of the conclusions for those issues is limited in scope to the assessment of the relevant new and significant information; the scope of the assessment does not include other facets of the issue that are not affected by the new information.

The NRC staff has not identified any new and significant information on environmental issues listed in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, related to the operation of PINGP 1 and 2 during the period of license renewal. The NRC staff also determined that information provided during the public comment period did not identify any new issues that require site-specific assessment. The NRC staff reviewed the discussion of environmental impacts in the GEIS (NRC 1996) and conducted its own independent review (including the public scoping meetings held in July 2008) to identify new and significant information.

4.11 Cumulative Impacts

The NRC staff considered potential cumulative impacts in the environmental analysis of continued operation of PINGP 1 and 2. For the purposes of this analysis, past actions are those related to the resources at the time of the power plant licensing and construction, present actions are those related to the resources at the time of current operation of the power plant, and future actions are considered to be those that are reasonably foreseeable through the end of plant operation including the period of extended operation. Therefore, the analysis considers potential impacts through the end of the current license terms as well as the 20-year renewal license term. The geographic area over which past, present, and future actions would occur is dependent on the type of action considered and is described below for each impact area.

The impacts of the proposed action, as described in Sections 4.1–4.9, are combined with other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

4.11.1 Cumulative Impacts on Aquatic and Water Resources

This section addresses past, present, and future actions that together could result in adverse cumulative impacts to aquatic and water resources, including water use, water quality, shoreline and river conditions, fish and shellfish populations, and invasive species. For the purposes of this analysis, the geographic area considered includes the section of the river adjacent to PINGP 1 and 2, Pool 3, as well as Pools 2 and 4, which lie upstream and downstream of PINGP 1 and 2, respectively.

The character and nature of the Upper Mississippi River was significantly and permanently changed by the construction of the Lock and Dam system in the 1930s to achieve 9-ft (3-m) navigation channels. The operation and continued maintenance involved with this system continues to affect the aquatic and water resources and alters sedimentation and resuspension of sediments; bottom type; flow and channelization; season patterns of flow that cue many biological processes; habitat diversity that provides areas for fish to spawn, rest, reproduce, feed, and grow; fish movements and migrations; and distribution of mussels and other aquatic resources. USACE continues to undertake projects that have both negative and positive effects on the ecology and hydrology of the Mississippi River.

The upper Mississippi River was significantly and permanently changed by the construction of the Lock and Dam system in the 1930s, which created 9-ft (2.7-m) navigation channels along the river. The operation and continued maintenance of this system continues to affect the aquatic resources by alterting sedimentation, flow, channelization, fish movements, and mussel distribution.

As mentioned previously in Section 2.1.7.3, nitrogen enrichment is an important water quality issue in the upper Mississippi River. The influx of nitrogen from the Mississippi into the Gulf of Mexico creates a zone of decreased dissolved oxygen (hypoxia), and the Minnesota area contributes an estimated five to six percent of that nitrogen (EPA 2006).

A 2000 study (Stark et al. 2000) found that water quality in the upper Mississippi River is primarily influenced by agricultural and urban pesticides and fertilizers, wastewater treatment facility discharges, agricultural and urban runoff, stream modifications and artificial drainage routes, loss of riparian cover, and contamination from precipitation. Fertilizer and agricultural animal waste in particular are thought to be major nitrogen contributors to the Mississippi. Stark et al. (2000) also indicated that the main influences on groundwater contamination are pesticides and fertilizers, urban contaminants, and naturally occurring radon gas. The study also highlighted the influence of confining units and water depth. Because the aquifer utilized at PINGP 1 and 2 is shallow and largely confined from the main aquifer used by both the Prairie Island Indian Community (PIIC) and the city of Red Wing, Stark et al. (2000) concluded that cross contamination interaction between these two water sources should be minimal.

The MPCA developed a Basin Plan for the Upper Mississippi to reduce river pollution (MPCA 2008). The plan includes best management practices to reduce nitrogen and phosphorus discharges into the river. It also includes several local water quality studies, the largest of which are the National Water Quality Assessment Program in the Upper Mississippi River Basin and the USACE Upper Mississippi River Reconnaissance Study. The purpose of these water quality studies is to gather more information about the pollution problems in the Upper Mississippi so action can be taken to solve some of the problems (MPCA 2000). The MPCA also directs large water quality studies by the Minnesota River Basin Data Center (MRBDC). In 2000, the MRBDC concluded that the Upper Mississippi is severely impaired by high concentrations of both nutrients and sediment (MRBDC 2000). Efforts are underway to consider regulations that would improve water and sediment quality and reduce hypoxia in the Mississippi River and its discharge in the Gulf of Mexico. For example, the Upper Mississippi River Basin Association (2007) Water Quality Task Force is investigating sediment-related water quality criteria for the Upper Mississippi River, and EPA is considering a petition for rulemaking to replace narrative water quality criteria for nutrients in the Mississippi River Basin with numerical criteria (USEPA 2008, Anon. 2009). These efforts could have a positive effect on cumulative impact.

PINGP 1 and 2 are located next to the PIIC. Based on information gathered during the site visit, the PIIC has a water treatment plant onsite that appears to discharge to the Mississippi River. NRC staff was unable to determine if this discharge was permitted by the MPCA. The community also has a large marina that brings a high frequency of boat traffic to the area. The increase in recreational boat traffic over the past few decades has contributed to increased erosion on the bottom of the river. Some small islands that used to exist near PINGP 1 and 2 are now almost completely submerged. The PIIC frequently dredges the main channel of Sturgeon Lake in order to maintain a navigable water depth for the marina traffic. Such dredging may disturb or destroy benthic communities.

PINGP 1 and 2 are located along Sturgeon Lake, a side slough connected to Navigation Pool 3, which is created by the upstream Lock and Dam 3. In late 2007, the USACE drafted a proposal to improve the quality of the water and emergent aquatic vegetation disturbed by the high elevations of water created by Lock and Dam 3. The project plans to use a seasonal summer drawdown of the water elevations in Sturgeon Lake. The hydrologic goal of the project is to improve water quality by way of sediment consolidation, reducing fetch, improving water clarity, and reducing nitrogen levels. The drawdown would also return the hydrologic cycle to a more natural state to induce the growth of aquatic vegetation. Based on information gathered at the site audit, including the observation that the pool elevation drop is not severe enough to significantly reduce the flow of the river at PINGP 1 and 2, the NRC believes the implementation of this project is unlikely to hinder water intake operations at PINGP 1 and 2, and would be beneficial to the water and aquatic resources of the area. (USACE 2007)

Pool 4, which is located downstream of PINGP 1 and 2, contains Lake Pepin. The USACE monitor ice coverage in the area. Along with other contributing factors, thermal effluent from PINGP 1 and 2 could in part be responsible for the deterioration of the ice cover in Lake Pepin. NSP has indicated that they are planning to submit an application for a power uprate in the future, which could increase the amount of thermal effluent. In a letter to the Minnesota Department of Commerce, MNDNR expressed concern that, unless appropriate measures are taken, the thermal plume could have an increased negative effect on the ice cover of Lake Pepin (MNDNR 2008a). NRC assumes that changes in ice cover would impact biological communities. If in the future NSP does move forward with a power uprate application, the potential impacts associated with that action would be addressed by the NRC at that time.

The spread of an invasive species, the zebra mussel (*Dreissena polymorpha*), throughout the Mississippi River has had a devastating impact on native mussel populations in the area. Currently, zebra mussels have not infiltrated Pool 3 as they have other pools. As discussed in Section 2.2.7 and 4.7.1, the FWS, the USACE, and the Mussel Coordination Team are engaged in a relocation project to aid in the recovery of the endangered Higgins eye pearlymussel. One of the relocation sites is in Pool 3, just half a mile upstream of the cooling water intake structure of PINGP 1 and 2. As of 2005, the project has reported "good recovery" in Pool 3 (Mussel Coordination Team 2005).

The NRC staff concludes that the minimal impacts of the continued operation of PINGP 1 and 2 to aquatic and water resources would not contribute to an overall decline in the current condition of these resources. However the impacts of other past, present, and future actions, including dredging by the PIIC, water quality issues arising from agricultural and urban runoff, and most notably, the creation of the Lock and Dam system have had and will continue to have a significant impact on the Upper Mississippi River, including Pools 2, 3, and 4; therefore, the cumulative impacts on these resources are MODERATE to LARGE.

4.11.2 Cumulative Impacts on Terrestrial Resources

This section addresses past, present, and future actions that could result in adverse cumulative impacts to terrestrial resources, including wildlife populations, upland habitats, wetlands, riparian zones, invasive species, protected species, and land use. For purposes of this analysis, the geographic area considered in the evaluation includes the PINGP 1 and 2 site and in-scope transmission line ROWs.

Approximately 60 ac (24 ha) of the 578 ac (234 ha) of land on the PINGP 1 and 2 site are developed and maintained for operation of PINGP 1 and 2 (NMC 2008). The site is situated on a floodplain on the western bank of the Mississippi River. Before PINGP 1 and 2 were constructed, the majority of the site's land was cultivated with some interspersed lowland forests and swamp areas near the site (AEC 1973). Goodhue County, in which PINGP 1 and 2 is located, and Dakota County, through which the Blue Lake and Red Rock 2 transmission lines travel, are mostly rural, and soybeans, corn, oats, and hay are the predominately cultivated crops (NMC 2008).

Construction of the transmission lines maintained by NSP and Great River Energy for PINGP 1 and 2 resulted in subsequent changes to the wildlife and plant species present within the vicinity of PINGP 1 and 2. Due to the fragmentation of previously contiguous forested and swamp areas, edge effects such as changes in light, wind, and temperature, changes in abundance and distribution of interior species, reduced habitat ranges for certain species, and an increased susceptibility to invasive species may have occurred in these areas. ROW maintenance has likely had past impacts and is likely to have present and future impacts on the terrestrial habitat. These impacts may include bioaccumulation of chemicals, prevention of the natural successional stages of the surrounding vegetative communities in and around the ROWs, and increase in abundance of edge species, a decrease in abundance of interior species, and an increase in invasive species populations.

Protected terrestrial species, which are discussed in Section 2.2.7, are not expected to be adversely affected due to future actions during the renewal term. Numerous wildlife refuges and scientific and natural areas are located in the vicinity of the PINGP 1 and 2 site, and these will continue to provide habitat to protected species and other wildlife. Habitat restoration efforts by the FWS in the Upper Mississippi River National Wildlife and Fish Refuge will support improvement of riverine habitat and native grass prairie.

The USACE, in conjunction with the MNDNR, Wisconsin Department of Natural Resources (WDNR), and other Federal and state agencies are considering a 1 to 2 ft (0.3 to 0.6 m) drawdown of Pool 3 for the purposes of improving aquatic habitat along this portion of the Mississippi River (WDNR 2008). Drawdown of Pool 3 would expose more of the small islands between the side and main channels of the river, which would create more riparian and wetland habitat in these areas.

The Treasure Island Resort and Casino is located about 1 mi (1.6 km) upstream of PINGP 1 and 2. The resort and casino is owned by the PIIC and includes a hotel, casino, and marina. Additionally, the PIIC operate a wastewater treatment facility. Initial construction of the resort and casino resulted in the loss of natural terrestrial habitat and fragmentation of previously contiguous areas of prairie grasslands. Increased boating traffic in Pool 3 of the Mississippi River as a result of the marina may cause increased erosion to riparian and wetland habitat along the shorelines. The wastewater treatment plant discharges to the Mississippi River. Those discharges may have current and future impacts on the surrounding vegetation, wetlands, and wildlife. Bioaccumulation and food web transfer of chemicals throughout the terrestrial environment also poses a threat to these habitats, as well as to riparian zones and wildlife species.

The cities of Minneapolis and St. Paul lie 39 and 32 mi (63 and 52 km), respectively, northwest of PINGP 1 and 2 (NMC 2008). Development of suburban housing and numerous interstate roads in northern Goodhue County in the 1970s and 1980s spurred subsequent commercial and industrial growth of the area in the 1990s (NMC 2008). Continued development of this area in the future may result in additional runoff from roads and impervious surfaces, development adjacent to wetlands and riparian zones, and an increase in waste releases, all of which could have future impacts on the terrestrial habitat.

The NRC staff examined the cumulative effects of forest fragmentation, the spread of invasive species, impacts to protected species, effects of neighboring facilities, and continued land development in the Minnepolis-St.Paul area. The NRC staff concludes that the minimal terrestrial impacts on the continued PINGP 1 and 2 operations would not contribute to the overall decline in the condition of terrestrial resources. The NRC staff believes that the cumulative impacts of other and future actions during the term of license renewal on terrestrial habitat and associated species, when added to past, present, and reasonably foreseeable future actions, would be SMALL.

4.11.3 Cumulative Human Health Impacts

The Radiological dose limits for protection of the public and workers have been developed by the EPA and NRC to address the cumulative impact of acute and long-term exposure to radiation and radioactive material. These dose limits are codified in 40 CFR Part 190 and 10 CFR Part 20. For the purpose of this analysis, the area within a 50-mi (80-km) radius of the PINGP 1 and 2 site is considered. The REMP conducted by NSP in the vicinity of the PINGP 1 and 2 site measures radiation and radioactive materials from all sources, including the Mississippi River; therefore, the monitoring program measures cumulative radiological impacts.

Monitoring results for the 5-year period from 2003 to 2007 were reviewed as part of the cumulative impacts assessment. In Sections 2.2.7 and 4.3 of this draft SEIS, the staff concluded that impacts of radiation exposure from operation of PINGP 1 and 2 during the renewal term to the public and workers (occupational) are SMALL. The NRC and the State of Minnesota would regulate any future actions in the vicinity of the PINGP 1 and 2 site that could contribute to cumulative radiological impacts.

NSP does not intend to construct any additional reactors on the PINGP 1 and 2 site. However, NSP is planning to replace the Unit 2 steam generators during the period of extended operation. Such an action is not likely to result in a significant increase of liquid and gaseous radioactive effluents being discharged than what is discharged during normal plant operations. Based on a historical evaluation of the Unit 1 steam generator replacement, similar quantities of radioactive gaseous effluents are expected to be generated during replacement activities. The replacement of the PINGP Unit 2 steam generators is likely to result in a small increase in the amount of solid radioactive waste generated. This is based on a temporary increase in the number of personnel working at the plant which will result in more solid waste being generated during the outage and any other associated related work. During an outage of this type, there will be an increased use of protective clothing, safety equipment, increased use of filters, and a general increase in generation of debris that will have to be disposed of as radioactive waste. However, the increased volume is expected to be short-termed and within the range of solid waste that can be safely handled by PINGP 1 and 2 during the period of extended operation. Therefore, the NRC staff concludes that cumulative radiological impacts of continued operations of PINGP 1 and 2 are SMALL, and that no further mitigation measures are warranted.

The NRC staff determined that the electric-field-induced currents from the PINGP 1 and 2 transmission lines are well below the National Electric Safety Code recommendations for preventing electric shock from induced currents. Therefore, the PINGP 1 and 2 transmission lines do not appreciably affect the overall potential for electric shock from induced currents within the analysis area. With respect to chronic effects of electromagnetic fields, although the NRC staff considers the GEIS finding of "not applicable" to be appropriate in regard to PINGP 1 and 2, the PINGP 1 and 2 transmission lines are not likely to contribute to the regional exposure to extremely low frequency-electromagnetic fields (ELF-EMFs). Therefore, the NRC staff has determined that the cumulative impacts of the continued operation of the PINGP 1 and 2 transmission lines would be SMALL.

4.11.4 Cumulative Socioeconomic Impacts

As discussed in Section 4.4 of this draft SEIS, continued operation of PINGP 1 and 2 during the license renewal term would have no impact on socioeconomic conditions in the region beyond what is currently being experienced. Since NSP has no plans to hire additional workers during the license renewal term, overall expenditures and employment levels at PINGP 1 and 2 would remain relatively constant with no additional demand for permanent housing and public services. In addition, since employment levels and the value of PINGP 1 and 2 would not change, there would be no population or tax revenue-related land use impacts. There would also be no disproportionately high and adverse health and environmental impacts on minority and low-income populations in the region. Based on this and other information presented in Chapter 4 of this draft SEIS, there would be no cumulative socioeconomic impacts from the continued operation of PINGP 1 and 2 during the license renewal term beyond what is currently being experienced.

NSP indicated in their environmental report that the PINGP 1 and 2, Unit 2, steam generators would be replaced prior to the license renewal term. NSP estimates that steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 80 days at PINGP 1 and 2 (NMC 2008). These additional workers would create a one-time short-term increase in the demand for temporary (rental) housing, and increased use of public water and sewer services, and transportation impacts on access roads in the immediate vicinity of PINGP 1 and 2. Given the short amount of time needed to replace the steam generators, the additional number of refueling outage workers and truck material deliveries needed to support this one-time replacement of the PINGP 1 and 2, Unit 2, steam generators could have a temporary cumulative affect on socioeconomic conditions in the vicinity of the nuclear plant. However, there would be no long-term cumulative socioeconomic impacts from the PINGP 1 and 2, Unit 2, steam generator replacement in the region.

Any ground disturbing activities in support of PINGP 1 and 2 during the license renewal term in addition to offsite ground disturbing activities could result in the cumulative loss of archaeological resources on Prairie Island. Archaeological resources are non-renewable; therefore, the loss of archaeological resources is cumulative. The continued operation of

PINGP 1 and 2 during the license renewal term has the potential to impact archaeological resources.

As discussed in Section 4.4.5, continued operation of PINGP 1 and 2 during the license renewal term would have a MODERATE impact on archaeological resources at the PINGP 1 and 2 site. NSP has no plans to alter the PINGP 1 and 2 site for license renewal. Any land disturbing activities would be carried out under corporate procedures. Should plans change, further consultation would be initiated by NSP with the NRC, MHS, OSA, BIA, and the PIIC. NSP is in the process of revising corporate procedures to protect archaeological resources along with detailed instructions to follow in the case of accidental discovery of archaeological resources (Xcel 2009). NSP is currently seeking comment from the MHS, BIA, OSA, and the PIIC on its revised procedures. Because impacts to important resources from the continued operation of PINGP 1 and 2 are MODERATE, the cumulative environmental impacts to archaeological resources would be MODERATE.

4.11.5 Cumulative Environmental Justice Impacts

NRC staff does not typically include a cumulative impact analysis on environmental justice; however, the following information is the PIIC's analysis of cumulative impacts associated with environmental justice.

> As discussed above, the Prairie Island Indian Community believes that it will be impacted disproportionately and adversely over the twenty year license renewal period. No other community is as close to PINGP 1 and 2 as the Prairie Island Indian Community. No other community is impacted, in as many ways, as the Prairie Island Indian Community. Furthermore, these impacts will have a cumulative environmental justice impact on our community.
>
> No other minority community or federally-recognized Indian tribe is impacted the way the Prairie Island Indian Community is.
>
> No other community (within a 50-mi [80-km] radius) is so close to a nuclear power plant and a nuclear waste storage facility.
>
> No other community is subjected to chronic radiological releases from PINGP 1 and 2 and gamma radiation from the ISFS I. This will also increase once the anticipated extended power uprate is approved by the NRC and NSP is allowed to expand the ISFSI to 64 casks and eventually to 98 casks once PINGP 1 and 2 is decommissioned. For many of our members, their exposure to low levels of radiation is for their entire lifetime.
>
> Our youth are worrying about the effects of an accident on their community and their futures; no other other community has documented the same concerns.
>
> High-voltage power lines from the PINGP 1 and 2 site are located immediately next to several of our homes.
>
> No other community has tritium leaching into its groundwater from PINGP 1 and 2.
>
> Our community would be devastated by an accident—our homeland would be gone, our culture would be decimated, our means of providing services to tribal members would be gone, and our tribal members' primary income would be gone. No other community faces this undesirable prospect.

No other community (within the 50-mi [80-km] radius) has the emergency planning concerns the tribe does (i.e., only one access road).

No other community participates in state or federal proceedings (using its own resources) to the extent that the Prairie Island Indian Community does.

As we stated earlier, we believe that all things are related and that you cannot affect one thing without affecting another. We know there are impacts to our community from the continued operation of the PINGP 1 and 2 and the ISFSI. We do not look at the ISFSI as separate from the reactor. We do not look at accidents as credible or non-credible, we believe that an accident could happen and it will devastate our community. We know that NSP plans to amend its operating license to operate at a higher level and that this action (and its impacts are considered to be out of scope for this SEIS). Nevertheless, we know that there will be an increase in radiological and thermal emissions resulting from the uprate. We know tritium is in our groundwater and that we did not ask for it to be there. We know that our youth feel that they have an uncertain future (because of the PINGP 1 and 2) and that affects the future of the tribe.

Taken together, we believe that these issues have an integrated and cumulative negative impact on our community that will continue impact our community well after the twenty-year extended operating period.

4.11.6 Summary of Cumulative Impacts

We considered the potential impacts resulting from operation of PINGP 1 and 2 during the period of extended operation and other past, present, and future actions in the vicinity of PINGP 1 and 2. The impacts to individual resource areas range from SMALL to LARGE. The preliminary determination is that the potential overall cumulative impacts resulting from PINGP 1 and 2 operation during the period of extended operation would be SMALL to MODERATE.

Table 4-13. Summary of Cumulative Impacts on Resources Areas

Resource Area	Impact	Discussion
Aquatic and Water Resources	MODERATE to LARGE	Impacts to aquatic resources from continued operation of PINGP 1 and 2 would have small cumulative impacts. Past impacts to the Mississippi River, specifically creation of a Lock and Dam system have had significant impacts on the aquatic environment. Nutrient enrichment from agricultural and urban runoff, land development, and sedimentation, as well as dredging of the Lake Sturgeon portion of the river by the PIIC, will also continue to affect water and aquatic resources.
Terrestrial Resources	SMALL	ROW maintenance, invasive species, chemical discharges from nearby wastewater treatment plants, and development of neighboring areas have all impacted terrestrial habitat and species in the vicinity of PINGP 1 and 2, and would likely continue in the future.
Human Health	SMALL	The cumulative human health impacts of continued operation of PINGP 1 and 2 from radiation exposure to the public and electric-field-induced currents from the PINGP 1 and 2 transmission lines would be small.

Resource Area	Impact	Discussion
Socioeconomics	MODERATE	There would be MODERATE cumulative impacts to socioeconomics during the license renewal period, and no long-term cumulative impacts from refurbishment. There would be MODERATE cumulative impacts to historic and archaeological resources during the license renewal period, including refurbishment.

4.12 References

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5.0 ENVIRONMENTAL IMPACTS OF POSTULATED ACCIDENTS

This chapter describes the environmental impacts from postulated accidents that might occur during the period of extended operation. The term "accident" refers to any unintentional event outside the normal plant operational envelope that results in a release or the potential for release of radioactive materials into the environment. Two classes of postulated accidents are evaluated in NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (GEIS), and are listed in Table 5-1 below. These are design-basis accidents (DBAs) and severe accidents.

Table 5-1. Issues Related to Postulated Accidents. *Two issues related to postulated accidents are evaluated under NEPA in the license renewal review, design-basis accidents and severe accidents.*

Issues	GEIS Sections	Category
Design-basis accidents	5.3.2; 5.5.1	1
Severe accidents	5.3.3; 5.3.3.2; 5.3.3.3; 5.3.3.4; 5.3.3.5; 5.4; 5.5.2	2

5.1 Design Basis Accidents

In order to receive U.S. Nuclear Regulatory Commission (NRC) approval to operate a nuclear power facility, an applicant for an initial operating license must submit a safety analysis report (SAR) as part of its application. The SAR presents the design criteria and design information for the proposed reactor and comprehensive data on the proposed site. The SAR also discusses various hypothetical accident situations and the safety features that are provided to prevent and mitigate accidents. The NRC staff reviews the application to determine whether the plant design meets the Commission's regulations and requirements and includes, in part, the nuclear plant design and its anticipated reponse to an accident.

DBAs are those accidents that both the licensee and the NRC staff evaluate to ensure that the plant can withstand normal and abnormal transients, and a broad spectrum of postulated accidents, without undue hazard to the health and safety of the public. A number of these postulated accidents are not expected to occur during the life of the plant, but are evaluated to establish the design basis for the preventative and mitigative safety systems of the facility. The acceptance criteria for DBAs are described in 10 Code of Federal Regulations (CFR) 50 and 10 CFR 100.

The environmental impacts of DBAs are evaluated during the initial licensing process, and the ability of the plant to withstand these accidents is demonstrated to be acceptable before issuance of the operating license. The results of these evaluations are found in license documentation such as the applicant's final safety analysis report (FSAR), the safety evaluation report (SER), the final environmental impact statement (FEIS), and Section 5.1 of this draft supplemental environmental impact statement (SEIS). A licensee is required to maintain the acceptable design and performance criteria throughout the life of the plant, including any extended-life operation. The consequences for these events are evaluated for the hypothetical maximum exposed individual; accordingly, changes in the plant environment will not affect these evaluations. Because of the requirements that continuous acceptability of the consequences and aging management programs be in effect for the period of extended operation, the environmental impacts as calculated for DBAs should not differ significantly from initial licensing assessments over the life of the plant, including the period of extended operation. Accordingly, the design of the plant relative to DBAs during the period of extended operation is considered to remain acceptable and the environmental impacts of those accidents were not examined further in the GEIS.

The Commission has determined that the environmental impacts of DBAs are of SMALL significance for all plants because the plants were designed to successfully withstand these accidents. Therefore, for the purposes of license renewal, DBAs are designated as a Category 1 issue. The early resolution of the DBAs makes them a part of the current licensing basis of the plant; the current licensing basis of the plant is to be maintained by the licensee under its current license and, therefore, under the provisions of 10 CFR 54.30, is not subject to review under license renewal.

The NRC did not identify any new and significant information related to DBAs during the review of the applicant's ER (NMC 2008), the staff's site audit, the scoping process, or the evaluation of other available information. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS.

5.2 Severe Accidents

Severe nuclear accidents are those that are more severe than DBAs because they could result in substantial damage to the reactor core, whether or not there are serious offsite consequences. In the GEIS, the staff assessed the impacts of severe accidents during the license renewal period using the results of existing analyses and site-specific information to conservatively predict the environmental impacts of severe accidents for each plant during the renewal period.

Severe accidents initiated by external phenomena such as tornadoes, floods, earthquakes, fires, and sabotage have not traditionally been discussed in quantitative terms in FESs and were not specifically considered for the Prairie Island Nuclear Generating Plant, Units 1 and 2, (PINGP 1 and 2) site in the GEIS. However, the GEIS did evaluate existing impact assessments performed by NRC and the industry at 44 nuclear plants in the United States and concluded that the risk from beyond design basis earthquakes at existing nuclear power plants is SMALL. The GEIS for license renewal performed a discretionary analysis of sabotage acts in connection with license renewal and concluded that the core damage and radiological release from such acts would be no worse than the damage and release expected from internally initiated events. In the GEIS, the Commission concludes that the risk from sabotage at existing nuclear power plants is small and additionally, that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents (NRC 1996).

Based on the information in the GEIS, the Commission found that

> The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.

The NRC did not identify any new and significant information related to severe accidents during the review of the applicant's ER (NMC 2008), the staff's site audit, the scoping process, or the evaluation of other available information. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. However, in accordance with 10 CFR 51.53(c)(3)(ii)(L), the NRC staff has reviewed severe accident mitigation alternatives (SAMAs) for PINGP 1 and 2. The results of the review are discussed in Section 5.3.

5.3 Severe Accident Mitigation Alternatives

10 CFR Section 51.53(c)(3)(ii)(L) requires that license renewal applicants consider alternatives to mitigate severe accidents if the staff has not previously evaluated SAMAs for the applicant's plant in an environmental impact statement (EIS) or related supplement or in an environmental assessment. The purpose of this consideration is to ensure that plant changes (i.e., hardware, procedures, and training) with the potential for improving severe accident safety performance are identified and evaluated. SAMAs have not been previously considered for PINGP 1 and 2; therefore, the remainder of Chapter 5 addresses those alternatives.

5.3.1 Introduction

This section presents a summary of the SAMA evaluation for PINGP 1 and 2 conducted by Northern States Power Company (NSP) and the NRC staff's review of that evaluation. The NRC staff performed its review with contract assistance from Information Systems Laboratories, Inc. The NRC staff=s review is available in full in Appendix G; the SAMA evaluation is available in full in NSP=s ER.

The SAMA evaluation for PINGP 1 and 2 was conducted with a four-step approach. In the first step, NSP quantified the level of risk associated with potential reactor accidents using the plant-specific probabilistic risk assessment (PRA) and other risk models.

In the second step, NSP examined the major risk contributors and identified possible ways (SAMAs) of reducing that risk. Common ways of reducing risk are changes to components, systems, procedures, and training. NSP identified 25 potential SAMAs for each unit. NSP performed an initial screening in which they eliminated SAMAs that are not applicable to PINGP 1 and 2 due to design differences, have already been implemented at PINGP 1 and 2, have no significant benefit or have benefits which have been achieved by other means, or require extensive changes that would involve implementation costs known to exceed any possible benefit. This screening reduced the list of potential SAMAs to nine for each unit.

In the third step, NSP estimated the benefits and the costs associated with each of the remaining SAMAs. Estimates were made of how much each SAMA could reduce risk. Those estimates were developed in terms of dollars in accordance with NRC guidance for performing regulatory analyses (NRC 1997). The cost of implementing the proposed SAMAs was also estimated.

Finally, in the fourth step, the costs and benefits of each of the remaining SAMAs were compared to determine whether the SAMA was cost-beneficial, meaning the benefits of the SAMA were greater than the cost (a positive cost-benefit). NSP concluded in its ER that several of the SAMAs evaluated are potentially cost-beneficial (NMC 2008). However, in response to NRC staff inquiries regarding the treatment of consequential steam generator tube rupture (SGTR) in the baseline PRA, the approach used to estimate uncertainty, and the consideration of lower cost alternatives, several additional potentially cost-beneficial SAMAs were identified (NSP 2009a and 2009b).

The potentially cost-beneficial SAMAs do not relate to adequately managing the effects of aging during the period of extended operation; therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54. NSP's SAMA analyses and the NRC's review are discussed in more detail below.

5.3.2 Estimate of Risk

NSP submitted an assessment of SAMAs for PINGP 1 and 2 as part of the ER (NMC 2008). This assessment was based on the most recent PINGP 1 and 2 PRA available at that time, a plant-specific offsite consequence analysis performed using the MELCOR Accident Consequence Code System 2 (MACCS2) computer program, and insights from the PINGP 1 and 2 Individual Plant Examination (IPE) (NSP 1994) and Individual Plant Examination of External Events (IPEEE) (NSP 1998).

The baseline core damage frequency (CDF) for the purpose of the SAMA evaluation is approximately 9.79×10^{-6} per year for Unit 1 and 1.21×10^{-5} per year for Unit 2. The CDF values are based on the risk assessment for internally initiated events. NSP did not include the contributions from external events within the PINGP 1 and 2 risk estimates; however, it did account for the potential risk reduction benefits associated with external events by increasing the estimated benefits for internal events by a factor of two. The breakdown of CDF by initiating event for Units 1 and 2 is provided in Table 5-2.

Table 5-2. PINGP 1 and 2 Core Damage Frequency

Initiating Event	Unit 1 CDF (per year)	Unit 1 % Contribution to CDF	Unit 2 CDF (per year)	Unit 2 % Contribution to CDF
Small LOCA	4.8 x 10-6	49	5.4 x 10-6	45
Loss of Cooling Water	1.8 x 10-6	18	1.8 x 10-6	15
Loss of Offsite Power	1.0 x 10-6	11	1.2 x 10-6	10
Loss of Main Feedwater	3.9 x 10-7	4	4.1 x 10-7	3
Medium LOCA	3.4 x 10-7	3	5.4 x 10-7	4
Loss of Component Cooling Water	2.9 x 10-7	3	2.9 x 10-7	2
Large LOCA	2.8 x 10-7	3	3.1 x 10-7	3
Internal Flooding	2.4 x 10-7	2	2.4 x 10-7	2
Normal Transient	2.4 x 10-7	2	2.8 x 10-7	2
Steam Generator Tube Rupture (STGR)	1.9 x 10-7	2	1.1 x 10-6	9
Loss of Train A DC	3.8 x 10-8	<1	4.0 x 10-7	3
Other	2.1 x 10-7	2	1.7 x 10-7	1
Total CDF (internal events)	**9.79 x 10-6**	**100**	**1.21 x 10-5**	**100**

As shown in Table 5-2, events initiated by small loss of coolant accident (LOCA), loss of cooling water and loss of offsite power are the dominant contributors to internal event CDF for each unit. The differences in the CDF contributions result largely from several differences between the two PINGP 1 and 2 units.

NSP estimated the dose to the population within 80 km (50 mi) of the PINGP 1 and 2 site to be approximately 0.0294 person-sievert (Sv) (2.94 person-rem) per year for Unit 1 and 0.0843 person-Sv (8.43 person-rem) per year for Unit 2 (NMC 2008). The breakdown of the total population dose by containment release mode is summarized in Table 5-3. Releases due to SGTR events, interfacing system loss-of-coolant accidents (ISLOCAs), and late containment failures dominate the population dose risk at PINGP 1 and 2.

Table 5-3. Breakdown of Population Dose by Containment Release Mode

Containment Release Modes		Unit 1 Population Dose (person-rem(a) per year)	Unit 1 Percent Contribution	Unit 2 Population Dose (person-rem(a) per year)	Unit 2 Percent Contribution
Intact Containment	Normal Leakage	0.01	0.4	0.01	0.2
Early Containment Failure	Over-pressure Failure	0.12	4.1	0.14	1.7
	Isolation Failure	<0.01	0.1	<0.01	<0.1
Late Containment Failure	Basemat Failure	0.63	21.4	0.76	9.0
	Over-pressure Failure	0.12	4.1	0.12	1.4
Containment Bypass	SGTR	1.32	44.9	6.66	79.0
	ISLOCA	0.74	25.0	0.74	8.7
Total		**2.94**	**100**	**8.43**	**100**

The NRC staff has reviewed NSP's data and evaluation methods and concludes that the quality of the risk analyses is adequate to support an assessment of the risk reduction potential for candidate SAMAs. Accordingly, the staff based its assessment of offsite risk on the CDFs and offsite doses reported by NSP.

5.3.3 Potential Plant Improvements

Once the dominant contributors to plant risk were identified, NSP searched for ways to reduce that risk. In identifying and evaluating potential SAMAs, NSP considered insights from the plant-specific PRA, and SAMA analyses performed for other operating plants that have submitted license renewal applications. NSP identified 25 potential risk-reducing improvements (SAMAs) to plant components, systems, procedures and training.

NSP removed 16 SAMAs from further consideration because they are not applicable to PINGP 1 and 2 due to design differences, have already been implemented at PINGP 1 and 2, have no significant benefit or have benefits which have been achieved by other means, or require extensive changes that would involve implementation costs known to exceed any possible benefit. A detailed cost-benefit analysis was performed for each of the nine remaining SAMAs.

The staff concludes that NSP used a systematic and comprehensive process for identifying potential plant improvements for PINGP 1 and 2, and that the set of potential plant improvements identified by NSP is reasonably comprehensive and, therefore, acceptable.

5.3.4 Evaluation of Risk Reduction and Costs of Improvements

NSP evaluated the risk-reduction potential of the remaining nine SAMAs. The SAMA evaluations were performed using realistic assumptions with some conservatism.

NSP estimated the costs of implementing the candidate SAMAs through the application of engineering judgment, use of other licensee's estimates for similar improvements, and site-specific cost estimates. The cost estimates conservatively did not include the cost of replacement power during extended outages required to implement the modifications, nor did they include contingency costs associated with unforeseen implementation obstacles.

The staff reviewed NSP=s bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and somewhat conservative (i.e., the estimated risk reduction is similar to or somewhat higher than what would actually be realized). Accordingly, the staff based its estimates of averted risk for the various SAMAs on NSP=s risk reduction estimates.

The staff reviewed the bases for the applicant=s cost estimates. For certain improvements, the staff also compared the cost estimates to estimates developed elsewhere for similar improvements, including estimates developed as part of other licensees= analyses of SAMAs for operating reactors and advanced light-water reactors. The staff found the cost estimates to be reasonable, and generally consistent with estimates provided in support of other plants= analyses.

The staff concludes that the risk reduction and the cost estimates provided by NSP are sufficient and appropriate for use in the SAMA evaluation.

5.3.5 Cost-Benefit Comparison

The cost-benefit analysis performed by NSP was based primarily on NUREG/BR-0184 (NRC 1997) and was executed consistent with this guidance. NUREG/BR-0058 has recently been revised to reflect the agency=s revised policy on discount rates. Revision 4 of NUREG/BR-0058 states that two sets of estimates should be developed B one at 3 percent and one at 7 percent (NRC 2004). NSP provided both sets of estimates (NMC 2008).

In the baseline analysis contained in the ER (using a 3 percent discount rate), NSP identified one potentially cost-beneficial SAMA for Unit 1 and two potentially cost-beneficial SAMAs for Unit 2. The potentially cost-beneficial SAMAs are:

SAMA 9 (Unit 1 and Unit 2) – Implement procedure or plant modification to improve ventilation for safeguards equipment in the Screenhouse.

SAMA 22 (Unit 2 only) – Provide compressed air backup for instrument air to containment.

NSP performed additional analyses to evaluate the impact of parameter choices and uncertainties on the results of the SAMA assessment (NMC 2008). If the benefits are based on use of the 95th percentile CDF results rather than the point estimate for CDF (to account for uncertainties) one additional SAMA candidate was determined to be potentially cost-beneficial for Unit 1. This is SAMA 22, which had already been shown to be cost-beneficial for Unit 2.

As a result of additional analyses in response to NRC staff requests, NSP identified three additional potentially cost-beneficial SAMAs (NSP 2009a and 2009b):

SAMA 3 – provide alternate flow path from refueling water storage tank (RWST) to charging pump suction (for Units 1 and 2)

SAMA 19a – provide a reliable backup water source for replenishing the RWST (for Unit 2)

An unnumbered SAMA regarding purchase of a gagging device for closing a stuck-open steam generator safety valve in SGTR events (for Units 1 and 2)

In addition, NSP has indicated that as a result of an identified internal flood modeling limitation, two internal flood related enhancements previously identified in the IPE have also been entered into the Corrective Action Program for further evaluation after the PRA has been updated with improved methodology for modeling pipe breaks (NSP 2009b).

The staff concludes that, with the exception of the potentially cost-beneficial SAMAs discussed above, the costs of the SAMAs evaluated would be higher than the associated benefits.

5.3.6 Conclusions

The staff reviewed NSP=s analysis related to SAMAs and concluded that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs support the general conclusion that the SAMA evaluations performed by NSP are reasonable and sufficient for the license renewal submittal.

Based on its review of the SAMA analysis, the staff concurs with NSP=s identification of areas in which risk can be further reduced in a cost-beneficial manner through the implementation of all or a subset of potentially cost-beneficial SAMAs. Given the potential for cost-beneficial risk reduction, the staff considers that further evaluation of these SAMAs by NSP is warranted. However, none of the potentially cost-beneficial SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of the license renewal pursuant to 10 CFR Part 54.

5.4 Environmental Justice Issues Related to Severe Accidents, as submitted by the PIIC

The following information is provided by the Prairie Island Indian Community (PIIC). The information below does not represent the opinion of the NRC staff.

> The evaluation of severe accidents, within the environmental justice analysis is of paramount importance to the Prairie Island Indian Community.
>
> The Prairie Island Indian Community believes that the NRC, as part of its environmental justice review, should evaluate the potential risk associated with accidents that may have a disproportionate impact on minority populations. The Prairie Island Indian Community is the closest community to the PINGP 1 and 2. This concept of risk includes the potential consequences of a reactor accident. Mitigation of severe accidents is an integral part of the NRC's Severe Accident Mitigation Alternatives (SAMA) analysis. The Tribe does not believe, however, that the SAMA process can provide a realistic or acceptable treatment of the risk to the Tribe's unique status as an Indian Tribe and minority Community. Therefore, the Tribe believes that the risk from an accident and mitigating measures must be specifically analyzed by the NRC as part of its Environmental Justice analysis. In the case of the continued operation of PINGP, the consequences of an accident would have a disproportionate impact on the Tribe, given its close proximity to PINGP 1 and 2 and its unique identity as a federally-recognized Indian tribe.
>
> Members of our community and our ancestors have lived on Prairie Island for countless generations. There is also a unique relationship between our culture and this specific location. Prairie Island is our <u>only</u> home and the location of our business (which can <u>only</u> be located on our reservation), which is our primary means of providing services (including income) to our community. Not all impacts to the tribe would be economic—if there was an accident at PINGP, our

culture would be significantly impacted, if not decimated, as it is inextricably linked to this unique and irreplaceable resource called Prairie Island.

If there was a severe reactor accident, 801 current tribal members would also lose a primary source of income and the Tribal government could no longer provide benefits or services to tribal members. Of course, non-Indians would be also be affected by severe accidents as well. Non-Indian residents in the region of the PINGP 1 and 2, however, could simply buy individual parcels of land outside the region in the event of contamination from a reactor accident. The Tribe, however, would face the daunting task of re-locating and re-establishing the entire tribal community (which includes an adequate land base that would meet the needs of tribal members). In addition, the Treasure Island Resort and Casino cannot be easily re-located. Federal laws and regulations govern not only how a Tribal gaming facility operates, but where a Tribal gaming facility can be located. Therefore this disproportionate impact on the Community would be high and adverse.

Although NRC regulations reduce the probability of accidents, these high and adverse disproportionate impacts would still call for the implementation of mitigating measures to reduce, as much as practicable, the impacts on the Tribe. Such mitigating measures would include the requirement that NSPM must implement all SAMAs found to be cost-beneficial, both age-related and non-age related. An appropriate finding of a high and adverse disproportionate impact on the PIIC, would also substantially enable the Tribe to begin a dialogue with appropriate entities of the Untitled States government to ensure that adequate replacement land would be provided to the Community.

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6.0 ENVIRONMENTAL IMPACTS OF THE URANIUM FUEL CYCLE AND SOLID WASTE MANAGEMENT

6.1 The Uranium Fuel Cycle

This chapter addresses issues related to the uranium fuel cycle and solid waste management during the period of extended operation. The uranium cycle includes uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low-level wastes and high-level wastes related to uranium fuel cycle activities. The generic potential impacts of the radiological and nonradiological environmental impacts of the uranium fuel cycle and transportation of nuclear fuel and wastes are described in detail in the *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (GEIS) (NRC 1996; 1999) based, in part, on the generic impacts provided in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data," and in 10 CFR 51.52(c), Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor." The GEIS also addresses the impacts from radon-222 and technetium-99.

No new and significant information related to the uranium fuel cycle was identified during the review of the Northern State Power Co. (NSP) environmental report (ER; NMC 2008), the site audit, or the scoping process. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. For these category 1 issues, the GEIS concludes that the impacts are SMALL except for the collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal, which are site-specific, category 2 analysis.

Table 6-1. Issues Related to the Uranium Fuel Cycle and Solid Waste Management. *There are nine generic issues related to the fuel cycle and waste management. There are no site-specific issues.*

Issues	GEIS Sections	Category
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	6.1; 6.2.1; 6.2.2.1; 6.2.2.3; 6.2.3; 6.2.4; 6.6	1
Offsite radiological impacts (collective effects)	6.1; 6.2.2.1; 6.2.3; 6.2.4; 6.6	1
Offsite radiological impacts (spent fuel and high-level waste disposal)	6.1; 6.2.2.1; 6.2.3; 6.2.4; 6.6	1

Table 6-1 (continued)

Issues	GEIS Sections	Category
Nonradiological impacts of the uranium fuel cycle	6.1; 6.2.2.6; 6.2.2.7; 6.2.2.8; 6.2.2.9; 6.2.3; 6.2.4; 6.6	1
Low-level waste storage and disposal	6.1; 6.2.2.2;6.4.2; 6.4.3; 6.4.3.1; 6.4.3.2; 6.4.3.3; 6.4.4; 6.4.4.1; 6.4.4.2; 6.4.4.3; 6.4.4.4; 6.4.4.5; 6.4.4.5.1; 6.4.4.5.2; 6.4.4.5.3; 6.4.4.5.4; 6.4.4.6;6.6	1
Mixed waste storage and disposal	6.4.5.1; 6.4.5.2; 6.4.5.3; 6.4.5.4; 6.4.5.5; 6.4.5.6; 6.4.5.6.1; 6.4.5.6.2; 6.4.5.6.3; 6.4.5.6.4; 6.6	1
Onsite spent fuel	6.1; 6.4.6; 6.4.6.1; 6.4.6.2; 6.4.6.3; 6.4.6.4; 6.4.6.5; 6.4.6.6; 6.4.6.7; 6.6	1
Nonradiological waste	6.1; 6.5; 6.5.1; 6.5.2; 6.5.3; 6.6	1
Transportation	6.1; 6.3.1; 6.3.2.3; 6.3.3; 6.3.4; 6.6, Addendum 1	1

6.2 Greenhouse Gas Emissions

6.2.1 Introduction

The NRC staff received comments during the scoping period from individuals and groups regarding the impact of the proposed reclicensing of PINGP 1 and 2 on the release of carbon dioxide (CO_2) and other greenhouse gas (GHG) emissions relative to potential alternative energy sources, including fossil fuels, renewable energy sources, and conservation programs.

6.2.2 PINGP 1 and 2

The NRC staff has not indentified any studies specifically addressing GHGs produced by PINGP 1 and 2 or their fuel cycles.

6.2.3 GEIS

The GEIS provided only qualitative discussion regarding the GHG impacts of the nuclear fuel cycle. In the analysis of potential alternatives to nuclear power plant relicensing, the GEIS referenced CO_2 emissions as one of the substantial operating impacts associated with new coal-fired and oil-fired power plants, although no direct quantitative assessment of GHG emissions was presented. The GEIS also did not address GHG impacts of the nuclear fuel cycle relative to other potential alternatives, such as natural gas, renewable energy sources, or conservation programs.

6.2.4 Other Studies

Since the development of the GEIS, extensive further research into the relative volumes of GHGs emitted by nuclear and other electricity generating methods has been performed. In support of the analysis for this draft SEIS, the NRC staff performed a survey of the recent literature on the subject. Based on this survey, the NRC staff found that estimates and projections of the carbon footprint of the nuclear power lifecycle vary widely, and considerable debate exists regarding the relative impacts of nuclear and other electricity generation methods on GHG emissions. These recent studies take two different forms:

3) qualitative discussions of the potential use of nuclear power to address GHG emissions and global warming

4) technical analysis and quantitative estimates of the actual amount of GHGs generated by the nuclear fuel cycle

6.2.5 Qualitative

The qualitative studies primarily consist of broad, large-scale public policy or investment evaluations of whether an expansion of nuclear power is likely to be a technically, economically, and/or politically feasible means of achieving global GHG reductions. Examples of the studies that the NRC staff identified during the subsequent literature search include the following:

- Studies conducted to evaluate whether investments in nuclear power in developing countries should be accepted as a flexibility mechanism to assist industrialized nations in achieving their GHG reduction goals under the Kyoto Protocols (Schneider 2000; IAEA 2000; NEA 2002; and NIRS/WISE 2005). Ultimately, the parties did not approve nuclear power as a component under the Clean Development Mechanism (CDM), but not because of concerns about GHGs from the nuclear fuel cycle (NEA 2002). Instead, it was eliminated from consideration for the CDM because it was not considered to meet the criterion of helping developing nations achieve sustainable development because of safety and waste disposal concerns (NEA 2002).

- Analyses developed to assist governments (including the U.S. Government) in making long-term investment and public policy decisions in nuclear power (Keepin 1988; Hagen et al. 2001; MIT 2003).

Although the qualitative studies sometimes reference and critique the rationale contained in the existing quantitative estimates of GHGs produced by the nuclear fuel cycle, their conclusions generally rely heavily on discussions of other aspects of nuclear policy decisions and investment such as safety, cost, waste generation, and political acceptability. Therefore, these studies are not directly applicable to the evaluation of GHG emissions that will be associated with the proposed relicensing of PINGP 1 and 2.

6.2.6 Quantitative

A large number of technical studies, including calculations and estimates of the amount of GHGs emitted by nuclear and other power generation options, are available in the literature. Examples of these studies include Mortimer (1990), Andseta et al. (1998), Spadaro (2000), Storm van Leeuwen and Smith (2005), Fritsche (2006), POST (2006), AEA (2006), Weisser (2006), Fthenakis and Kim (2007), and Dones (2007).

Comparison of the different studies is difficult because the assumptions and components of the lifecycles included within each study vary widely. Examples of differing assumptions that make comparability between the studies difficult include the following:

- the type of energy source that may be used to mine uranium deposits in the future
- the amount of reprocessing of nuclear fuel that will be performed in the future
- the type of energy source and process that might be used to enrich uranium in the future
- different calculations regarding the grade and volume of recoverable uranium deposits in the world
- different estimates regarding the GHG emissions associated with declining grades of recoverable coal, natural gas, and oil deposits
- the release of GHG gases other than CO_2, including the conversion of the masses of these gases into grams of CO_2 equivalents per kilowatt-hour (g C_{eq} /kWh)
- the technology to be used for future fossil fuel power systems, including cogeneration systems
- the projected capacity factors assumed for the different generation alternatives
- the different types of nuclear reactors used currently and in the projected future (light water reactor, pressurized-water reactor, Canadian deuterium-natural uranium reactor, breeder)

In addition, studies are inconsistent in their application of full lifecycle analyses, including plant construction, decommissioning, and resource extraction (uranium ore, fossil fuel). For instance, Storm van Leeuwen and Smith (2005) present comparisons of GHG emissions from nuclear versus natural gas that incorporate GHG emissions associated with nuclear plant construction and decommissioning in the values used for comparison.

In the case of the proposed PINGP 1 and 2 relicensing, the relicensing action will not involve additional GHG emissions associated with construction because the facility already exists. In addition, the proposed relicensing action will not involve additional GHG emissions associated with facility decommissioning, because that decommissioning must occur whether the facility is relicensed or not. Some emissions will occur as a result of construction associated with refurbishment activities; however, as discussed in Chapter 3 of this draft SEIS, these impacts are expected to be short-term and minimal. In many of these studies, the contribution of GHG emissions from facility construction and decommissioning cannot be separated from the other lifecycle GHG emissions that would be associated with PINGP 1 and 2 relicensing. Therefore, these studies overestimate the GHG emissions attributed to the proposed PINGP 1 and 2 relicensing action.

In an early study on the subject, Dr. Nigel Mortimer conducted an analysis of the GHG emissions resulting from the nuclear fuel cycle in 1990 (Mortimer 1990). In this study, Mortimer stressed that the GHG implications of the nuclear fuel cycle were substantially related to the ore grade of uranium that must be mined to support nuclear power generation. Using ore grades that were current as of 1990, this study concluded that nuclear power offered a dramatic reduction in GHG emissions over conventional coal-fired power plants over an estimated 35-year lifecycle. The analysis estimated that a nuclear power plant would generate 230,000 tons (209,000 metric tonnes [MT]) of CO_2 over a 35-year life span, or about 3.9 percent of the 5,912,000 tons (5,363,000 MT) that an equivalent coal-fired plant would generate (Mortimer 1990). The study also projected that most of this 230,000 tons (209,000 MT) of CO_2 resulted from the use of a coal-fired plant to perform uranium enrichment by gaseous diffusion, and that using nuclear power and alternative enrichment methods in the future could reduce the amount to 21,000 tons (19,000 MT) (Mortimer 1990).

Mortimer's study went on to demonstrate that the GHG impact of the nuclear fuel cycle would increase as the grade of uranium ore mined dropped, and that the net emissions of CO_2 from the nuclear and coal-fired alternatives would become equal once uranium ore grades reached 0.01-percent uranium oxide. However, Mortimer does not address differences in energy consumption from future extraction and enrichment methods, the potential for higher grade resource discovery, and technology improvements. Based on his cutoff ore grade and projections of ore reserves, Mortimer estimated GHG emissions of nuclear and natural gas generation would have the same emissions after a period of 23 years (Mortimer 1990). The analysis also compared GHG emissions associated with the nuclear fuel cycle with other electricity generation and efficiency options, including hydroelectric, wind, tidal power, and new types of insulation and lighting (but not including natural gas). The conclusion was that nuclear power had lower GHG emissions compared to coal, but that GHG emissions associated with the nuclear fuel cycle still exceeded those for renewable generation and conservation options (Mortimer 1990).

The Mortimer (1990) study is not presented here to support a definitive conclusion regarding whether nuclear energy produces fewer GHG emissions than other alternatives and similar discussions will not be presented in this draft SEIS for each of the available studies. Instead, the NRC staff presents the Mortimer (1990) study to provide an example of the types of considerations underlying the calculations and arguments presented by the various authors. Almost every existing study has been critiqued, and its assumptions challenged, by later authors. Therefore, no single study has been selected to represent definitive results in this draft SEIS. Instead, the results from a variety of the studies are presented in Tables 6-2, 6-3, and 6-4 to provide a weight-of-evidence argument comparing the relative GHG emissions resulting from the proposed PINGP 1 and 2 relicensing compared to the potential alternative use of coal-fired plants, natural gas-fired plants, and renewable energy sources.

6.2.7 Summary of Nuclear Greenhouse Gas Emissions Compared to Coal

Because coal is the fuel most commonly used to generate electricity in the U.S., and the burning of coal results in the largest emissions of GHGs for any of the likely alternatives to nuclear power, most of the available quantitative studies have focused on comparisons of the relative GHG emissions of nuclear to coal-fired generation. The quantitative estimates of the GHG emissions associated with the nuclear fuel cycle, as compared to an equivalent coal-fired plant, are presented in Table 6-2.

Table 6-2. Nuclear Greenhouse Gas Emissions Compared to Coal

Source	GHG Emission Results
Mortimer 1990	Nuclear—230,000 tons CO2 Coal—5,912,000 tons CO2 Note: Future GHG emissions from nuclear to increase because of declining ore grade
Andseta et al. 1998	Nuclear energy produces 1.4 percent of the GHG emissions compared to coal. Note: Future reprocessing and use of nuclear-generated electrical power in the mining and enrichment steps are likely to change the projections of earlier authors, such as Mortimer (1990).
Spadaro 2000	Nuclear—2.5 to 5.7 g Ceq/kWh Coal—264 to 357 g Ceq/kWh
Fritsche 2006 (values estimated from graph in Figure 4)	Nuclear—33 g Ceq/kWh Coal—950 g Ceq/kWh
POST 2006 (Nuclear calculations from AEA 2006)	Nuclear—5 g Ceq/kWh Coal—>1000 g Ceq/kWh Note: Decrease of uranium ore grade to 0.03% would raise nuclear to 6.8 g Ceq /kWh. Future improved technology and carbon capture and storage could reduce coal-fired GHG emissions by 90 percent.
Weisser 2006 *(compilation of* results from other studies)	Nuclear—2.8 to 24 g Ceq/kWh Coal—950 to 1250 g Ceq/kWh

6.2.8 Summary of Nuclear Greenhouse Gas Emissions Compared to Natural Gas

The quantitative estimates of the GHG emissions associated with the nuclear fuel cycle, as compared to an equivalent natural gas-fired plant, are presented in Table 6-3.

Table 6-3. Nuclear Greenhouse Gas Emissions Compared to Natural Gas

Source	GHG Emission Results
Spadaro 2000	Nuclear—2.5 to 5.7 g Ceq/kWh Natural Gas—120 to 188 g Ceq/kWh
Storm van Leeuwen and Smith 2005	Nuclear fuel cycle produces 20 to 33% of the GHG emissions compared to natural gas (at high ore grades). Note: Future nuclear GHG emissions to increase because of declining ore grade.
Fritsche 2006	Nuclear—33 g Ceq/kWh

(values estimated from graph in Figure 4)	Cogeneration Combined Cycle Natural Gas—150 g Ceq/kWh
POST 2006 (Nuclear calculations from AEA 2006)	Nuclear—5 g Ceq/kWh Natural Gas—500 g Ceq/kWh Note: Decrease of uranium ore grade to 0.03% would raise nuclear to 6.8 g Ceq/kWh. Future improved technology and carbon capture and storage could reduce natural gas GHG emissions by 90%.
Weisser 2006 (compilation of results from other studies)	Nuclear—2.8 to 24 g Ceq/kWh Natural Gas—440 to 780 g Ceq/kWh
Dones 2007	Author critiqued methods and assumptions of Storm van Leeuwen and Smith (2005), and concluded that the nuclear fuel cycle produces 15 to 27% of the GHG emissions of natural gas.

6.2.9 Summary of Nuclear Greenhouse Gas Emissions Compared to Renewable Energy Sources

The quantitative estimates of the GHG emissions associated with the nuclear fuel cycle, as compared to equivalent renewable energy sources, are presented in Table 6-4. Calculation of GHG emissions associated with these sources is more difficult than the calculations for nuclear energy and fossil fuels because the efficiencies of the different energy sources vary so much by location. For instance, the efficiency of solar and wind energy is highly dependent on the location in which the power generation facility is installed. Similarly, the range of GHG emissions estimates for hydropower varies greatly depending on the type of dam or reservoir involved. Therefore, the GHG emissions estimates for these energy sources have a greater range of variability than the estimates for nuclear and fossil fuel sources.

Table 6-4. Nuclear Greenhouse Gas Emissions Compared to Renewable Energy Sources

Source	GHG Emission Results
Mortimer 1990	Nuclear—230,000 tons CO2 Hydropower—78,000 tons CO2 Wind power—54,000 tons CO2 Tidal power—52,500 tons CO2 Note: Future GHG emissions from nuclear to increase because of declining ore grade.
Spadaro 2000	Nuclear—2.5 to 5.7 g Ceq/kWh Solar PV—27.3 to 76.4 g Ceq/kWh Hydroelectric—1.1 to 64.6 g Ceq/kWh Biomass—8.4 to 16.6 g Ceq/kWh Wind—2.5 to 13.1 g Ceq/kWh
Fritsche 2006	Nuclear—33 g Ceq/kWh

Source	GHG Emission Results
(values estimated from graph in Figure 4)	Solar PV—125 g Ceq/kWh Hydroelectric—50 g Ceq/kWh Wind—20 g Ceq/kWh
POST 2006 (Nuclear calculations from AEA 2006)	Nuclear—5 g Ceq/kWh Biomass—25 to 93 g Ceq/kWh Solar PV—35 to 58 g Ceq/kWh Wave/Tidal—25 to 50 g Ceq/kWh Hydroelectric—5 to 30 g Ceq/kWh Wind—4.64 to 5.25 g Ceq/kWh Note: Decrease of uranium ore grade to 0.03% would raise nuclear to 6.8 g Ceq/kWh.

Source	GHG Emission Results
Weisser 2006 (compilation of results from other studies)	Nuclear—2.8 to 24 g Ceq/kWh Solar PV—43 to 73 g Ceq/kWh Hydroelectric—1 to 34 g Ceq/kWh Biomass—35 to 99 g Ceq/kWh Wind—8 to 30 g Ceq/kWh
Fthenakis and Kim (2007)	Nuclear—16 to 55 g Ceq/kWh Solar PV—17 to 49 g Ceq/kWh
Dones 2007	Author did not evaluate nuclear versus renewable energy sources.

6.2.10 Conclusions

Estimating the GHG emissions associated with current nuclear energy sources is challenging because of differing assumptions and noncomparable analyses performed by the various authors. The differences and complexities in these assumptions and analyses increase when using them to project future GHG emissions. However, even with these differences, the NRC staff can draw several conclusions.

First, the studies indicate a consensus that nuclear power currently produces fewer GHG emissions than fossil-fuel-based electrical generation. Based on the literature review, the lifecycle GHG emissions from the complete nuclear fuel cycle currently range from 2.5 to 55 g C_{eq}/kWh. The comparable lifecycle GHG emissions from the current use of coal range from 264 to 1250 g C_{eq}/kWh, and GHG emissions from the current use of natural gas range from 120 to 780 g C_{eq}/kWh. The existing studies also provided estimates of GHG emissions from five renewable energy sources, based on current technology. These estimates included solar-photovoltaic (17 to 125 g C_{eq}/kWh), hydroelectric (1 to 64.6 g C_{eq}/kWh), biomass (8.4 to 99 g C_{eq}/kWh), wind (2.5 to 30 g C_{eq}/kWh), and tidal (25 to 50 g C_{eq}/kWh). The range of these estimates is very wide, but the general conclusion is that the current GHG emissions from the nuclear fuel cycle are of the same order of magnitude as those for these renewable energy sources.

Second, the studies indicate no consensus on future relative GHG emissions from nuclear power and other sources of electricity. There is substantial disagreement among the various authors regarding the GHG emissions associated with declining uranium ore concentrations, future uranium enrichment methods, and other factors, including changes in technology. Similar disagreement exists regarding future GHG emissions associated with coal and natural gas electricity generation. Even the most conservative studies conclude that the nuclear fuel cycle currently produces fewer GHG emissions than fossil-fuel-based sources, and are expected to continue to do so in the near future. The primary difference between the authors is the projected cross-over date (the time at which GHG emissions from the nuclear fuel cycle exceed those of fossil-fuel-based sources) or whether cross-over will actually occur at all.

Considering the current estimates and future uncertainties, it appears that GHG emissions associated with the proposed PINGP 1 and 2 relicensing action are likely to be lower than those associated with fossil-fuel-based energy sources. The NRC staff bases this conclusion on the following rationale:

1) The current estimates of GHG emissions from the nuclear fuel cycle are far below those for fossil-fuel-based energy sources.

2) PINGP 1 and 2 license renewal will involve continued GHG emissions due to uranium mining, processing, and enrichment, but will not result in increased GHG emissions associated with plant construction or decommissioning (as the plant will have to be decommissioned at some point whether the license is renewed or not).

3) Few studies predict that nuclear fuel cycle emissions will exceed those of fossil fuels within a timeframe that includes the PINGP 1 and 2 periods of extended operation. Several studies suggest that future extraction and enrichment methods, the potential for higher grade resource discovery, and technology improvements could extend this timeframe.

With respect to comparison of GHG emissions between the proposed PINGP 1 and 2 license renewal action and renewable energy sources, it appears likely that there will be future technology improvements and changes in the type of energy used for mining, processing, and constructing facilities in both areas. Currently, the GHG emissions associated with the nuclear fuel cycle and renewable energy sources are within the same range. Because nuclear fuel production is the most significant contributor to possible future increases in GHG emissions from nuclear power, and because most renewable energy sources lack a fuel component, it is likely that GHG emissions from renewable energy sources would be lower than those associated with PINGP 1 and 2 at some point during the period of extended operation.

6.3 References

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10 CFR 54. *Code of Federal Regulations*, Title 10, *Energy,* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

10 CFR Part 63. Code of Federal Regulations, Title 10, *Energy,* Part 63, "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada."

40 CFR Part 191. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste."

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7.0 ENVIRONMENTAL IMPACTS OF DECOMMISSIONING

Decommissioning is defined as the safe removal of a nuclear facility from service and the reduction of residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license. The U.S. Nuclear Regulatory Commission (NRC) issued the *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* (NRC 2002) that evaluated the environmental impacts from the activities associated with the decommissioning of any reactor before or at the end of an initial or renewed license.

The NRC staff has not identified any new and significant information during the review of the Northern State Power Co. (NSP) environmental report (ER; NMC 2008), the site audit, or the scoping process. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS (NRC 1996, 1999). For the issues listed in table 7-1 below, the GEIS concluded that the impacts are SMALL.

Plant shutdown will likely have no noticeable impacts on historic and archaeological resources at the PINGP 1 and 2 site. NRC requirements ensure that the decommissioning activities for PINGP 1 and 2 would be subject to a Section 106 review in accordance with the National Historic Preservation Act (NHPA). In Chapter 4, the NRC concluded that the impacts of continued plant operation on historic and archaeological resources could be MODERATE. Since plant shutdown would not involve any land disturbance, the NRC concludes that the impacts on historic and archaeological resources from plant shutdown would be SMALL.

Table 7-1. Issues Related Decommissioning. *Decommissioning would occur regardless of whether Three Mile Island Nuclear Station, Unit 1, is shut down at the end of its currect operating license or at the end of the period of extended operation. There are no site-specific issues related to decommissioning.*

Issues	GEIS Section	Category
Radiation doses	7.3.1; 7.4	1
Waste management	7.3.2; 7.4	1
Air quality	7.3.3; 7.4	1
Water quality	7.3.4; 7.4	1
Ecological resources	7.3.5; 7.4	1
Socioeconomic impacts	7.3.7; 7.4	1

7.1 References

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8.0 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

The National Environmental Policy Act of 1969 (NEPA) mandates that each environmental impact statement (EIS) consider alternatives to any proposed major federal action. NRC regulations implementing NEPA for license renewal require that a supplemental EIS "considers and weighs the environmental effects of the proposed action [license renewal]; the environmental impacts of alternatives to the proposed action; and alternatives available for reducing or avoiding adverse environmental impacts," [10 CFR 51.71(d)]. In this case, the proposed Federal action is issuing renewed licenses for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2), which will allow the plant to operate for 20 years beyond their current license expiration dates.

In this chapter, we examine the potential environmental impacts of alternatives to issuing renewed operating licenses for PINGP 1 and 2, as well as alternatives that may reduce or avoid adverse environmental impacts from license renewal, when and where these alternatives are applicable.

While the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, NUREG-1437 (GEIS; NRC 1996; 1999), reached generic conclusions regarding many environmental issues associated with license renewal, it did not determine which alternatives are reasonable or reach conclusions about site-specific environmental impact levels. Therefore, the NRC staff must evaluate environmental impacts of alternatives on a site-specific basis.

In accordance with the GEIS, alternatives to the proposed action of issuing renewed PINGP 1 and 2 operating licenses must meet the purpose and need for issuing a renewed license; they must:

> provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and, where authorized, Federal (other than NRC) decisionmakers.

The NRC staff ultimately make no decision regarding which alternative, or whether the proposed action, is implemented, since that decision falls to utility, State, or other Federal officials. Comparing the environmental effects of these alternatives will assist the NRC staff in deciding whether the environmental impacts of license renewal are so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable [10 CFR 51.95(c)(4)]. If the NRC acts to issue a renewed license, all of the alternatives, including the *proposed action, will be available to energy-planning decisionmakers.* If the NRC decides not to renew the license (or takes no action at all), then energy-planning decisionmakers may no longer elect to continue operating PINGP 1 and 2 and will have to resort to another alternative, which may or may not be one of the alternatives the NRC staff considers in this section, in order to meet their energy needs.

In addition to evaluating alternatives to the proposed action, when appropriate, the NRC staff also examine alternatives that may reduce or avoid environmental impacts of the proposed action; the staff does so to illustrate how such alternatives may act to mitigate potential impacts of license renewal.

In evaluating alternatives to license renewal, the NRC staff first selects energy technologies or options currently in commercial operation as well as some technologies not currently in commercial operation but likely to be commercially available by the time the current PINGP 1 and 2 operating licenses expire.

Second, the NRC staff screens the alternatives to remove those that cannot meet future system needs. Then, the NRC staff screens the remaining options to remove those for which the cost or benefits do not justify inclusion in the range of reasonable alternatives. Any alternatives remaining, then, constitute alternatives to the proposed action that the NRC staff evaluates in-depth throughout this section. At the end of the section, the NRC staff briefly addresses each alternative that was removed during screening.

In-Depth Alternatives:

- **Natural-gas-fired combined-cycle**
- **Combination including natural gas, wind, wood-fired generation**
- **Combination including one nuclear unit, natural gas, and wind**

Other Alternatives Considered:

- **Wind Power**
- **Wood Waste**
- **Conservation**
- **Solar Power**
- **Conventional Hydroelectric Power**
- **Geothermal Power**
- **Biofuels**
- **New nuclear**
- **Coal-fired power**
- **Oil-fired Power**
- **Fuel Cells**
- **Municipal Solid Waste**
- **Delayed Retirement**

The NRC staff initially considered 14 discrete potential alternatives to the proposed action and narrowed the list to one single-source alternative and two combination alternatives considered in this chapter. In addition, the NRC staff considered purchased power, but not as a discrete alternative to license renewal, because the power sources for purchased power would likely be similar to those considered in this section, but may include older, less clean and efficient power plants. Also, Minnesota's Next Generation Energy Act of 2007 (136-S.F.No. 145) restricts importation of power from certain power plants, including essentially any new coal-fired power plant.

Once the NRC staff identified the in-depth alternatives, it referred to generic environmental impact evaluations in the GEIS. The GEIS provides overviews of some energy technologies available at the time of its publishing in 1996, though it does not reach any conclusions regarding which alternatives are most appropriate, nor does it precisely categorize impacts for each site. Since 1996, many energy technologies have evolved significantly in capability and cost, while regulatory structures have changed to either promote or impede development of particular alternatives.

Where applicable, the NRC staff uses information in the GEIS and includes updated information from the Energy Information Administration (EIA), other organizations within the Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), industry sources and publications, and information submitted by Northern States Power Co. (NSP) in the environmental report (ER).

For each in-depth analysis, the NRC staff analyzes environmental impacts across seven impact categories: air quality, groundwater use and quality, surface water use and quality, ecology, human health, socioeconomics, and waste management. As in earlier chapters of this draft supplemental environmental impact statement (SEIS), the NRC staff uses the NRC's three-level standard of significance – SMALL, MODERATE, or LARGE – to indicate the intensity of environmental effects for each alternative that the NRC staff evaluates in-depth.

By placing the detailed alternative analyses in this order, the NRC staff does not imply which alternative would have the least impact, or which alternative an energy planning decisionmaker would be most likely to implement. Whenever possible, the NRC staff considers effects from locating the alternative at the existing site, as well as at an alternate site.

Sections 8.1 through 8.3, include the NRC staff's analysis of environmental impacts of alternatives to license renewal. These include a gas-fired alternative located both at the PINGP 1 and 2 site and at a different site (8.1), a combination alternative including gas-fired capacity at the PINGP 1 and 2 site as well as renewable capacity at other sites and conservation (8.2), and a combination alternative that includes continued operation of one PINGP 1 and 2 unit as well as renewables and conservation (8.3). In section 8.4, the NRC staff briefly discusses purchased power. In section 8.5, the NRC staff addresses alternatives excluded from in-depth analysis and addresses why they were excluded. Finally, in section 8.6, the NRC staff considers the environmental effects that occur if NRC takes no action and does not issue renewed licenses for PINGP 1 and 2.

Energy Outlook: Each year the Energy Information Administration (EIA), part of the U.S. Department of Energy (DOE), issues its updated *Annual Energy Outlook (AEO)*. *AEO 2008* indicates that coal and natural gas are likely to fuel most new electrical capacity through 2030, with significant contributions from new renewable sources, and some growth in nuclear capacity (EIA 2008a), though all projections are subject to future developments in fuel price or electricity demand:

> "Natural-gas-fired plants generally have lower capacity costs but higher fuel costs than coal-fired plants. As a result, coal-fired plants account for 40 percent of total capacity additions from 2006 to 2030, compared with a 36-percent share for natural gas. Renewable and nuclear plants tend to have high investment costs and relatively low operating costs. EPACT2005 and State RPS programs are expected to stimulate generation from renewable and nuclear plants, which represent 18 percent and 6 percent of total additions, respectively. The quantity and mix of capacity additions can also be affected by different fuel price paths or growth rates for electricity demand."

Notably, the NRC staff's alternatives analysis for PINGP 1 and 2 license renewal excludes several alternatives the NRC staff typically analyzes for license renewal. As discussed in greater depth in Section 8.4, the NRC staff found that Minnesota regulations restricting greenhouse gas emissions would make building a coal-fired alternative difficult regardless of combustion technology used. The NRC staff also found that the lead time remaining prior to the expiration of current PINGP 1 and 2 licenses make it unlikely that a replacement nuclear plant could be permitted and constructed prior to license expiration. The alternatives that NRC staff considered in depth, then, focus primarily on natural gas-fired generation, wind, wood waste biomass, and conservation resources.

8.1 Gas-fired Generation

In this section, the NRC staff evaluates the environmental impacts of natural gas-fired generation at both the PINGP 1 and 2 site and at an alternate site.

Natural gas fueled 20 percent of electric generation in the U.S. in 2006, the most recent year for which data are available, accounting for the second greatest share of electrical power after coal (EIA 2007a). Like coal-fired power plants, natural-gas-fired plants may be affected by perceived or actual action to limit greenhouse gas emissions, though they produce markedly fewer greenhouse gases per unit of electrical output than coal-fired plants. Natural gas-fired power plants are feasible, commercially-available options for providing electrical generating capacity beyond the current license terms for PINGP 1 and 2.

Combined-cycle power plants differ significantly from power plants that generate electricity solely from a steam cycle, as almost all coal-fired and all existing nuclear power plants do. Combined-cycle power plants derive the majority of their electrical output from a gas-turbine cycle, and then generate additional power – without burning any additional fuel – through a second, steam-turbine cycle. The first, gas-turbine stage (similar to a large jet engine) burns natural gas that turns a driveshaft to power an electric generator. Ducts carry the hot exhaust from the turbine to a heat recovery steam generator, which then produces steam to drive another turbine and produce additional electrical power. The combined-cycle approach is significantly more efficient than any one cycle on its own; efficiencies can exceed 60 percent. Natural gas combined-cycle generation requires significantly less cooling water and smaller cooling towers than the existing PINGP 1 and 2 units, partly because of greater thermal efficiency and partly because gas turbines do not require condenser cooling like steam turbines do.

In order to replace the 1044 megawatts electrical (MWe) that PINGP 1 and 2 currently supply, the NRC staff selected a gas-fired alternative that uses two General Electric Company (GE) S207FB combined-cycle generating units. While any number of commercially-available combined-cycle units could be installed in a variety of combinations to replace the power currently produced by PINGP 1 and 2, the S207FB is an efficient model that operates at a heat *rate of 5940 British thermal units per kilowatt hour* (Btu/kWh), *or 57.4 percent thermal efficiency* (GE 2007). GE and other manufacturers, like Siemens, offer similar high efficiency models, including several that slightly exceed the thermal efficiency of this model. The NRC staff selected this particular configuration because it is able to provide almost the same amount of electricity as PINGP 1 and 2. This gas-fired alternative produces 562.5 MWe per unit. Two units produce a total of 1125 MWe — or, after accounting for 4 percent onsite usage including site lighting, cooling towers, and emissions controls — nearly the same output as PINGP 1 and 2. Cooling towers for this alternative would likely be mechanical draft-type towers approximately 65 ft (20 m) in height and similar in appearance and function to the existing PINGP 1 and 2 cooling towers.

In addition to cooling towers, other visible structures onsite would include the turbine buildings and heat recovery steam generators (which may be enclosed in the turbine building), two exhaust stacks, an electrical switchyard, and, possibly, equipment associated with a natural gas pipeline, like a compressor station. The GEIS estimated that a 1000 MWe gas-fired alternative would require 110 ac (40 ha), meaning this 1125-MWe plant would require 129 ac (52 ha). In their ER, NSP (NMC 2008) indicated that the plant would require 41 ac (17 ha), a number more consistent with minimum utility needs as demonstrated by existing power plants (including Dominion Resources' Fairless Energy Works located in Falls Township, Pennsylvania). The NRC staff uses NSP's estimate for the purposes of the following analysis.

This 1125-MWe power plant would consume 50.2 billion ft^3 (1.4 billion m^3) of natural gas annually, assuming an average heat content of 1,033 Btu/ft^3 (EIA 2006). Natural gas would be extracted from the ground through wells, then treated to remove impurities (like hydrogen sulfide), and blended to meet pipeline gas standards, before being piped through the interstate pipeline system to the power plant site. This gas-fired alternative would produce relatively little waste, which would primarily be in the form of spent catalysts used for emissions controls.

Environmental impacts from the gas-fired alternative will be greatest during construction. Site crews will clear vegetation from the site, prepare the site surface, and begin excavation before other crews begin actual construction on the plant and any associated infrastructure, including a pipeline spur to serve the plant and electricity transmission infrastructure connecting the plant to existing transmission lines.

Constructing the gas-fired alternative on the PINGP 1 and 2 site would allow the gas-fired alternative to make use of the site's existing transmission system, as well as take advantage of partially cleared areas of the site.

A gas-fired unit constructed offsite may cause additional construction-related impacts depending on the nature of the site selected. A site that has never been developed will likely experience greater impacts than a site that was previously industrial; a site near other power plants or industrial facilities will likely experience smaller impacts than a site surrounded by farmland or relatively natural surroundings.

Table 8-1. Summary of Environmental Impacts of Gas-Fired Combined-Cycle Generation Compared to Continued PINGP 1 and 2 Operation

	Gas-fired combined-cycle		Continued PINGP 1 and 2 Operation
	At PINGP 1 and 2 site	At alternate site	
Air Quality	MODERATE	MODERATE	SMALL
Groundwater	SMALL	SMALL	SMALL
Surface Water	SMALL	SMALL	SMALL
Ecology	SMALL	SMALL TO MODERATE	SMALL
Human Health	SMALL	SMALL	SMALL
Socioeconomics	SMALL TO MODERATE	SMALL TO MODERATE	SMALL TO MODERATE
Waste Management	SMALL	SMALL	SMALL

8.1.1 Air Quality

With the exception of Olmstead County, all Minnesota counties within the Southeast Minnesota–La Crosse (Wisconsin) Interstate Air Quality Control Region are in attainment for all Clean Air Act (CAA) criteria pollutants. Olmsted County, which is located approximately 30 mi (48 km) to the south of PINGP 1 and 2, is a maintenance county for sulfur dioxide (SO_2) and particulate matter (PM_{10}).

A new gas-fired generating plant, would qualify as a new major-emitting industrial facility and require a New Source Review and a Title V permit under the CAA (EPA 2008). The New Source Review program requires that a permit be obtained before construction of a new major-emitting industrial facility (42 U.S.C. §7475(a)). The permit will be issued only if the new plant includes pollution control measures that reflect the Best Available Control Technology standard mandated by the CAA. The natural gas-fired plant would need to comply with the standards of performance for electric utility steam generating units set forth in 40 CFR Part 60, Subpart D, "Standards of Performance for New Stationary Sources." Additionally, in order to address climate change issue and greenhouse gas emissions with the effort to maximize energy efficiency and minimize greenhouse gas emissions, the Minnesota Pollution Control Agency (MPCA) requires submission of an Air Emission Risk Analysis for proposed electric production facilities greater than or equal to 25 MWe and completion of the Greenhouse Gas Emissions Evaluation in conjunction with the application for a Title V permit, as required per 40 CFR Part 70.

Emissions sources constructed in attainment or unclassified areas that may have an effect on visibility in designated Federal Class I areas, as defined by Protection of Visibility provisions (40 CFR Part 51, Subpart P), must complete a new source review. The closest Federal Class I areas to the PINGP 1 and 2 site are Boundary Waters Canoe Area Wilderness Area, located approximately 230 mi (370 km) north-northeast of the PINGP 1 and 2 site, and Voyageurs National Park, located 260 mi (420 km) north-northwest of the PINGP 1 and 2 site. If the gas-fired alternative were constructed near or at the PINGP 1 and 2 site, it is unlikely that this additional requirement would apply, as the nearest Federal Class I areas in Minnesota would not be significantly affected due to the distance from the site.

The projected emissions from this natural gas-fired alternative based on published EIA data, EPA emission factors, performance characteristics for this alternative, and implemented emission controls are as follows:

Sulfur dioxide (SO_2) – 88.11 tons (79.94 MT) per year;

Nitrogen oxides (NO_x) – 282.48 tons (256.27 MT) per year;

Carbon monoxide (CO) – 58.72 tons (53.28 MT) per year;

Total suspended particles/PM_{10} – 49.24 tons (44.67 MT) per year;

Carbon dioxide (CO_2) – 3,031,481.84 tons (2,750,160.32 MT) per year.

The new natural gas-fired plant would have to comply with Title IV of the CAA reduction requirements for SO_2 and NO_x. These compounds are precursors of acid rain and are major contributors to reduced visibility. Title IV establishes maximum SO_2 and NO_x emission rates from existing plants and a system of the SO_2 emission allowances that can be used, sold, or saved for future use by the new plants.

As stated above, the new natural gas-fired alternative would produce 88.11 tons (79.94 MT) per year of SO_2 and 282.48 tons (256.27 MT) per year of NO_x based on the use of the dry-low NO_x combustion technology and the use of the selective catalytic reduction in order to significantly reduce NO_x emissions.

The new plant would be subject to the continuous monitoring requirements of SO_2, NO_x, and CO specified in 40 CFR Part 75. The natural gas-fired plant would emit approximately 2.9 million tons (approximately 2.6 million MT) per year of unregulated CO_2 emissions. Minnesota Statute §216H (added as part of the Next Generation Energy Act of 2007) stipulates greenhouse gas emissions reporting requirements and statewide adoption of a climate change action plan, which requires a reduction in greenhouse gases. Minnesota also voluntarily participates in the Climate Registry which establishes and endorses a greenhouse gas emissions inventory across North America. The inventory contains verified and accurate data available to the public and is published as general reporting protocol.

This alternative would emit 49.24 tons (44.67 MT) per year of particulate matter having an aerodynamic diameter less than or equal to 10 μm (PM_{10}) (40 CFR 50.6a). All suspended particles emitted by this alternative are PM_{10}.

Activities associated with the construction of the new natural gas-fired plant onsite or offsite of the PINGP 1 and 2 site would cause some additional air effects as a result of equipment emissions and fugitive dust from operation of the earth-moving and material handling equipment. Exhaust emissions from workers' vehicles and construction equipment would be temporary. The construction crews would employ dust-control practices in order to control and reduce fugitive dust, which would be temporary in nature. The NRC staff concludes that the impact of vehicle exhaust emissions and fugitive dust from operation of the earth-moving and material handling equipment would be SMALL.

The overall air-quality impacts of a new natural gas-fired plant located at the PINGP 1 and 2 site or at an alternate site would be MODERATE.

8.1.2 Groundwater Use and Quality

The use of groundwater for a gas-fired plant in Minnesota would likely be limited to supply wells for drinking water, pump and valve cooling, filtered service water for system cleaning purposes, and landscaping. The number, depth, and location of the wells would be specific to the site selected for the plant. One onsite plant located on the PINGP 1 and 2 site with two units would use the same shallow alluvial aquifer and the bedrock Franconia formation as the existing nuclear plant for sources of groundwater supply. The average pumping rate would likely range from 75 to 100 gpm which is less than the current use of ground water.

A gas-fired plant at an offsite location would require wells, which would vary in depth depending on groundwater and aquifer resources at the site. Generally, Minnesota has abundant ground water supplies, but the aquifer(s) selected for use at a given location will depend on groundwater quality requirements and the location of existing water supply wells with higher water appropriation priorities.

The amount of groundwater needed to service the alternative natural gas-fired plants is relatively low and the impact of groundwater use would be SMALL. No effects on groundwater quality would be apparent, except during the construction phase when possible dewatering and run-off controls are used. The construction phase should implement best management practices to minimize any potential construction impacts.

8.1.3 Surface Water Use and Quality

Consumptive surface water use for either an onsite or offsite natural gas-fired alternative would be approximately half the volume needed for PINGP 1 and 2 because of a higher efficiency of cooling water used per given unit of energy production. Waste water discharge at the gas-fired plant would be minimal. If the alternative is placed on the existing site, all intakes and discharges would be on the Mississippi River, and the impact on surface water resources, both in quantity and quality, would be SMALL. An offsite location would have different intake and discharge points that would require a National Pollutant Discharge Elimination System (NPDES) permit from the MPCA, but the scale of water use would be the same as for the onsite plant. Therefore, the impact of the offsite plant on surface water use and quality would also be SMALL.

8.1.4 Aquatic and Terrestrial Ecology

Impacts to aquatic ecology would be minimal, as the consumptive water use of a natural gas-fired plant would be less than half that of the current consumption rate of PINGP 1 and 2. Additionally, the onsite natural gas-fired plant could use parts of the existing cooling system, which would reduce potential impacts to aquatic resources. Impacts of the offsite alternative to aquatic resources would depend on location, the ecology of the site and the source and receiving water body. Construction in a previously disturbed area would have lower impacts to the aquatic resources than construction in an undisturbed area. Overall, the impacts to aquatic resources from a natural gas-fired plant would be SMALL for an onsite natural gas-fired plant, but could range from SMALL to MODERATE for an offsite plant, depending on the ecological conditions of the alternate site.

As indicated in previous sections, constructing the natural gas-fired alternative will require 41 ac (17 ha) of land, according to calculations presented in the ER (NMC 2008). Impacts to terrestrial ecology from the onsite alternative will be minor because the selected site has been previously disturbed. Buildings and structures associated with PINGP 1 and 2 occupy approximately 60 ac (24 ha) of the site (NMC 2008); therefore, some areas of previously disturbed land may return to natural habitat as a result of this alternative because less land would be required than is currently in use for PINGP 1 and 2. Buffer areas and surrounding wetland habitat on or in the vicinity of the site may remain undeveloped and would continue to provide habitat for terrestrial species, though site lighting, noise, and activities may degrade the value of these neighboring habitats. Construction of additional transmission line rights-of-way (ROWs) is unlikely because existing transmission capacity at the PINGP 1 and 2 site could be used. Any lengthy pipelines or additional roads on undisturbed or less-disturbed areas could adversely impact terrestrial ecology by fragmenting or destroying habitats. However, a pipelined fuel source and a small workforce would help to minimize the need for additional transportation infrastructure. Gas extraction and collection will also affect terrestrial ecology in offsite gas fields, although much of this land is likely already disturbed by gas extraction, and the incremental effects of this alternative on gas field terrestrial ecology are difficult to gauge. Deposition of air pollutants from this alternative may affect terrestrial ecology, but it is unlikely to be noticeable. Impacts to terrestrial resources from a natural gas-fired alternative at the PINGP 1 and 2 site would likely be SMALL.

Impacts of the offsite alternative to terrestrial resources would depend on location and whether the land was previously disturbed or located near any unique natural habitats. Construction in previously disturbed areas would have lower impacts than construction in an undisturbed area. Because impacts may vary widely based on the natural habitat of an alternate site, impacts to terrestrial resources from an offsite natural gas-fired alternative would range from SMALL to MODERATE.

8.1.5 Human Health

A natural gas-fired alternative would release a variety of air pollutants. EPA establishes National Ambient Air Quality Standards (NAAQS) for six criteria pollutants (40 CFR Part 50) under the CAA. The CAA recognizes two types of national air quality standards for particle pollution: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

Human health risks of a gas-fired alternative are generally low, although Table 8-2 of the GEIS identifies cancer and emphysema as potential risks from the operation of the natural gas-fired plant. However, the current Federal and Minnesota State air emission standards adequately protect the occupational workers and the members of the public. Therefore, the NRC staff has adopted applicable Federal and state air quality regulations as the thresholds for determining the human health risks associated with the operation of a new natural gas-fired power plant.

Natural gas-fired plants emit total suspended particulates mostly in a form of PM_{10}. Fine particle pollution, especially particulate matter less than 2.5 μm in diameter ($PM_{2.5}$), is linked to a variety of lung and cardiovascular diseases (EPA 2008). Industrial fabric filters or electrostatic precipitators would be used to control and significantly minimize emissions.

NO_x emissions contribute to formation of ground-level ozone (O_3) and participate in chemical reactions with other air particles to form nitrate particles, acid aerosols, and NO_2, all of which are known to have adverse impacts on human health. If the new natural gas-fired plant employed the latest technology for NO_x emission control systems and implemented emission-trading or offset requirements, it would not contribute to an overall increase in NO_x in the region. The NRC staff concludes that the impacts on human health of the onsite and offsite natural gas-fired alternative are likely to be SMALL.

8.1.6 Socioeconomics

Land Use

The GEIS generically evaluates the impacts of operations on land use both onsite and offsite. The analysis of land use impacts focuses on the amount of land area that would be affected by the construction and operation of a natural gas-fired power plant at the PINGP 1 and 2 site and at an alternate site. Land use impacts would vary depending on where the plant is located and whether construction would take place on undeveloped land or within a previously disturbed (brownfield) site.

As stated in the introduction of the natural gas-fired alternative, NSP indicated that approximately 41 ac (17 ha) would be necessary to support a natural gas-fired alternative capable of replacing PINGP 1 and 2. There is a possibility that additional land would be necessary for a buffer zone around plant structures or to support transmission lines at an alternate site and gas pipelines at both PINGP 1 and 2 and at an alternate site. Land use impacts from construction would be SMALL. Impacts could be further reduced if the power plant is collocated at an alternate site with another generating station or on a previously industrial site like PINGP 1 and 2.

In addition to onsite land requirements, land would be required offsite for natural gas wells and collection stations. The GEIS estimates that 3600 ac (1500 ha) would be required for wells, collection stations, and pipelines to bring the gas to a 1000-MWe generating facility. If this land requirement were scaled with generating capacity, an alternative to PINGP 1 and 2 could require approximately 4220 ac (1710 ha). Most of this land requirement would occur on land where gas extraction already occurs. In addition, some natural gas could come from outside of the U.S. and be delivered as liquefied gas.

The elimination of uranium fuel for PINGP 1 and 2 could partially offset offsite land requirements. In the GEIS, the NRC staff estimated that, if the need for uranium fuel were eliminated, approximately 1000 ac (405 ha) would not be needed for mining and processing uranium for the operating life of a 1000-MWe nuclear power plant. For PINGP 1 and 2, roughly 1044 ac (423 ha) of uranium mining area would no longer be needed.

Overall land use impacts from a gas-fired power plant would be SMALL to MODERATE, depending on whether the gas-fired plant is located at the PINGP 1 and 2 site, local land use if the gas-fired plant is located at a different site, the percentage of gas extraction that takes place where gas extraction already occurs, and the availability of previously disturbed land near the proposed site.

Socioeconomics

Socioeconomic impacts are defined in terms of changes to the demographic and economic characteristics and social conditions of a region. For example, the number of jobs created by the construction and operation of a new natural gas-fired power plant could affect regional employment, income, and expenditures. Job creation is characterized in two ways: (1) construction-related jobs, which are transient, short in duration, and less likely to have a long-term socioeconomic impact; and (2) operation-related jobs in support of power plant operations, which have the greater potential for permanent, long-term socioeconomic impacts. Workforce requirements of power plant construction and operations for the natural gas-fired power plant alternative were examined in order to measure their possible effect on current socioeconomic conditions.

NSP projected a maximum construction workforce of 629 (NMC 2008). The GEIS projects a workforce of 1200 to 2500 for a 1000-MWe plant (when extrapolated, a lower-end workforce of approximately 1400 for an 1125-MWe plant).

During construction, the communities surrounding the power plant site would experience increased demand for rental housing and public services, although these effects would be moderated if the power plant construction site is located near an urban area with many skilled workers. The relative economic effect of these workers on local economy and tax base would vary over time.

After construction, local communities may be temporarily affected by the loss of construction jobs and associated loss in demand for business services, and the rental housing market could experience increased vacancies and decreased prices. As noted in the GEIS, the socioeconomic impacts at a rural construction site could be larger than at an urban site, because of an increased likelihood that the workforce would have to move to be closer to the construction site. The impact of construction on socioeconomic conditions could range from SMALL to MODERATE depending on the socioeconomic characteristics of communities near the new gas-fired plant. The socioeconomic impacts of power plant construction could be reduced if the power plant is located near an urban area with many skilled workers. Impacts are likely to be SMALL at the current plant site given proximity to areas with skilled workers.

NSP estimated a gas-fired power plant operations workforce of 35 (NMC 2008), or up to 166 workers based on an extrapolated GEIS estimates. The NSP estimate appears reasonable and is consistent with trends toward lowering labor costs by reducing the size of power plant operations workforces. Depending on location, the small number of operations workers would likely not have a noticeable effect on socioeconomic conditions in the region.

This alternative would lead to the shutdown of the PINGP 1 and 2. This shutdown would have an impact on socioeconomic conditions in the region. Plant shutdown would eliminate approximately 700 jobs and would reduce tax revenue in the region. The loss of these contributions, which may not occur until after decommissioning, could have a SMALL to MODERATE local impact. Appendix J to NUREG-0586, Supplement 1 (NRC 2002) discusses the potential socioeconomic impacts of plant decommissioning.

Overall, socioeconomic impacts associated with operation of a gas-fired power plant would be SMALL to MODERATE.

Transportation

Construction and operation of a two unit natural gas-fired power plant would increase the number of vehicles on roads in the vicinity of the plant. During construction, cars and trucks would deliver workers, materials, and equipment to the worksite. The increase in vehicular traffic would peak during shift changes resulting in temporary levels of service impacts and delays at intersections. Pipeline construction and modification to existing natural gas pipeline systems could also have an impact.

During plant operations, transportation impacts would almost disappear. According to NSP, approximately 35 workers would be needed to operate the gas-fired power plant. Because fuel is transported by pipeline, most transportation infrastructure would experience little increased use from plant operations.

The gas-fired alternative would have a SMALL impact on transportation conditions in the region around the PINGP 1 and 2 site and a SMALL to MODERATE impact at an alternate site, depending on the location of the alternative site and what the roadway capacity and average daily volumes are at that site location.

Aesthetics

Aesthetic resources are the natural and manmade features that give a particular landscape its character and aesthetic quality. The aesthetics impact analysis focuses on the degree of contrast between the power plant and the surrounding landscape and the visibility of the power plant.

The two gas-fired units could be approximately 100 ft (30 m) tall, with two exhaust stacks at least 175 ft (53 m) tall or taller depending on the topography at an alternate site. Some structures may require aircraft warning lights. If the plant is located near the existing PINGP 1 and 2 site some of the impacts may be reduced because higher elevations and vegetation along the Mississippi river valley could make it difficult to see or hear the plant outside of the river valley. Power plant infrastructure would generally be smaller and less noticeable than PINGP 1 and 2 containments. Mechanical draft cooling towers would generate condensate plumes and operational noise, though smaller cooling requirements will mean smaller (or fewer) towers, which should generate less noise and smaller plumes than the existing facility. Noise during power plant operations would be limited to industrial processes and communications. Pipelines delivering natural gas fuel could be audible off site near compressors.

In addition to new power plant structures, the alternate plant site may require the construction of transmission lines and natural gas pipelines. Although the pipelines would be buried, the transmission lines would have a lasting visual effect on the landscape.

In general, aesthetic changes would be limited to the immediate vicinity of PINGP 1 and 2 or an alternate site. The gas-fired alternative would have a SMALL impact on aesthetics if the location was at the existing PINGP 1 and 2 site, and a possible SMALL to MODERATE impact of the location was at a different site location. If a new site is selected for the gas-fired alternative, impacts to aesthetics could be reduced by choosing a site where a plant is already located and where transmission lines are already in place.

Historic and Archaeological Resources

Historic property, as defined in 36 CFR Part 800, means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. Historic and archaeological resources are the indications of human occupation and use of the landscape as defined and protected by a series of Federal laws, regulations, and guidelines. Prehistoric resources are physical remains of human activities that predate written records; they generally consist of artifacts that may alone or collectively yield information about the past. Historic resources consist of physical remains that postdate the emergence of written records; in the U.S., they are architectural structures or districts, archaeological objects, and archaeological features dating from 1492 and later. Ordinarily, sites less than 50 years old are not considered eligible for listing on the NRHP, but exceptions can be made for such properties if they are of particular importance, such as structures associated with the development of nuclear power (e.g., Shippingport Atomic Power Station) or Cold War themes. American Indian resources are sites, areas, and materials important to American Indians for religious or heritage reasons. Such resources may include geographic features, plants, animals, cemeteries, battlefields, trails, and other environmental features. The power plant site and adjacent areas that could potentially be disturbed by the construction and operation of alternative power plants constitutes the area of potential effect (APE).

Chapter 2 of this draft SEIS discusses the affected environment in terms of cultural and archeological resources in the vicinity of the PINGP 1 and 2 site. As noted in Chapter 4, impacts to historic and archeological resources are a MODERATE impact; therefore, impacts from a gas-fired plant located on the PINGP 1 and 2 site could be MODERATE. However, these impacts could be mitigated if the utility commitments discussed in Chapter 4 of this draft SEIS were implemented for the gas-fired plant as well. Impacts to historic and archeological resources from a gas-fired plant located at an alternative site would vary depending on the location of the site. Given the relatively small amount of land required for this alternative, and the commitments discussed in Chapter 4, impacts to historic and archeological resources would be SMALL to MODERATE.

The following information is provided by the Prairie Island Indian Community.

> Depending on the location and timing of this alternative, there could be MODERATE impacts to archaeological sites within the boundaries of the PINGP. For instance, if this alternative was implemented before the PINGP was decommissioned, there may be impacts to archaeological sites, as the facility would require approximately 40 acres of land that has not been previously developed. It is presumed that the existing PINGP infrastructure (parking lots, buildings, etc.) would be needed until the PINGP was fully decommissioned. Therefore, this alternative would need land that had not been previously disturbed and likely to contain archaeological resources.
>
> This alternative would have less or no impact on archaeological sites if it were to be developed after PINGP decommissioning, as the entire former site could be utilized. The NRC would have to ensure that archaeological sites are not impacted during decommissioning. As well, the developer of the gas-fired alternative would have to ensure that all archaeological sites were protected during construction.

Environmental Justice

Section 4.9.7 of this draft SEIS addresses the purpose and content of an environmental justice impact analysis. In this section, the NRC staff evaluates the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from the construction and operation of a new natural gas-fired power plant.

Minority and low-income populations could be affected by the construction and operation of a new natural gas-fired power plant. Some of these effects have been identified in other resource areas discussed in this section. The extent of disproportionate effect is difficult to determine since it would depend on the location of the natural gas-fired power plant. If the natural gas-fired plant were located on the PINGP 1 and 2 site, the PIIC would be disproportionately affected. In addition, increased demand for rental housing during construction could disproportionately affect low-income populations. However, demand for rental housing could be mitigated if the alternate plant site is constructed near a metropolitan area.

Impacts on minority and low-income populations from the construction and operation of a natural gas-fired power plant alternative could range from SMALL to MODERATE. Because an on-site gas-fired plant located on the current PINGP 1 and 2 site would only require a small number of workers, effects are unlikely to be adverse, and any that are disproportionate are likely to be SMALL. An off-site gas-fired plant could have SMALL to MODERATE environmental justice impacts; however these effects could be reduced if the plant was located near a metropolitan area or on a previously disturbed site.

The following information is provided by the Prairie Island Indian Community.

> As stated above, if the 1000 MWe gas-fired plant were to be located within the boundaries of the PINGP, the Prairie Island Indian Community would be

> disproportionately impacted. The Tribe believes that the MODERATE air quality impacts would also have a MODERATE impact on the health of tribal members, particularly the children and elders, who would be reside next to the gas-fired plant. The winds do not always blow from the west to the east (i.e., away from the community). Our research has shown that the often prevailing winds are out of the S, SE, SW, or E. In addition, because of our location within the floodplain of the Mississippi River valley, there are days when we experience air inversions. The result of these air inversions is that particulate matter is trapped closer to the ground and not dispersed in the atmosphere, thereby potentially impacting human health.
>
> There would be a significant increase in the number of vehicles driving through the community, as part of constructing the 1000 MWe gas-fired plant and, possibly, decommissioning the PINGP. This also has air quality implications, safety concerns related to increases in traffic burdens for tribal members, employees and guests at the Treasure Island Resort and Casino, and noise impacts
>
> In addition, if the PINGP were to be decommissioned, the Independent Spent Fuel Storage Installation (ISFSI) would still be operational. Depending on when the PINGP shutdown, there could be between 68 and 98 dry casks stranded indefinitely on Prairie Island. The 2003 Settlement agreement between the tribe and NSPM, related to the dry cask storage, would still be in effect.

8.1.7 Waste Management

Spent selective catalytic reduction catalysts, which are used to control NO_x emissions from the natural gas-fired plants, would make up the majority of the waste generated by this alternative.

Land clearing and other construction activities, associated with the construction of the gas-fired plant would generate waste that can be recycled, disposed of onsite, or shipped to an offsite waste disposal facility. If the alternative were constructed at the PINGP 1 and 2 site or any previously disturbed site, the amounts of waste produced by land-clearing during construction would be reduced.

In the GEIS, NRC staff concluded that a natural gas-fired alternative located either onsite or offsite of an existing nuclear facility would generate minimal waste and that the waste impacts would be SMALL. .

8.2 Combination Alternative 1

In this section, we evaluate the environmental impacts of an alternative that makes use of several different means of power generation as well as power conservation. This alternative includes a 400-MWe gas-fired unit on the existing PINGP 1 and 2 site, 300 MWe of wind power capacity offsite, 100 MWe of wood-fired generation offsite, and 250 MWe of electricity offset by conservation measures.

The gas-fired portion of this alternative would be similar in function to the gas-fired alternative in Section 8.1. It would also use combined-cycle technology, but would be slightly more efficient than the units used in Section 8.1. An existing 400-MWe combined-cycle unit currently available from GE (GE 2007) operates at 5690 Btu/kWh, or 60 percent thermal efficiency.

Wind power portions of this alternative would likely be located offsite, as insufficient land is available on the PING 1 and 2 site to support a wind-powered alternative. While wind power installations require substantial amounts of land to achieve adequate turbine spacing, only a small amount of land is actually disturbed during construction and occupied by turbines and infrastructure during operation. In many areas, surrounding land can be used for agriculture.

Wood-fired portions of this alternative would also likely be located offsite, and would likely consist of a number of small (approximately 50-MWe) installations. Wood-fired generation tends to be most economical when located near wood resources, especially mills or areas that generate forest wastes during logging operations. Generation fired by wood wastes tends to be more environmentally benign than installations fired by wood harvested specifically for power generation. For purposes of this analysis, the NRC staff has assumed that wood waste would power the wood-fired portion of this alternative. Construction impacts from a wood waste facility would likely be similar to an equivalently-sized coal-fired facility.

Energy conservation (or energy efficiency), while not a generation alternative per se, is a component of established energy policy in Minnesota. The Next Generation Energy Act of 2007 established a goal of a 1.5 percent annual reduction in retail electric sales for utilities and associations in Minnesota. As noted in Section 8.4.3, this reduction in energy consumption would not be sufficient to offset the full capacity of PINGP 1 and 2 by the time its licenses expire, but it is sufficient to contribute to a combination alternative. The GEIS notes that environmental impacts of conservation tend not be well-established.

Table 8-2. Summary of Environmental Impacts of Combination Alternative 1 Compared to Continued PINGP 1 and 2 Operation

	Combination Alternative 1	Continued PINGP 1 and 2 Operation
Air Quality	MODERATE	SMALL
Groundwater	SMALL	SMALL
Surface Water	SMALL to MODERATE	SMALL
Ecology	MODERATE	SMALL
Human Health	MODERATE	SMALL
Socioeconomics	SMALL to LARGE	SMALL TO MODERATE
Waste Management	SMALL	SMALL

8.2.1 Air Quality

As discussed in Section 8.1.2, a new gas-fired generating plant, proposed to be built in Goodhue County, would require a New Source Review and a Title V permit under the CAA and would need to submit an Air Emission Risk Analysis as required by the MPCA and a Greenhouse Gas Emissions Evaluation as required by 40 CFR Part 70. As discussed in Section 8.1.2, it is unlikely that Protection of Visibility provision (40 CFR Part 51, Subpart P) requirements would apply as the nearest Federal Class I areas in Minnesota would not be significantly affected due to the distance from the site.

The projected emissions from the one-unit natural gas-fired component of the alternative based on published EIA data, EPA emission factors, performance characteristics for this alternative, and implemented emission controls are as follows:

Sulfur dioxide (SO_2) – 30.01 tons (27.23 MT) per year;

Nitrogen oxides (NO_x) – 96.21 tons (87.28 MT) per year;

Carbon monoxide (CO) – 20 tons (18.15 MT) per year;

Total suspended particles/PM_{10}– 16.77 tons (15.21 MT) per year;

Carbon dioxide (CO_2) – 1,032,495.72 tons (936,680.12 MT) per year.

The new natural gas-fired plant would have to comply with Title IV of the CAA reduction requirements for SO_2 and NO_x. These compounds are precursors of acid rain and are major contributors to reduced visibility. Title IV establishes maximum SO_2 and NO_x emission rate from the existing plants and a system of the SO_2 emission allowances that can be used, sold' or saved for future use by the new plants.

As stated above, the new natural gas-fired alternative would produce 30.01 tons (27.23 MT) per year of SO_2 and 96.21 tons (87.28 MT) per year of NO_x based on the use of the dry low NO_x combustion technology and the use of the selective catalytic reduction, which allow significant reduction of NO_x emissions.

The new plant would be subjected to the continuous monitoring requirements of SO_2, NO_x, and CO specified in 40 CFR Part 75. The natural gas-fired plant as a part of this alternative would emit 1,032,495.72 tons (936,680.12 MT) per year of unregulated CO_2 emissions. Minnesota Statute §216H stipulates greenhouse gas emissions reporting requirements and statewide adoption of climate change action plan, which requires a reduction in greenhouse gases.

This alternative would emit 16.77 tons (15.21 MT) per year of PM_{10} (40 CFR 50.6a). All suspended particles emitted by the gas-fired portion of this alternative are PM_{10}.

As discussed in section 8.1.2, the EPA Administrator found that "regulation of hazardous air pollutant emissions from natural gas-fired electric utility steam generating units is not appropriate or necessary."

The projected emissions from the wood-fired component of this combination alternative based on published EIA data, EPA emission factor, performance characteristics for this alternative, and implemented emission controls are as follows:

Sulfur dioxide (SO_2) – 124.10 tons (112.58 MT) per year;

Nitrogen oxides (NO_x) – 608.09 tons (551.66 MT) per year;

Carbon monoxide (CO) – 744.60 tons (675.50 MT) per year;

TSP (filtered) – 496.40 tons (450.33 MT) per year;

PM_{10} (filtered) – 367.34 tons (333.25 MT) per year;

$PM_{2.5}$ (filtered) – 322.66 tons (292.72 MT) per year;

Carbon dioxide (CO_2) – 967,980 tons (878,151.46 MT) per year.

The wood-fired combustion facility would be subjected to Federal and state air emissions regulations described above for the natural gas-fired component of this alternative. This plant would also produce 496.55 tons (450.33 MT) per year of PM_{10} (40 CFR §50.6a) and 322.66 tons (292.72 MT) per year of $PM_{2.5}$, which have to meet the national primary and secondary ambient air quality standards (40 CFR §50.7a).

There would be no emissions from the wind-powered component of this combination alternative.

The energy conservation component of this alternative reduces direct fuel use and causes reduction in environmental emissions from workers' vehicle exhaust, plant fuel cycles, and operation and maintenance of the plant. Improvements in efficiency may also reduce consumption of fuels that are used for space and water heating purposes.

Activities associated with the construction of the new natural gas-fired plant onsite or offsite of PINGP 1 and 2 as well as construction of a wood-fired combustion facility and a wind farm would cause some additional air effects as a result of equipment emissions and fugitive dust from operation of the earth-moving and material handling equipment. Exhaust from workers' vehicles and motorized construction equipment would be temporary. If construction crews employ dust control practices, impacts from fugitive dust could be minimized. The NRC staff concludes that the impact of vehicle exhaust emissions and fugitive dust from operation of the earth-moving and material handling equipment would be SMALL.

The overall air quality impacts from the implementation of this combination alternative would be MODERATE.

8.2.2 Groundwater Use and Quality

The use of groundwater for an onsite gas-fired unit would likely be limited to supply wells for drinking water, landscaping, non-condenser cooling, and filtered service water. The existing permitted onsite supply wells could continue to be used with a range of total average discharge from 75 to 100 gpm. The impact on ground water use and quality would be SMALL. The offsite wind farm and biomass combustion units would also use a limited amount of groundwater. Water appropriation permits would be required, but the impact on groundwater use and quality in the area would also be SMALL.

8.2.3 Surface Water Use and Quality

An onsite 400-MWe gas-fired unit would use less than half the amount of surface water from the Mississippi River as the current plant. The consumptive use of surface water would be SMALL compared to the average flow of the river in the vicinity of PINGP 1 and 2, and the impact would be SMALL. The offsite biomass combustion units, totaling 100-MWe, would also have relatively small consumptive use of surface water. The waste water discharge from the biomass plant, including runoff, would have to be permitted by the MPCA, and the impact on receiving waters could potentially be MODERATE depending on the location of the plant.

8.2.4 Aquatic and Terrestrial Ecology

Impacts to aquatic ecology from this combination alternative would be minimal, as the consumptive water use of a natural gas-fired plant would be significantly less than the water consumption of PINGP 1 and 2. Additionally, the onsite natural gas-fired plant could use parts of the existing cooling system, which would reduce potential impacts to aquatic resources. Impacts of the offsite wind and biomass facilities would depend on location and the ecology of the site, but would likely be minimal. Construction in a previously disturbed area would have lower impacts to the aquatic resources than construction in an undisturbed area. Energy conservation would have no impacts on aquatic ecology. Overall, the impacts to aquatic resources from this combination of alternatives would be SMALL.

As indicated in previous sections, the onsite one-unit natural gas-fired component of this alternative will require 16 ac (7 ha) of land, according to calculations presented in the ER (NMC 2008). Impacts to terrestrial ecology from this portion of the alternative will be minor because the selected site has been previously disturbed. Buildings and structures associated with PINGP 1 and 2 occupy approximately 60 ac (24 ha) of the site (NMC 2008); therefore, some areas of previously disturbed land may return to natural habitat as a result of this alternative because less land would be required than is currently in use for PINGP 1 and 2. Buffer areas and surrounding wetland habitat on or in the vicinity of the site may remain undeveloped and would continue to provide habitat for terrestrial species, though site lighting, noise, and activities may degrade the value of these neighboring habitats. Construction of additional transmission line ROWs is unlikely because existing transmission capacity at the PINGP 1 and 2 site could be used. Any lengthy pipelines or additional roads on undisturbed or less-disturbed areas could adversely impact terrestrial ecology by fragmenting or destroying habitats. However, a pipelined fuel source and a small workforce would help to minimize the need for additional transportation infrastructure. Gas extraction and collection will also affect terrestrial ecology in offsite gas fields, although much of this land is likely already disturbed by gas extraction, and the incremental effects of this alternative on gas field terrestrial ecology are difficult to gauge.

The offsite two-unit biomass combustion component of this alternative will require 192 ac (78 ha) of land, according to calculations presented in the GEIS for coal-fired units. The GEIS estimates that the overall level of construction impacts from biomass combustion unit impacts are expected to be similar to coal-fired units of similar size. Because biomass combustion units require large areas for buildings and structures associated with fuel and processing, construction activities may fragment or destroy natural habitats. Construction of additional transmission line ROWs, railways, or roads would further fragment natural habitat beyond the 192-ac (78-ha) site. Impacts from logging slash and forest thinning to provide fuel for this alterative may alter terrestrial habitats by allowing edge effects to permeate a greater portion of the disturbed land, which may change the abundance and distribution of interior species and increase the area's susceptibility to invasive species. Deposition of air pollutants may affect terrestrial ecology, but are expected to be minimal. Ash disposal is not likely to adversely affect terrestrial ecology and may enrich soils if deposited at lower pH levels.

The offsite windpower installation component of this alternative will require approximately 64,000 ac (25,900 ha) of land, of which approximately 250 ac (100 ha) would be used for actual towers and infrastructure. Construction disturbances associated with the windpower installation may significantly impact terrestrial ecology, and some erosion and sedimentation may result. However, because the windpower installations would be dispersed among a total area of approximately 64,000 ac (25,900 ha), and the potential exists to spread the installations among several locations, wildlife corridors resulting from construction and undisturbed buffer zones would continue to provide habitat for terrestrial species. No air pollutant deposition would result from this component of the alternative.

Impacts to terrestrial resources from this combination of alternatives at both the PINGP 1 and 2 site and offsite locations are expected to be MODERATE.

8.2.5 Human Health

EPA establishes NAAQS for six criteria pollutants (40 CFR Part 50) under the CAA. The CAA recognizes two types of national air quality standards for particle pollution: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; and secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

CO, NO_x, and particulate matter are the major emissions during operation of the wood-fired plant, as concluded in the GEIS. In Table 8-2 of the GEIS, the NRC staff identified that occupational risks are high (same as agricultural) during the operation of the wood-fired electricity generating plant. However, the current Federal and state air emission standards adequately protect the occupational workers and the members of the public. Therefore, the NRC staff has adopted applicable Federal and state air quality regulations as the thresholds for determining the human health risks associated with the operation of a new natural gas-fired power plant.

Wood-fired plants would emit PM_{10} and $PM_{2.5}$. Fine particle pollution, $PM_{2.5}$, is linked to a variety of lung and cardiovascular diseases (EPA 2008). Industrial fabric filters or electrostatic precipitators could be used to control and significantly minimize emissions.

NO_x emissions contribute to formation of ground-level ozone and participate in chemical reactions with other air particles to form nitrates, acid aerosols, and NO_2, which are known to have adverse impacts on human health. The new natural gas-fired plant would have latest technology NO_x emission control systems installed and implemented emission-trading or offset requirements, and therefore, a new plant would not increase overall NO_x in the region. The NRC staff concludes that the impacts on human health of this combination alternative are likely to be MODERATE.

8.2.6 Socioeconomics

Land Use

The GEIS generically evaluates the impacts of nuclear power plant operations on land use both onsite and offsite of a power plant site. The analysis of land use impacts for this combination alternative focuses on the amount of land area that would be affected by the construction and operation of a single natural gas-fired unit power plant at PINGP 1 and 2 and an offsite wind and biomass energy generating power plant.

Land use impacts for the gas-fired component of this alternative would take place on the existing PINGP 1 and 2 site and will likely require no additional land. Most land on the PINGP 1 and 2 site has been previously disturbed. Construction impacts could be further reduced by reusing the cooling towers and other existing support facilities, like the switchyard. Therefore, land use impacts for the construction of the gas-fired portion of this alternative would be SMALL.

In addition to onsite land requirements for the gas-fired plant, land would be required offsite for natural gas wells and collection stations. The GEIS estimates that 3600 ac (1500 ha) would be required for wells, collection stations, and pipelines to bring the gas to a 1000-MWe generating facility. If this land requirement were scaled directly with generating capacity for this alternative, up to 1500 ac (600 ha) of land could be required. Most of this land requirement would occur on land where gas extraction already occurs. In addition, some natural gas could come from outside of the U.S. and be delivered as liquefied gas. Effects from gas extraction are generally small, as most land around a gas extraction site would remain undisturbed, except for roads and collection pipe network. Therefore, impacts to land use from offsite gas wells and collection stations would be SMALL.

The wind farm component of this combination alternative would produce 300 MWe of electricity and require approximately 64,000 ac (26,000 ha) spread over several locations. Turbine towers and infrastructure would only occupy roughly 5% of this area, while the remainder would be available for complementary land uses, like agriculture. The wood-fired biomass component would produce 100 MWe of electricity and require 190 ac (78 ha) for plant facilities, though wood fuel may be collected over a much larger area. Because the wood-fired portion of this alternative uses wood waste for fuel, the wood-fired plants should have little other effect on land use.

Regarding the conservation portion of this alternative, quickly replacing and disposing of old inefficient equipment could generate waste material and potentially increase the size of landfills. Roughly 4 to 5 years remain, respectively, before PINGP 1 and 2 licenses expire, thus some equipment may be replaced prior to the end of its expected life span in exchange for more efficient equipment, depending on how authorities ultimately structure a conservation program. Some programs may provide incentives for replacing less efficient equipment. In general, though, the cost of replacements and the average life of electrical equipment should allow for a somewhat gradual replacement process that favors replacement of older or shorter-lived equipment by more efficient equipment as it fails (especially in the case of frequently replaced items, like light bulbs). In addition, many items (like home appliances or industrial items) have substantial recycling value and would likely not be disposed of in landfills.

The elimination of uranium fuel for PINGP 1 and 2 could partially offset this alternative's offsite land requirements. In the GEIS, the NRC staff estimated that approximately 1000 ac (405 ha) would not be needed for mining and processing uranium during the operating life of a 1000-MWe nuclear power plant. For PINGP 1 and 2, roughly 1044 ac (423 ha) of uranium mining area would no longer be needed.

Overall impacts to land use from this combination alternative would be SMALL to LARGE, depending on the locations selected for wind farms and the location for offsite gas wells and collection stations. Some of these impacts could be reduced by locating the wind farms on previously disturbed areas, or locations that have existing land uses—like agriculture—that can coexist with wind farms. Land use impacts can also be minimized by using existing transmission lines.

Socioeconomics

As previously discussed, socioeconomic impacts are defined in terms of changes to the demographic and economic characteristics and social conditions of a region. For example, the number of jobs created by the construction and operation of a new single natural gas-fired power plant, wind farm, and wood-fired biomass generating plant could affect regional employment, income, and expenditures. Job creation is characterized in two ways: (1) construction-related jobs, which are transient, short in duration, and less likely to have a long-term socioeconomic impact; and (2) operation-related jobs in support of power plant operations, which have the greater potential for permanent, long-term socioeconomic impacts. Workforce requirements of power plant construction and operations for this combination alternative were determined in order to measure their possible effect on current socioeconomic conditions.

NSP projected a peak construction workforce of 237 workers for the gas-fired plant (NMC 2008). The GEIS projects a workforce of 1200 to 2500 for a 1000-MWe plant (when extrapolated, a workforce of approximately 500 for a 400-MWe plant). NRC staff will use the NSP estimate of 237 workers for reasons discussed in 8.1.

This alternative would lead to the shutdown of the PINGP 1 and 2. This shutdown would have an impact on socioeconomic conditions in the region. Plant shutdown would eliminate approximately 700 jobs and would reduce tax revenue in the region. The loss of these contributions, which may not occur until after decommissioning, could have a SMALL to MODERATE local impact. Appendix J to NUREG-0586, Supplement 1 (NRC 2002) discusses the potential socioeconomic impacts of plant decommissioning.

Additional estimated construction workforce requirements for this combination alternative would include 300 workers for the wind farm and 133 to 278 workers for the wood-fired biomass energy plant. The number of additional workers would cause a short-term increase in the demand for services and temporary (rental) housing in the region around the construction sites.

After construction of the wind farm and wood-fired plant, and depending on the size of the affected communities, some local communities may be temporarily affected by the loss of the construction jobs and associated loss in demand for business services. The local rental housing markets could also experience increased vacancies and decreased prices. The impact of construction from the wind farm and the wood-fired plant on socioeconomic conditions would be SMALL, given the relatively low levels of employment associated with the wind power and wood waste components of this alternative. Further, employment effects from the wind power portion of this alternative are likely to be spread over a larger area, as the wind farms may be constructed in more than one location.

Following construction, a single unit gas-fired combination alternative could provide up to 13 jobs, based on NSP estimates, or up to 63 jobs based on an extrapolated estimate from the GEIS. Additional estimated operations workforce requirements for this combination alternative would include 50 workers for the wind farm and 28 workers for the wood-fired biomass energy plant. Given the small numbers of operations workers at these facilities, socioeconomic impacts associated with the operation of the natural gas-fired power plant at PINGP 1 and 2, as well as the wind farm and wood-fired biomass energy plant, would be SMALL.

Socioeconomic effects of an energy efficiency program would be SMALL. As noted in the GEIS, the program would likely employ additional workers. Lower-income families could benefit from weatherization and insulation programs. This effect would be greater than the effect for the general population because low-income households experience home energy burdens more than four times larger than the average household (OMB 2007).

Overall, operational impacts to socioeconomics for this combination alternative would be SMALL, due to the small numbers of additional workers required to run the gas-fired, wind farm, and wood-fired portions of the alternative.

Transportation

Construction and operation of a natural gas-fired power plant, wind farm, and wood-fired biomass generating plant would increase the number of vehicles on roads in the vicinity of these facilities. During construction, cars and trucks would deliver workers, materials, and equipment to the worksites. The increase in vehicular traffic would peak during shift changes resulting in temporary levels of service impacts and delays at intersections. Transporting components of wind turbines could have a noticeable impact, but are likely to be spread over a large area. Pipeline construction and modification to existing natural gas pipeline systems could also have an impact. Any transportation effects from the energy conservation portion of this alternative would be widely distributed across the state, and would be SMALL to MODERATE.

During plant operations, transportation impacts would almost disappear, excepting transportation of wood waste to the wood-fired power plants. Given the small numbers of operations workers at these facilities, overall operational impacts on transportation associated with this combination alternative would be SMALL.

Aesthetics

As previously discussed, aesthetic resources are the natural and manmade features that give a particular landscape its character and aesthetic quality. The aesthetics impact analysis focuses on the degree of contrast between the components of this alternative and the surrounding landscape, as well as the aesthetic value of the surrounding landscape (e.g., areas near parks or recreation areas may be more sensitive).

A single natural gas-fired unit located at PINGP 1 and 2 could be approximately 100 ft (30 m) tall, with an exhaust stack of at least 175 ft (53 m) tall. The impact would be moderated as higher elevations and vegetation along the Mississippi River valley could make it difficult to see or hear the power plant outside of the river valley. Power plant infrastructure would generally be smaller and less noticeable than PINGP 1 and 2 containment structures. The mechanical draft cooling tower or towers – much smaller than the existing onsite towers – would generate condensate plumes and operational noise. Noise during power plant operations would be limited to industrial processes and communications. In addition to the power plant structures, construction of natural gas pipelines would have a short-term impact. Noise from the pipelines could be audible offsite near compressors.

The wind farm would have a greater aesthetic effect than the other elements of this combination alternative. Compared to a single power plant unit on 46 to 190 ac (19 to 77 ha), 500 turbines 300 ft (100 m) in height spread over 64,000 ac (26,000 ha) acres could have significant impacts and, in the absence of larger topographic features, would be the major focus of viewer attention as the most readily-visible structures around. In some areas where aesthetics are an important value, this may be objectionable.

Impacts from the energy conservation efficiency programs portion of this alternative would be SMALL. Because one of the PINGP 1 and 2 units would continue to operate, NSP would continue to use the existing onsite transmission lines, which would also support the onsite gas-fired plant. Traffic to the existing PINGP 1 and 2 would decrease as would noise and emissions. Some noise impacts could occur in instances of energy efficiency upgrades to major building systems, though this impact would be intermittent and short-lived, and would be scattered across many sites.

Most of the aesthetic impacts of this alternative would be a result of the wind farm. Overall the aesthetic impacts associated with this combination alternative would be categorized as MODERATE to LARGE if the wind farm is built at a site where aesthetics are an important element of the natural environment, and SMALL to MODERATE at other locations.

<u>Historic and Archaeological Resources</u>

Historic property as defined in 36 CFR Part 800 is described above in Section 8.1.7.

Chapter 2 of this draft SEIS discusses the affected environment in terms of cultural and archeological resources in the vicinity of the PINGP 1 and 2 site. Impacts to historic and archeological resources from a single unit gas-fired plant located on the PINGP 1 and 2 site could be MODERATE; however, these impacts could be mitigated if the utility commitments discussed in Chapter 4 of this draft SEIS are implemented for the gas-fired plant as well. Regarding the wind farm portion of this alternative, impacts to cultural and archeological resources could be significant; however, selecting a site where survey results indicate low sensitivity or where land has already been disturbed would minimize the overall impacts. Impacts to cultural and archeological resources from the conservation portion of this alternative would be minimal.

Overall, the impacts to historic and archeological resources could range from SMALL to MODERATE due mostly to uncertainty regarding the location of the wind farm, the effect on archeological resources at that site and whether the provisions discussed in 8.1.7 are used to determine the location of the offsite wind farm.

The following information is provided by the Prairie Island Indian Community.

> Depending on the location and timing of this alternative, there could possibly be impacts to archaeological sites within the boundaries of the PINGP. For instance, if this alternative was implemented before the PINGP was decommissioned, there may be impacts to archaeological sites, as the facility would require approximately 16 acres of land that has not been previously developed. It is presumed that the existing PINGP infrastructure (parking lots, buildings, etc.) would be needed until the PINGP was fully decommissioned. Therefore, this alternative would need land that had not been previously disturbed and likely to contain archaeological resources.

> This alternative would have less or no impact on archaeological sites if it were to be developed after PINGP decommissioning, as the entire former site could be utilized. The NRC would have to ensure that archaeological sites are not impacted during decommissioning. As well, the developer of the gas-fired alternative would have to ensure that all archaeological sites were protected during construction.

Environmental Justice

Section 4.9.7 of this draft SEIS addresses the purpose and content of an environmental justice impact analysis. In this section, the NRC staff evaluates the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from the construction and operation of a combination alternative.

Minority and low-income populations could be affected by the construction and operation of a new natural gas-fired power plant, wind farm, and wood-fired biomass generating plant. Some of these effects have been identified in resource areas discussed earlier in this section. The extent of disproportionate effects is difficult to determine since it would depend on the location of the wind farm and wood-fired portions of this alternative. The PIIC, because it is located next to the PINGP 1 and 2 site, would be disproportionately affected from the gas-fired portion of this alternative because the location will be on the PINGP 1 and 2 site. Increased demand for rental housing during construction could disproportionately affect low-income populations. However, demand for rental housing could be mitigated if the gas-fired plant, wind farm, and wood-fired plants are constructed near a metropolitan area.

Weatherization programs could target low-income residents as a cost-effective energy efficiency option since low-income populations tend to spend a larger proportion of their incomes paying utility bills and also tend to live in structures that are less well insulated or have less-efficient appliances. According to the Office of Management and Budget, low income populations experience energy burdens more than four times as large as those of average households (OMB 2007). Impacts to minority and low-income populations from energy conservation efficiency programs portion of this alternative would be SMALL, though actual levels would depend on program design and enrollment.

Overall disproportionate and adverse impacts on minority and low-income populations from this combination alternative could range from SMALL to MODERATE depending on location of the off-site wind farm and wood-fired plants. Disproportionate effects such as increased demand for rental housing, are likely to be SMALL. The offsite wind farm and wood-fired plant could have MODERATE environmental justice impacts depending on location of the wind farm and wood-fired plants.

The following information is provided by the Prairie Island Indian Community.

> If the 400 MWe gas-fired plant were implemented within the boundaries of the PINGP, the Prairie Island Indian Community would be disproportionately affected. The Tribe believes that implementing the 400 MWe gas-fired plant will have a SMALL to MODERATE impact on air quality. In addition, these SMALL to MODERATE air quality impacts would also have a SMALL to MODERATE impact on the health of tribal members, particularly the children and elders, who would reside next to the 400 MWe gas-fired plant. As discussed in Section 8.1.7, the winds do not always blow from the west to the east (i.e., away from the community); often the prevailing winds are out of the S, SE, SW, or E. In addition, because of our location within the floodplain of the Mississippi River valley, there are days when we experience air inversions. The result of these air

inversions is that particulate matter is trapped closer to the ground, and therefore not dispersed in the atmosphere.

There would be also be an increase in the number of vehicles driving through the community, as part of constructing the 400 MWe gas-fired plant and, possibly, decommissioning the PINGP. This also has air quality implications, additional traffic burdens for tribal members, employees and guests at the Treasure Island Resort and Casino, and noise impacts

Like Alternative 1 (the gas-fired plant), if this alternative were implemented, the PINGP would be decommissioned and the Independent Spent Fuel Storage Installation (ISFSI) would still be operational. Depending on when the PINGP shut-down, there could be between 68 and 98 dry casks, stranded indefinitely on Prairie Island. The 2003 Settlement agreement between the tribe and NSPM, related to the dry cask storage, would still be in effect.

8.2.7 Waste Management

Spent selective catalytic reduction catalysts, which are used to control NO_x emissions from the natural gas-fired plants, would be the primary waste component from the natural gas-fired alternative.

Land clearing and other construction activities, associated with the construction of the gas-fired plant, would generate waste that can be recycled, disposed onsite, or shipped to an offsite waste disposal facility. If the alternative were constructed at the PINGP 1 and 2 site or any previously disturbed site, the amounts of wastes produced during land clearing would be reduced.

An increase in wastes would be experienced during installation or implementation of conservation measures such as appropriate disposal of old appliances, installation of control devices, and building modifications. Implementation of recycling programs would help to minimize the amount of generated waste.

As stated in the GEIS, the wood-fired component of this alternative would produce considerable amount of fly ash, which could be recycled for use as a beneficial fertilizer and soil conditioner.

The NRC staff concludes that overall waste impacts from this combination alternative are SMALL.

8.3 Combination Alternative 2

In this section, the NRC staff evaluates the environmental impacts that may occur from a combination of alternatives that includes continued operation of one PINGP 1 and 2 unit (either Unit 1 or Unit 2), 300 MWe of wind capacity, and 250 MWe of capacity offset by conservation.

Impacts from wind and conservation portions of this alternative are the same as those addressed in Section 8.2 for Combination Alternative 1. Impacts from continued operation of one PINGP 1 and 2 unit will be similar to – though for some resource areas it may be less than – continued operation of PINGP 1 and 2.

Table 8-3. Summary of Environmental Impacts of Combination Alternative 2 Compared to Continued PINGP 1 and 2 Operation

	Combination Alternative 2	Continued PINGP 1 and 2 Operation
Air Quality	SMALL	SMALL
Groundwater	SMALL	SMALL
Surface Water	SMALL	SMALL
Ecology	SMALL	SMALL
Human Health	SMALL	SMALL
Socioeconomics	SMALL to LARGE	SMALL TO MODERATE
Waste Management	SMALL	SMALL

8.3.1 Air Quality

The nuclear component of this combination alternative would have very limited effects on air quality and would produce less pollution than the natural gas-fired alternative or Combination Alternative 1. The major source of air pollution during continued operation of one PINGP 1 and 2 unit would be testing and usage of the diesel generators, which run a permitted amount of time, ranging from several hours to several days per year.

The energy conservation component of the alternative reduces direct fuel use and causes reduction in environmental emissions from workers' vehicle exhaust, plant fuel cycles, and operation and maintenance of the plant. Improvements in efficiency may also reduce consumption fuels that are used for space and water heating purposes.

Exhaust emissions resulting from workers' vehicles and motorized construction equipment in conjunction with construction of wind capacity would be temporary. Implementation of dust control practices would minimize air quality impacts. Once constructed, no emissions would result from operation of the wind power units.

The NRC staff concludes that this combination alternative would have a SMALL overall impact on air quality.

8.3.2 Groundwater Use and Quality

Impacts on groundwater use and quality of the continued operation of one PINGP 1 and 2 unit onsite would remain SMALL. The total use of groundwater from the onsite wells would be less than the current annual use of approximately 115 gpm. The effects on groundwater quality would also be SMALL because waste management and discharge procedures would be maintained as at present.

8.3.3 Surface Water Use and Quality

Operation of one PINGP 1 and 2 unit instead of two will reduce the consumptive use of surface water by approximately half. The impact of this reduced use of surface water would remain SMALL because the consumptive use would be negligible compared to flow in the Mississippi River near the PINGP 1 and 2 site, as it is with both units operating.

8.3.4 Aquatic and Terrestrial Ecology

Impacts to aquatic ecology will be minimal, as the consumptive water use of a single PINGP 1 and 2 unit would be less than the consumptive water use of a two-unit nuclear plant. Impacts of an offsite wind facilities on aquatic resources would depend on location and the ecology of the site, but would likely be minimal. Construction in a previously disturbed area would have less impacts to the aquatic resources than construction in an undisturbed area. Energy conservation would also result in less water withdrawal and discharge corresponding to a decreased demand for power generation. Overall, the impacts to aquatic resources from this combination of alternatives would be SMALL.

The continued operation of one PINGP 1 and 2 unit would result in no additional impacts to terrestrial resources than those discussed in Chapter 4 of this draft SEIS, as no additional land disturbances onsite or offsite would occur. The Unit 2 steam generator replacement project may not be necessary under this alternative; therefore, no temporary construction or ground-disturbing activities would occur onsite. Maintenance of transmission line ROWs would continue. No additional impacts to terrestrial resources are expected as a result of shutdown of one of the two units.

The offsite windpower installation component of this alternative will require approximately 64,000 ac (25,900 ha) of land, of which approximately 250 ac (101 ha) would be used. Construction disturbances associated with the windpower installation may significantly impact terrestrial ecology, and some erosion and sedimentation may result due to the location of windpower installations in mountainous, plains, or higher elevation areas where wind velocities are highest. However, because the windpower installations would be dispersed among a total area of approximately 64,000 ac (25,900 ha), and the potential exists to spread the installations among several locations, wildlife corridors resulting from construction and undisturbed buffer zones would continue to provide habitat for terrestrial species. No air pollutant deposition would result from this component of the alternative.

Impacts to terrestrial resources from this combination of alternatives at both the PINGP 1 and 2 site and offsite locations are expected to be SMALL.

8.3.5 Human Health

EPA establishes NAAQS for six criteria pollutants (40 CFR Part 50) under the CAA. The CAA recognizes two types of national air quality standards for particle pollution: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

The NRC established human health impacts for operating nuclear power reactors in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, which would apply to the continued operation of one PINGP 1 and 2 unit.

No human health impacts would be caused by operation of wind power units. The increase in air emissions during the construction stage would be temporary in nature and could be minimized by use of appropriate air pollution reduction management practices.

An energy efficiency program is unlikely to have a significant effect on human health. Changes to most building appliances would not affect health, though upgrades to HVAC systems, insulation, and weatherization (including windows) may affect indoor air quality. The GEIS noted that this issue has not been sufficiently studied, but that mitigation measures would be available to correct problems. The GEIS also noted that hazardous chemicals in the waste stream would not affect human health. Accordingly, the NRC staff determined that these effects would be SMALL.

The implementation of the conservation portion of this alternative would have a minimal impact on the human health. Implementation of energy conservation measures such as sealing drafts and windows to be more air tight could cause an increase in radon, which can cause lung cancer. However, installation of more efficient ventilation systems, sealing cracks in basements, and other mitigative measures can reduce the concentration of radon in homes. The NRC staff concludes that the human health risks to members of the public from the conservation portion of this alternative would be SMALL.

The overall human health impacts from the combination 2 alternative would be SMALL.

8.3.6 Socioeconomics

Land Use

The GEIS generically evaluates the impacts of nuclear power plant operations on land use both onsite and offsite of a power plant site. The analysis of land use impacts for this combination alternative focuses on the amount of land area that would be affected by the construction and operation of an offsite wind farm, which would be similar to the discussion on land use impacts in section 8.2.7 of this draft SEIS.

The wind farm component of this combination alternative would produce 300 MWe of electricity and require approximately 64,000 ac (26,000 ha) spread over several locations. Turbine tower footings and infrastructure would only occupy roughly 5% of this area, while the remainder would be available for complementary land uses, like agriculture. The elimination of uranium fuel for one of the two PINGP 1 and 2 units could partially offset offsite land requirements. In the GEIS, the NRC staff estimated that approximately 1,000 ac (405 ha) would not be needed for mining and processing uranium during the operating life of a 1000-MWe nuclear power plant. For operating only one unit at PINGP 1 and 2, roughly 552 ac (223 ha) of uranium mining area would no longer be needed. Overall land use impacts from this combination alternative would be SMALL to MODERATE, depending on local land use and the availability of land near the proposed sites.

Regarding the conservation portion of this alternative, quickly replacing and disposing of old inefficient appliances could generate waste material and potentially increase the size of landfills. Roughly 4 to 5 years remain, respectively, before PINGP 1 and 2 licenses expire, thus some equipment may be replaced prior to the end of its expected life span in exchange for more efficient equipment, depending on how authorities ultimately structure a conservation program. Some programs may provide incentives for replacing less efficient equipment. In general, though, the cost of replacements and the average life of electrical equipment should allow for a somewhat gradual replacement process that favors replacement of older or shorter-lived equipment by more efficient equipment as it fails (especially in the case of frequently replaced items, like light bulbs). In addition, many items (like home appliances or industrial equipment) have substantial recycling value and would likely not be disposed of in landfills.

Impacts from continued operation of one PINGP 1 and 2 unit would remain a SMALL impact on land use as concluded in Chapter 4.9 of this draft SEIS. Overall impacts to land use from this combination alternative would be SMALL to LARGE depending on the location of the wind farm portion of this alternative. Some of these impacts could be reduced by locating the wind farms on previously disturbed areas, or locations that have existing land uses—like agriculture—that can coexist with wind farms. Land use impacts can also be minimized by using existing transmission lines.

Socioeconomics

As previously discussed, socioeconomic impacts are defined in terms of changes to the demographic and economic characteristics and social conditions of a region. For example, the number of jobs created by the construction and operation of a wind farm could affect regional employment, income, and expenditures. Job creation is characterized in two ways: (1) construction-related jobs, which are transient, short in duration, and less likely to have a long-term socioeconomic impact; and (2) operation-related jobs in support of power plant operations, which have the greater potential for permanent, long-term socioeconomic impacts. Workforce requirements of power plant construction and operations for this combination alternative were determined in order to measure their possible effect on current socioeconomic conditions.

Plant shutdown of one of the two PINGP 1 and 2 units would have an impact on socioeconomic conditions in the region. Plant shutdown would eliminate approximately 342 jobs and would reduce tax revenue in the region. The loss of these contributions, which may not entirely cease until after decommissioning, could have a SMALL to MODERATE impact in reductions of tax revenues. Appendix J to NUREG-0586, Supplement 1 (NRC 2002) discusses of the potential socioeconomic impacts of plant decommissioning.

Estimated construction workforce requirements for this combination alternative would include 300 workers for the wind power unit. The number of additional workers would cause a short-term increase in the demand for services and temporary (rental) housing in the region around the construction sites.

After construction, and depending on the size of the community, some local communities may be temporarily affected by the loss of the construction jobs and associated loss in demand for business services. The rental housing market could also experience increased vacancies and decreased prices. The impact of construction on socioeconomic conditions would be SMALL.

Estimated operations workforce requirements for this combination alternative would include 50 workers for the wind power unit. Given the small numbers of operations workers at these facilities, socioeconomic impacts associated with the operation of the wind farm would be SMALL.

Socioeconomic effects of the energy conservation efficiency program portion of this alternative would be SMALL. As noted in the GEIS, the program would likely employ additional workers. Lower-income families could benefit from weatherization and insulation programs. This effect would be greater than the effect for the general population because low-income households experience home energy burdens more than four times larger than the average household (OMB 2007).

Overall, impacts to socioeconomics for this combination alternative would be SMALL, due to the relatively small numbers to additional workers required to run the one remaining nuclear reactor and wind portions of the alternative.

Transportation

Traffic volumes on the roads in the vicinity of PINGP 1 and 2 would be reduced after one of the two units terminated operations. Most of the reduction in traffic volume would be associated with the loss of jobs at the plant. Deliveries to the plant would be reduced until decommissioning. Transportation impacts associated with the shutdown of one reactor portion of this alternative would be SMALL.

Construction and operation of a wind farm would increase the number of vehicles on roads in the vicinity of the facility. During construction, cars and trucks would deliver workers, materials, and equipment to the worksite. The increase in vehicular traffic would peak during shift changes resulting in temporary levels of service impacts and delays at intersections. Transporting components of wind turbines could have a noticeable impact, but are likely to be spread over a large area. Any transportation effects from the energy conservation portion of this alternative would be widely distributed across the state, and would be SMALL to MODERATE.

During plant operations, transportation impacts would almost disappear. Given the small numbers of operations workers at the wind farm, overall impacts on transportation associated with this combination alternative would be SMALL.

Aesthetics

As previously discussed, aesthetic resources are the natural and manmade features that give a particular landscape its character and aesthetic quality. The aesthetics impact analysis focuses on the degree of contrast between the power generating plant and the surrounding landscape and the visibility of the power plant.

Plant structures and other facilities would remain in place until decommissioning. Noise caused by plant operation would be reduced. Aesthetic impacts of reactor shutdown of one of the two units at PINGP 1 and 2 would be SMALL.

The wind farm would have a greater aesthetic effect than the other elements of this combination alternative. Compared to a single power plant unit on 46 to 190 ac (19 to 77 ha), 500 turbines 300 ft (100 m) in height spread over 64,000 ac (26,000 ha) acres could have significant impacts and, in the absence of larger topographic features, would be the major focus of viewer attention as the most readily-visible structures around. In some areas where aesthetics are an important value, this may be objectionable.

Impacts from the energy conservation efficiency programs portion of this alternative would be SMALL. NSP would continue to use the existing transmission lines. Traffic to the plant would decrease, however, as would noise and emissions. Some noise impacts could occur in instances of energy efficiency upgrades to major building systems, though this impact would be intermittent and short-lived.

Most of the aesthetic impacts of this alternative would be a result of the wind farm. Overall the aesthetic impacts associated with this combination alternative would be categorized as MODERATE to LARGE if the wind farm is built at a site where aesthetics are an important element of the natural environment, and SMALL to MODERATE at other locations.

Historic and Archaeological Resources

Historic property as defined in 36 CFR Part 800 is described above in Section 8.1.7.

Chapter 2 of this draft SEIS discusses the affected environment in terms of cultural and archeological resources in the vicinity of the PINGP 1 and 2 site. Impacts to historic and archeological resources from operation of one unit at the PINGP 1 and 2 site could be MODERATE; however, these impacts could be mitigated if the utility commitments discussed in Chapter 4 of this draft SEIS are implemented for continued operation of one unit. Regarding the wind farm portion of this alternative, impacts to cultural and archeological resources could be significant; however, selecting a site where survey results indicate low sensitivity or where land has already been disturbed would minimize the overall impacts. Impacts to cultural and archeological resources from the conservation portion of this alternative would be minimal.

Overall, the impacts to historic and archeological resources would be SMALL to MODERATE due to the relatively small amount of land required for the use of one nuclear reactor portion of this alternative, and if the provisions discussed in 8.1.7 are used for the location of the offsite wind farm.

Environmental Justice

Section 4.9.7 of this draft SEIS addresses the purpose and content of an environmental justice impact analysis. In this section, the NRC staff evaluates the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from the construction and operation of this combination alternative.

Impacts associated with the reactor shutdown of one PINGP 1 and 2 unit portion of this alternative would disproportionately affect the Prairie Island Indian Community (PIIC), due to the proximity of the PIIC and the PINGP 1 and 2 site. Appendix J of NUREG-0586, Supplement 1 (NRC 2002) provides additional discussion of these impacts.

Minority and low-income populations could be affected by the construction and operation of wind power units. Some of these effects have been identified in resource areas discussed in this section. For example, increased demand for rental housing during construction could disproportionately affect low-income populations.

Weatherization programs could target low-income residents as a cost-effective energy efficiency option since low-income populations tend to spend a larger proportion of their incomes paying utility bills. According to the Office of Management and Budget, low income populations experience energy burdens more than four times as large as those of average households (OMB 2007). Impacts to minority and low-income populations from energy conservation efficiency programs portion of this alternative would be SMALL, depending on program design and enrollment.

Overall impacts on minority and low-income populations from this combination alternative could range from SMALL to MODERATE. Because reactor shutdown of one PINGP 1 and 2 unit would only require a small number of workers after the initial shutdown and the reduced number of employees required for two reactors at the PINGP 1 and 2 site, disproportionate effects such as increased demand for rental housing, are likely to be SMALL. The offsite wind farm could have MODERATE environmental justice impacts; however these effects could be reduced if the plant was located near a metropolitan area or on a previously disturbed site.

The following information is provided by the Prairie Island Indian Community.

> Implementing this alternative would disproportionately impact the PIIC, as one of the two reactors would continue to operate for an additional twenty years.
>
> No other community is as close to the PINGP as the Prairie Island Indian Community. No other community is impacted, in as many ways, as the Prairie Island Indian Community. Furthermore, these impacts will have a cumulative environmental justice impact on our community.
>
> No other minority community or federally recognized Indian tribe is impacted the way the Prairie Island Indian Community is..
>
> Even though only one PINGP unit would be operating, spent fuel will still accumulate at the ISFSI. No other community (within a 50 mile radius) is so close to a nuclear power plant and a nuclear waste storage facility.
>
> No other community would be subjected to chronic radiological releases from one unit of the PINGP and gamma radiation from the ISFSI. For many of our members, their exposure to low levels of radiation is for their entire lifetime.

> One unit of the PINGP would continue to transmit electricity via the high-voltage power lines located immediately next to several of our homes.
>
> One unit of the PINGP would continue to release tritium, which leaches into groundwater on the tribe's land.
>
> Our youth are worrying about the effects of an accident on their community and their futures. Even if one unit were operating, there is still the possibility of an accident.
>
> An accident at one unit could still devastate our community. The consequences would be the same—our homeland would be gone, our culture would be decimated, our means of providing services to tribal members would be gone, and our tribal members' primary income would be gone. No other community faces this undesirable prospect.
>
> No other community (within the 50 mile radius) has the emergency planning concerns the tribe does (i.e., only one access road). Operating with one unit would not alleviate emergency preparedness concerns.
>
> No other community participates in state or federal proceedings (using its own resources) to the extent that the Prairie Island Indian Community does. Even with one unit operating, the tribe would still need to participate in state and federal proceedings.
>
> We believe that all things are related and that you cannot affect one thing without affecting another. Taken together, we believe that the operation of even one unit of the PINGP will have an integrated and cumulative negative impact on our community that will continue impact our community well after the twenty-year extended operating period.

8.3.7 Waste Management

The waste impacts associated with the continued operation of one PINGP 1 and 2 unit are outlined in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B. Wastes related to refurbishment and routine maintenance projects would be disposed in a permitted manner, either onsite or offsite at an authorized disposal facility.

The quantity of wastes generated during installation or implementation of conservation measures, which would depend on a number of factors, including appropriate disposal of old appliances, installation of control devises, and building modifications, would increase, but implementation of recycling programs could help minimize the amount of generated waste.

There would be minimal waste associated with the routine maintenance of the wind generating units.

The NRC staff concludes that waste impacts from this combination alternative would be SMALL.

8.4 Purchased Power

In the ER (NMC 2008), NSP indicated that purchased power would likely come from a variety of sources, most of which have already been considered in this section, though it could also include older, coal-fired power plants. Further, NSP indicated that relying on purchased power to replace PINGP 1 and 2 would likely result in construction of new facilities elsewhere in the region, given existing regional supply and demand, and would also require the construction of additional 500-kilovolt (kV) or 345-kV transmission lines. In other words, purchased power may incur similar construction-related impacts to the alternatives already considered, while requiring additional impacts for new transmission projects. In the ER, NSP assumed that 100 mi (160 km) of new transmission line in a new corridor 150 ft (46 m) wide may be necessary. The NRC staff notes that purchased power could serve as an alternative to license renewal, but the impacts would likely be larger than those for the alternatives already considered in this draft SEIS because substantial new transmission lines would likely be necessary. As a result, the NRC staff has not separately evaluated purchased power as an alternative to license renewal.

8.5 Alternatives Considered but Dismissed

In this section, we discuss the energy alternatives that we initially considered, but that we determined either would not individually meet the purpose and need identified in the GEIS or whose costs preclude consideration in greater depth. As you'll note, we considered several of these alternatives in the combination alternatives in Sections 8.2 and 8.3.

8.5.1 Wind Power

The American Wind Energy Association indicates that Minnesota currently ranks 4th among the states in installed wind power capacity with 1752 MWe wind-powered electricity (AWEA Undated). Resource evaluations by Minnesota's Department of Commerce indicate that wind project in most of western and southern Minnesota can operate at capacity factors from 36 to *nearly 45 percent (MNDOC 2006a). Roughly one-third of the state has wind resources in power* classes 4 through 7 (MNDOC 2006b). Generally, wind power classes 4 and above are considered adequate for wind power production. Further, Xcel Energy indicated in its 2007 Minnesota Resource Plan (Xcel 2007xx) that it would need to add 2600 MW of wind capacity by 2020 to comply with Minnesota's Renewable Energy Standard (RES).

Despite Minnesota's excellent wind power potential and Xcel's potentially large capacity additions, windpower is not yet suitable for stand-alone large baseload capacity. When paired with energy storage or a readily dispatchable power source like hydropower, wind could serve as a means of providing baseload power. While Xcel Energy indicates that is about to begin testing of a large-scale battery backup for wind power (Xcel 2008), the potential for large-scale implementation of battery backup is not yet clear. In addition, hydropower resources in Minnesota (addressed in 8.4.5) are too small to provide backup for a wind power alternative. Further, Xcel Energy staff indicated at the NRC site audit that it is not currently possible to expand hydropower purchases from Manitoba Hydro.

Given wind power's intermittency and the lack of available backup, NRC staff will not consider wind power as a stand-alone alternative to license renewal. However, given Minnesota's significant wind resource and Xcel's large potential capacity additions, the NRC staff will consider wind power as a portion of a combination alternative.

8.5.2 Wood Waste

In 1999, DOE researchers estimated that Minnesota has biomass fuel resources consisting of urban, mill, agricultural, and forest residues, as well as speculative potential for energy crops. Excluding potential energy crops, DOE researchers projected that Minnesota had 15,464,325 tons (14,028,999 MT) of plant-based biomass available at $50 per ton delivered (Walsh et al. 2000; costs are in 1995 dollars). The Bioenergy Feedstock Development Program at Oak Ridge National Laboratory estimated that each air-dry pound of wood residue produces approximately 6400 Btu of heat (ORNL 2007). Assuming a 33 percent conversion efficiency, using all plant-based biomass available in Minnesota at $50 per ton (the maximum price the researchers considered) would generate roughly 29 terawatt hours of electricity. This is roughly three and a half times the electricity PINGP 1 and 2 generated in 2006. However, most of this potential comes from agricultural residues. Excluding agricultural residues (many of which are traditionally left on fields following harvest and provide fertilization for the following years crops), the total potential is 6.6 terawatt-hours.

Walsh et al. (2000) go on to note that these estimates of biomass capacity contain substantial uncertainty and that potential availability does not mean biomass will actually be available at the prices indicated or that resources will be usably free of contamination. Some of these plant wastes already have reuse value and would likely be more costly to deliver because of competition. Others, such as forest residues, may prove unsafe and unsustainable to harvest on a regular basis.

As a result of limited resource availability, NRC staff will not consider wood waste as a stand-along alternative to license renewal. NRC staff will, however, consider wood waste a portion of a combination alternative.

8.5.3 Energy Conservation

The Minnesota Next Generation Energy Act of 2007 set energy reduction goal of 1.5 percent of annual retail sales per year for each utility in the state (Chapter 136-S.F.No. 145). By the time the current license for PINGP 1 and 2, Unit 2, expires, the reduction goal would have all utilities in the state reduce sales by approximately 10 percent. In 2006, total retail sales of electricity were roughly 67 terawatt-hours of electricity (EIA 2007b), while PINGP 1 and 2 produced approximately 8.1 terrawatt-hours of electricity in the same year (NMC 2008). PINGP 1 and 2's generation accounted for roughly 12 percent of electricity sold in the state of Minnesota. The conservation goals of Minnesota statute, then, appear unable to replace the power generated by PINGP 1 and 2.

The NRC staff had difficulty identifying further studies on conservation of energy efficiency potential in Minnesota. Given the size of the state's goal and apparent lack of other estimates of conservation potential in the state, the NRC staff will not evaluate conservation as a stand-along alternative. The NRC staff will, however, consider it as a portion of a combination alternative, given its potential for low environmental impacts.

8.5.4 Solar Power

Solar technologies use the sun's energy to produce electricity. Minnesota receives between 4 and 5 kWh per square meter per day, or approximately 0.4 to 0.5 kWh of solar radiation per square foot per day, for solar collectors oriented at an angle equal to the installation's latitude (NREL 2009). At this level of incident solar radiation, photovoltaics are likely to be more effective than solar thermal power plants. Because flat-plate photovoltaics tend to be roughly 25 percent efficient, a solar-powered alternative would require 4390 to 5480 ac (1780 to 2220 ha) of collectors to provide an amount of electricity equivalent to that generated by PINGP 1 and 2. Space between collectors and associated infrastructure increase this land requirement. This amount of land, while large, is consistent with the land required for coal and natural gas fuel cycles.

In the GEIS, the NRC staff noted that, by its nature, solar power is intermittent (i.e., it does not work at night and cannot serve baseload), and the efficiency of collectors varies greatly with weather conditions. A solar-powered alternative will require energy storage or a backup power supply to provide electric power at night. As noted in the wind energy section, 8.4.1, energy storage technologies are in early stages of development and not yet large enough to backup enough capacity to replace PINGP 1 and 2.

Given the challenges in meeting baseload requirements, the NRC staff did not evaluate solar power as an alternative to license renewal of PINGP 1 and 2.

8.5.5 Hydroelectric Power

According to researchers at Idaho National Energy and Environmental Laboratory, Minnesota has an estimated 225.9 MWe of technically available, undeveloped hydroelectric resources at 40 project sites throughout the state (INEEL 1996). This amount occurs almost entirely in small installations, with only one site capable of generating more than 15 MWe.

The NRC staff notes that the total available hydroelectric potential is much smaller than the capacity of PINGP 1 and 2, and will not consider hydroelectric power as an alternative to license renewal.

8.5.6 Geothermal Power

Geothermal energy has an average capacity factor of 90 percent and can be used for baseload power where available. However, geothermal electric generation is limited by the geographical availability of geothermal resources (NRC 1996). As illustrated by Figure 8.4 in the GEIS, no feasible location for geothermal capacity exists to serve as an alternative to PINGP 1 and 2. The NRC staff concluded that geothermal energy is not a reasonable alternative to license renewal of PINGP 1 and 2.

8.5.7 Biofuels

In addition to wood and municipal solid-waste fuels, there are other concepts for biomass-fired electric generators, including direct burning of energy crops (crops grown specifically as fuel or feedstock for fuel), conversion to liquid biofuels, and biomass gasification. In the GEIS, the NRC staff indicated that none of these technologies had progressed to the point of being competitive on a large scale or of being reliable enough to replace a baseload plant such as PINGP 1 and 2. After reevaluating current technologies, the NRC staff finds that other biomass-fired alternatives are still unable to reliably serve as an alternative to the continued operation of PINGP 1 and 2 and does not consider biofuels to be a viable alternative to PINGP 1 and 2 license renewal.

8.5.8 New Nuclear Power

Sources in the nuclear industry have recently indicated that reactor projects currently under development are likely eight or nine years from completion, or possibly online in the 2016-2017 timeframe (Nucleonics Week 2008). This is two to three years after the expiration of the license for PINGP 1 and 2, Unit 2, and three to four years after the expiration of the license for PINGP 1 and 2, Unit 1. Further, potential plant owners or operators wishing to submit a new proposal specifically to offset the capacity of PINGP 1 and 2 would require additional time to develop an application. Given the relatively short time remaining on the current PINGP 1 and 2 operating licenses compared to the time to license and construct a new nuclear power plant, the NRC staff has not evaluated new nuclear generation as an alternative to license renewal.

8.5.9 Coal-fired Power

Minnesota's Next Generation Energy Act explicitly caps utility-sector emissions of carbon dioxide and places a moratorium on constructing "new large energy facilities" as of August 1, 2009 (Chapter 136-S.F.No. 145). While the definition of "new large energy facility" excludes gas-fired and other turbine or combined-cycle plants, it includes coal-fired facilities. The law also prevents Minnesota utilities from purchasing power from new coal-fired power plants located outside of Minnesota. Given legal restrictions on the construction of new coal-fired power plants in the state and the purchase of power from outside the state, the NRC staff will not consider coal-fired power as an alternative to PINGP 1 and 2 license renewal.

8.5.10 Oil-fired Power

EIA's 2008 *Annual Energy Outlook*, in contrast to past years' projections, no longer indicates that oil-fired power will account for any additions to capacity in the U.S. (EIA 2008a). The variable costs of oil-fired generation tend to be greater than those of the nuclear or coal-fired options, and oil-fired generation tends to have greater environmental impacts than natural gas-fired generation. The high cost of oil (even prior to the record-high prices of 2008) has prompted a steady decline in its use for electricity generation. Thus the NRC staff did not consider oil-fired generation as an alternative to PINGP 1 and 2 license renewal.

8.5.11 Fuel Cells

Fuel cells oxidize fuels without combustion and related environmental side effects. Power is produced electrochemically by passing a hydrogen-rich fuel over an anode and air (or oxygen) over a cathode and separating the two by an electrolyte. The only byproducts (depending on fuel characteristics) are heat, water, and CO_2. Hydrogen fuel can come from a variety of hydrocarbon resources by subjecting them to steam under pressure. Natural gas is typically used as the source of hydrogen.

At the present time, fuel cells are not economically or technologically competitive with other alternatives for baseload electricity generation. EIA projects that fuel cells may cost $5,374 per installed kW (total overnight costs), or 3.5 times the construction cost of new coal-fired capacity and 7.5 times the cost of new, advanced gas-fired, combined-cycle capacity (EIA 2008b). In addition, fuel cell units are likely to be small in size (the EIA reference plant is 10 MWe). While it may be possible to use a distributed array of fuel cells to provide an alternative to PINGP 1 and 2, it would be extremely costly to do so. Accordingly, the NRC staff does not consider fuel cells as an alternative to PINGP 1 and 2 license renewal.

8.5.12 Municipal Solid Waste

Municipal solid waste combustors incinerate waste to produce steam, hot water, or electricity. Combustors use three types of technologies—mass burn, modular, and refuse-derived fuel.

Mass burning is currently the method used most frequently in the U.S. and involves little to no sorting, shredding, or separation. Consequently, toxic or hazardous components present in the waste stream are combusted, and toxic constituents are exhausted to the air or become part of the resulting solid wastes. Currently, approximately 89 waste-to-energy plants operate in the U.S. These plants generate approximately 2700 MWe, or an average of approximately 30 MWe per plant (IWSA 2007). Approximately 35 average-sized plants will be necessary to provide the same level of output as the other alternatives to PINGP 1 and 2 license renewal.

The GEIS indicates that the overall level of construction impact from a waste-fired plant will be similar to that for a coal-fired power plant. The GEIS also indicates that waste-fired plants have the same or greater operational impacts than coal-fired technologies (including impacts on the aquatic environment, air, and waste disposal). The initial capital costs for municipal solid-waste plants are greater than for comparable steam-turbine technology at coal-fired facilities or at wood-waste facilities because of the need for specialized waste separation and handling equipment (NRC 1996).

Regulatory structures that once supported municipal solid waste incineration no longer exist. For example, the Tax Reform Act of 1986 made capital-intensive projects such as municipal waste combustion facilities more expensive relative to less capital-intensive waste disposal alternatives such as landfills. Also, the 1994 Supreme Court decision C&A Carbone, Inc. v. Town of Clarkstown, New York, struck down local flow control ordinances that required waste to be delivered to specific municipal waste combustion facilities rather than landfills that may have had lower fees. Additionally, environmental regulations have increased the capital cost necessary to construct and maintain municipal waste combustion facilities.

Given the small average installed size of municipal solid waste plants and the unfavorable regulatory environment, the NRC staff does not consider municipal solid waste combustion to be a feasible alternative to PINGP 1 and 2 license renewal.

8.5.13 Delayed Retirement

In the PINGP 1 and 2 ER, NSP indicated that any plans to upgrade older baseload plants are already included in its plans to meet future energy needs (NMC 2008). NSP did not indicate that it had plans to retire any of its currently-operating plants. As a result, the NRC staff will not consider delayed retirement as an alternative to PINGP 1 and 2 license renewal.

8.6 No-Action Alternative

This section will examine the environmental effects that occur if NRC takes no action. No action in this case means that NRC does not issue renewed operating licenses for PINGP 1 and 2 and the licenses simply expire at the end of the current license term, in 2013 and 2014, respectively. If NRC takes no action, the plant will shutdown at or before the end of the current license. After shutdown, plant operators will initiate decommissioning according to 10 CFR 50.82.

The NRC staff notes that no action is the only alternative considered in-depth that does not satisfy the purpose and need for this draft SEIS, as it does not provide power generation capacity. The no-action alternative would not meet the energy needs currently met by PINGP 1 and 2 or that the alternatives evaluated in sections 8.1 through 8.3 would satisfy. Assuming that a need currently exists for the power generated by PINGP 1 and 2, the no-action alternative would require the appropriate energy planning decisionmakers to rely on another alternative or conservation to replace or offset PINGP 1 and 2's capacity.

In this section, the NRC staff addresses only those impacts that arise directly as a result of plant shutdown. The NRC staff has already addressed environmental impacts from decommissioning and related activities in several other documents. These documents include the *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, NUREG-0586, Supplement 1 (NRC 2002); the license renewal GEIS (Chapter 7; NRC 1996); and Chapter 7 of this draft SEIS. These analyses either directly address or bound the environmental impacts of decommissioning whenever NSP ceases operating PINGP 1 and 2.

The NRC staff notes that, even with a renewed operating license, PINGP 1 and 2 will eventually shut down, and the environmental effects addressed in this section will occur at that time. Since these effects have not otherwise been addressed in this draft SEIS, the NRC staff will address the impacts in this section. As with decommissioning effects, it is likely that shutdown effects will be similar whether they occur at the end of the current license or at the end of a renewed license.

Table 8-4. Summary of Environmental Impacts of No Action Compared to Continued PINGP 1 and 2 Operation

	No Action	Continued PINGP 1 and 2 Operation
Air Quality	SMALL	SMALL
Groundwater	SMALL	SMALL
Surface Water	SMALL	SMALL
Ecology	SMALL	SMALL
Human Health	SMALL	SMALL
Socioeconomics	SMALL to MODERATE	SMALL TO MODERATE
Waste Management	SMALL	SMALL

8.6.1 Air Quality

If PINGP 1 and 2 are shut down, there would be a reduction in emissions from activities related to plant operation such as use of diesel generators and employees vehicles. In Chapter 4, NRC staff determined that these emissions would have a SMALL impact on air quality during the renewal term. Therefore, if the plant shuts down and emissions decrease, the impact to air quality would remain SMALL.

8.6.2 Groundwater Use and Quality

If PINGP 1 and 2 are shut down, the use of groundwater would diminish as plant personnel are removed from the site and operations cease. Some groundwater consumption would continue as a result of the limited staff remaining onsite to maintain facilities prior to decommissioning. Impacts to groundwater use and quality would remain SMALL.

8.6.3 Surface Water Use and Quality

The rate of consumptive use of surface water would decrease as the plant is shut down and the reactor cooling system continues to remove decay heat. Wastewater discharges would also be reduced considerably. Shutdown would have SMALL impacts on surface water resources, which would continue to decrease over the decommissioning phase.

8.6.4 Aquatic and Terrestrial Resources

Plant shutdown will minimally affect terrestrial resources. In Chapter 4 of this draft SEIS, the NRC staff concluded that the impacts of continued operation on terrestrial resources will be SMALL. No additional land disturbances onsite or offsite would occur. Maintenance of transmission line ROWs would continue, regardless of plant operation. Shutdown would reduce the already SMALL impacts to terrestrial ecology. Accordingly, the NRC staff concludes that impacts to terrestrial resources as a result of plant shutdown would be SMALL.

Because plant shutdown would result in less water withdrawal and discharge, the no-action alternative would reduce the already SMALL impacts to aquatic ecology; therefore, impacts to aquatic resources as a result of plant shutdown would be SMALL.

8.6.5 Human Health

Human health risks would decrease following plant shutdown. The plant, which is currently operating within regulatory limits, would emit less gaseous and liquid radioactive material to the environment. Also, after shutdown, the variety of potential accidents at the plant (radiological or industrial) would be reduced to a limited set associated with shutdown events and fuel handling and storage. In Chapter 4 of this draft SEIS, the NRC staff concluded that the impacts of continued plant operation on human health would be SMALL. In Chapter 5, the NRC staff concluded that the impacts of accidents during operation were SMALL. Therefore, as radioactive emissions to the environment decrease, and as the likelihood and variety of accidents decrease following shutdown, the NRC staff concludes that the impacts to human health following plant shutdown would be SMALL.

8.6.6 Socioeconomics

Land Use

Plant shutdown would not affect onsite land use. Plant structures and other facilities would remain in place until decommissioning. Transmission lines connected to PINGP 1 and 2 would remain in service after the plant stops operating, and maintenance of these transmission lines would continue as before. Impacts on land use from plant shutdown would be SMALL.

Socioeconomics

Plant shutdown would have an impact on socioeconomic conditions in the region around PINGP 1 and 2. Plant shutdown would eliminate approximately 685 jobs and would reduce tax revenue in the region. The loss of these contributions, which may not entirely cease until after decommissioning, would have a SMALL to MODERATE impact. Appendix J to NUREG 0586, Supplement 1 (NRC 2002) provides additional discussion of the potential socioeconomic impacts of plant decommissioning.

Transportation

Traffic volumes on the roads in the vicinity of PINGP 1 and 2 would be reduced after plant shutdown. Most of the reduction in traffic volume would be associated with the loss of jobs at the plant. Deliveries to the plant would be reduced until decommissioning, at which point they would cease. Transportation impacts would be SMALL as a result of plant shutdown. Transportation impacts would increase if a new energy facility were constructed on the PINGP 1 and 2 site, as described in the alternatives above.

Aesthetics

Plant structures and other facilities would remain in place until decommissioning, but plumes from the plant's cooling towers would disappear entirely. Noise caused by plant operation would cease. Aesthetic impacts of plant closure would be SMALL.

Historic and Archaeological Resources

Plant shutdown will likely have no noticeable immediate impacts on historic and archaeological resources. Decommissioning methods would be described in a post-shutdown decommissioning activities report, which is required to be submitted to NRC within two years following cessation of operations. NRC requirements ensure that the decommissioning activities would be subject to a Section 106 review in accordance with the National Historic Preservation Act (NHPA). Additionally, if NSP's commitments outlined on 4.9.6 of this draft SEIS are implemented, impacts from decommissioning would be reduced. It is unlikely that plant staff will begin deconstruction or remediation before decommissioning. Because existing transmission lines will remain energized, transmission line ROW maintenance would continue. In Chapter 4 of this draft SEIS, the NRC concluded that the impacts of continued plant operation on historic and archaeological resources could be MODERATE. Given the high potential for resources in the area, the NRC concludes that the impacts on historic and archaeological resources from plant shutdown could also be MODERATE.

The Following information is provided by the Prairie Island Indian Community.

> If this alternative is implemented, the PINGP 1 and 2 would shut down and decommissioning would commence. Given the number of recorded archaeological sites and the high potential to encounter unrecorded sites within the PINGP 1 and 2 boundaries, the tribe agrees with the NRC's conclusion that impacts could be MODERATE. It is expected that the Prairie Island Indian Community would be involved in the archaeological reconnaissance work associated with decommissioning.

Environmental Justice

Plant shutdown could disproportionately affect the PIIC, but would not disproportionately affect other minority and low-income populations outside of the immediate vicinity of PINGP 1 and 2. Impacts to all the other resource areas pertaining to environmental justice are SMALL to MODERATE regarding the no-action alternative. Minority and low-income populations are generally concentrated in the urban area of Minneapolis-St. Paul. Thus, overall impacts to environmental justice from plant shutdown would be SMALL to MODERATE. Appendix J of NUREG 0586, Supplement 1 (NRC 2002), provides additional discussion of these impacts.

The following information is provided by the Prairie Island Indian Community.

> As stated above, plant shut down could disproportionately affect the Prairie Island Indian Community. The tribe, however, views the disproportionate impacts in a positive way:
>
> Health risks from chronic exposure to low levels of radiation from the PINGP 1 and 2 would decrease.
>
> Risk to the community from accidents would be reduced.
>
> Risks to the community from the operation of the PINGP 1 and 2 would decrease.
>
> Tritium contamination from plant operations would cease, thereby reducing health risks.
>
> NSPM will not apply for a license amendment for an extended power uprate, thereby eliminating all environmental and health impacts associated with the uprate.
>
> The risk of cumulative and integrated health and safety impacts would be reduced.
>
> Cumulative and integrated environmental impacts would decrease.
>
> Overall, the long-term Environmental Justice impacts to the Prairie Island Indian Community from the implementation of the No Action alternative would be LARGE and positive.
>
> Traffic impacts associated with decommissioning the PINGP 1 and 2 would be MODERATE. The impacts, however, would be of a short-duration.
>
> Even if the PINGP 1 and 2 were to shut down, spent fuel stored at the ISFSI would remain indefinitely stranded on Prairie Island. It is not clear whether there be any plant personnel who would monitor the ISFSI operation and respond to any emergencies. The 2003 Settlement agreement between the tribe and NSPM, related to the dry cask storage, would still be in effect.

8.6.7 Waste Management

If the no-action alternative were implemented, the generation of high-level waste would cease and generation of low-level and mixed waste would decrease. Impacts from implementation of the no-action alternative are expected to be SMALL.

8.7 Alternatives Summary

In this chapter, we considered the following alternatives to PINGP 1 and 2 license renewal:

- a gas-fired combined-cycle plant at the PINGP 1 and 2 site and an undetermined alternate site
- a combination including a gas-fired unit, wind power, conservation, and wood-waste biomass, and
- a combination including continued operation of one of the two PINGP 1 and 2 unit, wind power, and conservation.

Finally, the NRC staff considered the effects of no action by the NRC and the effects it would have. Impacts for all alternatives are summarized in Table 8.5. The impacts of license renewal for PINGP 1 and 2 are similar to or smaller than the impacts of the alternatives considered in this chapter in all resource areas.

1 **Table 8-5. Summary of Environmental Impacts of Proposed Action and Alternatives**

	PINGP 1 and 2 License Renewal	Gas-fired at PINGP 1 and 2 Site	Gas-fired at Alternate Site	Combination Alternative 1	Combination Alternative 2	No-Action Alternative
Air Quality	SMALL	MODERATE	MODERATE	MODERATE	SMALL	SMALL
Groundwater	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Surface Water	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL
Ecology	SMALL	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL	SMALL
Human Health	SMALL	SMALL	SMALL	MODERATE	SMALL	SMALL
Socioeconomics	SMALL TO MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE
Waste Management	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL

2

8.8 References

10 CFR 51. *U.S. Code of Federal Regulations,* Title 10 "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," Part 51, "Energy."

40 CFR 50. *U.S. Code of Federal Regulations*, Title 40, Protection of Environment, Part 50, "Domestic Licensing of Production and Utilization Facilties."

40 CFR 51. *U.S. Code of Federal Regulations*, Title 40, Protection of Environment, Part 51, "Requirements for Preparation, Adoption, and Submittal of Implementation Plans."

40 CFR 60. *U.S. Code of Federal Regulations*, Title 40, Protection of Environment, Part 60, "Standards of Performance for New Stationary Sources."

42 U.S.C. §7475. *United States Code.* Title 42, "The Public Health and Welfare"; Section 7475, "Preconstruction Requirements."

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9.0 CONCLUSION

This draft supplemental environmental impact statement (SEIS) contains the preliminary environmental review of Northern State Power Co. (NSP) application for a renewed operating license for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2) as required by Part 51 of Title 10, of the *Code of Federal Regulations* (10 CFR Part 51), the NRC's regulations that implement the National Environmental Policy Act of 1969 (NEPA). Chapter 9 presents the conclusions and recommendations from the site-specific environmental review of PINGP 1 and 2 and summarizes site-specific environmental issues of license renewal that were identified during the review. The environmental impacts of license renewal are summarized in Section 9.1; a comparison of the environmental impacts of license renewal and energy alternatives is presented in Section 9.2; unavoidable impacts of license renewal and energy alternatives and resource commitments are discussed in Section 9.3; and conclusions and NRC staff recommendations are presented in Section 9.4.

9.1 Environmental Impacts of License Renewal

Our review of site-specific environmental issues in this draft supplemental EIS leads us to conclude that issuing a renewed license would have SMALL impacts for 20 of the 21 Category 2 issues applicable to license renewal and refurbishment at PINGP 1 and 2, and MODERATE for 1 Category issue applicable to license renewal and refurbishment at PINGP 1 and 2, as well as environmental justice and chronic effects of electromagnetic fields.

Mitigation measures were considered for each Category 2 issue, as applicable. For ground water and surface water use issues, current measures to mitigate the environmental impacts of plant operation were found to be adequate. Potential mitigation measures for reducing impacts from thermophilic microbiological organisms resulting from PINGP 1 and 2 thermal discharge include periodically monitoring for thermophilic microbiological organisms in the water and sediments near the discharge, and prohibiting recreational use near the discharge plume. The staff identified a variety of measures that could mitigate potential acute electromagnetic field impacts resulting from continued operation of the PINGP 1 and 2 transmission lines, including limiting public access to transmission line structures, installing road signs at road crossings, and increasing transmission line clearances.

For aquatic resources issues, current measures to mitigate the environmental impacts of plant operation were found to be adequate including using closed and helper cycle cooling, fine-mesh screens, and flow limitations. Additional mitigative measures that PINGP 1 and 2 could add include operating in closed cycle more often, using the fine-mesh screens for a longer period of time, reducing intake velocities, and operating under reduced intake flows.

Mitigation measures that could reduce impacts to the terrestrial environment, as well as to the threatened and endangered species during refurbishment activities, include undertaking the steam generator replacement outside of the peregrine falcon breeding season, minimizing activities that may cause significant noise during midday hours when peregrine falcons are more likely to hunt for food, the use of best management practices, and restoring cleared land that remains after completion of construction. Mitigation measures to reduce potential air quality impacts resulting from refurbishment activities include implementation of a dust control plan to minimize emissions from construction activities, and the use of multiperson vans and workforce shift changes to reduce the number of vehicles on the road at any one given time.

Impacts to known historic and archaeological resources are potentially expected from the continued operation of PINGP 1 and 2 during the license renewal term; however, with the committmetns proposed by NSP, these impacts could be mitigated. These commitments would serve to integrate cultural resource considerations with ongoing PINGP 1 and 2 activities. Additionally, training of NSP staff in the Section 106 process would ensure that informed decisions are made when considering the effects of future projects on historic and archaeological resources. As previously discussed, lands not previously surveyed should be investigated by a professional archaeologist prior to any ground disturbance.

The NRC also considered cumulative impacts of past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes them. The staff concluded that cumulative impacts of PINGP 1 and 2 license renewal and refurbishment would be SMALL to LARGE for potentially affected resources.

9.2 Comparison of Environmental Impacts of License Renewal and Alternatives

In the conclusion to Chapter 8, we determined that impacts from license renewal are generally less than the impacts of alternatives to license renewal, with the exception of energy conservation and energy efficiency. In comparing likely environmental impacts from a gas-fired combined-cycle plant at the PINGP 1 and 2 site and an undetermined alternate site, a combination including a gas-fired unit, wind power, conservation, and wood-waste biomass, and a combination including continued operation of one of the two PINGP 1 and 2 unit, wind power, and conservation, and environmental impacts from license renewal, we found that the energy conservation and energy efficiency alternative would result in the lowest environmental impact. Based on our analysis, we found that the impacts of license renewal are reasonable in light of the impacts from alternatives to the license renewal of PINGP 1 and 2.

9.3 Resource Commitments

9.3.1 Unavoidable Adverse Environmental Impacts

Unavoidable adverse environmental impacts are impacts that would occur after implementation of all feasible mitigation measures. Implementing any of the energy alternatives considered in this supplemental EIS, including the proposed action, would result in some unavoidable adverse environmental impacts.

Minor unavoidable adverse impacts on air quality would occur due to emission and release of various chemical and radiological constituents from power plant operations. Nonradiological emissions resulting from power plant operations are expected to comply with U.S. Environmental Protection Agency (EPA) emissions standards, though the alternative of operating a fossil-fueled power plant in some areas may worsen existing attainment issues. Chemical and radiological emissions would not exceed the National Emission Standards for Hazardous Air Pollutants.

During nuclear power plant operations, workers and members of the public would face unavoidable exposure to radiation and hazardous and toxic chemicals. Workers would be exposed to radiation and chemicals associated with routine plant operations and the handling of nuclear fuel and waste material. Workers would have higher levels of exposure than members of the public, but doses would be administratively controlled and would not exceed any standards or administrative control limits. In comparison, the alternatives entailing the construction and operation of a non-nuclear power generating facility would also result in unavoidable exposure to hazardous and toxic chemicals to workers and the general public.

The generation of spent nuclear fuel and waste material, including low-level radioactive waste, hazardous waste, and nonhazardous waste would also be unavoidable. In comparison, hazardous and nonhazardous wastes would also be generated at non-nuclear power generating facilities. Wastes generated during plant operations would be collected, stored, and shipped for suitable treatment, recycling, or disposal in accordance with applicable Federal and State regulations. Due to the costs of handling these materials, power plant operators would be expected to conduct all activities and optimize all operations in a way that generates the smallest amount of waste practical.

9.3.2 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The operation of power generating facilities would result in short-term uses of the environment as described in Chapters 4, 5, 6, 7, and 8. "Short term" is the period of time during which continued power generating activities would take place.

Power plant operations would necessitate short-term use of the environment and commitments of resources, and would also commit certain resources (e.g., land and energy) indefinitely or permanently. Certain short-term resource commitments would be substantially greater under most energy alternatives, including license renewal, than under the No Action Alternative due to the continued generation of electrical power as well as continued use of generating sites and associated infrastructure. During operations, all energy alternatives would entail similar relationships between local short-term uses of the environment and the maintenance and enhancement of long term productivity.

Air emissions from power plant operations would introduce small amounts of radiological and nonradiological constituents to the region around the plant site. Over time, these emissions would result in increased concentrations and exposure, but are not expected to impact air quality or radiation exposure to the extent that public health and long-term productivity of the environment would be impaired.

Continued employment, expenditures, and tax revenues generated during power plant operations would directly benefit local, regional, and State economies over the short term. Local governments investing project-generated tax revenues into infrastructure and other required services could enhance economic productivity over the long term.

The management and disposal of spent nuclear fuel, low-level radioactive waste, hazardous waste, and nonhazardous waste would require an increase in energy and would consume space at treatment, storage, or disposal facilities. Regardless of the location, the use of land to meet waste disposal needs would reduce the long-term productivity of the land.

Power plant facilities would be committed to electricity production over the short term. After decommissioning these facilities and restoring the area, the land could be available for other future productive uses.

9.3.3 Irreversible and Irretrievable Commitments of Resources

This section describes the irreversible and irretrievable commitments of resources that have been identified in this supplemental EIS. Irreversible resources refer to when primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the use or consumption of resources that are neither renewable nor recoverable for future use. Irreversible and irretrievable commitment of resources for electrical power generation would include the commitment of land, water, energy, raw materials, and other natural and man-made resources required for power plant operations. In general, the commitment of capital, energy, labor, and material resources would also be irreversible.

The implementation of any of the energy alternatives considered in this supplemental EIS would entail the irreversible and irretrievable commitment of energy, water, chemicals, and, in some cases, fossil fuels. These resources would be committed during the license renewal term and over the entire life cycle of the power plant and would essentially be unrecoverable.

Energy expended would be in the form of fuel for equipment, vehicles, and power plant operations and electricity for equipment and facility operations. Electricity and fuels would be purchased from offsite commercial sources. Water would be obtained from existing water supply systems. These resources are readily available, and the amounts required are not expected to deplete available supplies or exceed available system capacities.

The irreversible and irretrievable commitment of material resources includes materials that cannot be recovered or recycled, materials that are rendered radioactive and cannot be decontaminated, and materials consumed or reduced to unrecoverable forms of waste. However, none of the resources used by these power generating facilities are in short supply, and, for the most part, are readily available.

Various materials and chemicals, including acids and caustics, would be required to support operations activities. These materials would be derived from commercial vendors, and their consumption is not expected to affect local, regional, or national supplies.

The treatment, storage, and disposal of spent nuclear fuel, low-level radioactive waste, hazardous waste, and nonhazardous waste would require the irretrievable commitment of energy and fuel and would result in the irreversible commitment of space in disposal facilities.

9.4 Recommendations

Based on (1) the analysis and findings in the GEIS, (2) information provided in the environmental report (ER) submitted by NSP, (3) consultation with Federal, State, and local agencies, (4) a review of pertinent documents and reports, and (5) consideration of public comments received during scoping, the preliminary recommendation of the NRC staff is that the Commission determine that the adverse environmental impacts of license renewal for PINGP 1 and 2 are not so great that preserving the option of license renewal for energy planning decision makers would be unreasonable.

10.0 LIST OF PREPARERS

This supplemental EIS was prepared by members of the Office of Nuclear Reactor Regulation, with assistance from other NRC organizations and contract support from Pacific Northwest National Laboratory.

Table 10-1. List of Preparers. *Pacific Northwest National Laboratory provided contract support for the severe accident mitigation alternatives (SAMA) analysis, presented in Chapter 5 and Appendix F and the Prairie Island Indian Community provided expertise in Land Use, Socioeconomics, Cultural Resources, and Environmental Justice, presented in Chapters 2, 3, 4, 5, and 8 .*

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Dennis Logan	Nuclear Reactor Regulation	Ecology
Sarah Lopas	Nuclear Reactor Regulation	Project Support; Nonradiological Waste; TMO; EMF
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[(a)] Pacific Northwest National Laboratory is operated by Batelle for the U.S. Department of Energy

Appendix A

Comments Received on the Prairie Island Nuclear Generating Station, Units 1 and 2, Environmental Review

A. Comments Received on the Prairie Island Nuclear Generating Station, Units 1 and 2, Environmental Review

Introduction

On April 11, 2008, the Nuclear Regulatory Commission (NRC) received an application from Northern States Power Co. (NSP) [formerly Nuclear Management Company, LLC (NMC)] for renewal of the operating license of Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2). PINGP 1 and 2 are located in Red Wing, Minnesota, which is in Goodhue County on the west bank of the Mississippi River. As part of the application, NSP submitted an environmental report (ER) prepared in accordance with the requirements of 10 CFR Part 51. 10 CFR Part 51 contains the NRC requirements for implementing the National Environmental Policy Act (NEPA) of 1969 and the implementing regulations promulgated by the Council on Environmental Quality (CEQ). Section 51.53 outlines requirements for preparation and submittal of environmental reports to the NRC.

Section 51.53(c)(3) was based upon the findings documented in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants," (GEIS). The GEIS, which identified and evaluated the environmental impacts associated with license renewal, was first issued as a draft for public comment. The staff received input from Federal and State agencies, public organizations, and private citizens before developing the final document. As a result of the assessments in the GEIS, a number of impacts were determined to be small and to be generic to all nuclear power plants. These were designated as Category 1 impacts. An applicant for license renewal may adopt the conclusions contained in the GEIS for Category 1 impacts, absent new and significant information that may cause the conclusions to fall outside those of the GEIS. Category 2 impacts are those impacts that have been determined to be plant-specific and are required to be evaluated in the applicant's ER.

The Commission determined that the NRC does not have a role in energy planning decision-making for existing plants, which should be left to State regulators and utility officials. Therefore, an applicant for license renewal need not provide an analysis of the need for power, or the economic costs and economic benefits of the proposed action. Additionally, the Commission determined that the ER need not discuss any aspect of storage of spent fuel for the facility that is within the scope of the generic determination in 10 CFR 51.23(a) and in accordance with 10 CFR 51.23(b). This determination was based on the Nuclear Waste Policy Act of 1982 and the Commission's Waste Confidence Rule, 10 CFR 51.23.

On July 22, 2008, the NRC published a Notice of Intent in the *Federal Register* (73 FR 42628), to notify the public of the staff's intent to prepare a plant-specific supplement to the GEIS (SEIS) regarding the renewal application for the PINGP 1 and 2 operating license. The plant-specific supplement to the GEIS will be prepared in accordance with NEPA, CEQ guidelines, and 10 CFR Part 51. As outlined by NEPA, the NRC initiated the scoping process with the issuance of the *Federal Register* Notice. The NRC invited the applicant, federal, state, local, and tribal government agencies, local organizations, and individuals to participate in the scoping process by providing oral comments at scheduled public meetings, which were held at the Red Wing Public Library, in Red Wing, Minnesota on July 30, 2008, and/or submitting written suggestions and comments no later than September 22, 2008. The NRC issued press releases, placed ads in the local paper, and distributed flyers locally to advertise the public meetings. Approximately 75 people attended the meetings. Both sessions began with NRC staff members providing a brief overview of the license renewal process and the NEPA process. Following the NRC's prepared statements, the meetings were open for public comments. Several attendees submitted written comments, others provided oral comments, which were transcribed by a certified court reporter. The transcripts of the meetings were issued on September 3, 2008 for the afternoon session and September 5, 2008 for the evening session. The transcripts are available for public inspection in the NRC Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's Agencywide Documents Access and Management System (ADAMS). The ADAMS Public Electronic Reading Room is accessible at http://www.nrc.gov/reading-rm/adams/web-based.html. The transcripts for the public meeting can be found in ADAMS at accession numbers ML082470336 and ML082490514. Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, should contact the NRC's Public Document Room Reference staff by telephone at 1-800-397-4209, or 301-415- 4737, or by e-mail at pdr.resource@nrc.gov.

The scoping process provides an opportunity for public participation to identify issues to be addressed in the SEIS and highlight public concerns and issues. The *Federal Register* Notice of Intent identified the following objectives of the scoping process:

- *Define the proposed action*
- Determine the scope of the SEIS and identify significant issues to be analyzed in depth
- Identify and eliminate peripheral issues
- Identify any environmental assessments and other environmental impact statements being prepared that are related to the SEIS
- Identify other environmental review and consultation requirements
- Indicate the schedule for preparation of the SEIS
- Identify any cooperating agencies
- Describe how the SEIS will be prepared.

Scoping Comment Period Summary

During the scoping period, the NRC staff received six letters and three e-mails containing comments related to the environmental review for the proposed license renewal of PINGP 1 and 2. Additionally, thirteen people provided oral comments or comments in writing during the July 30, 2008, scoping meetings.

Individuals and/or groups and their affiliation (if applicable) that provided comments during the scoping period are identified in Table 1. A numerical commenter identification code (1-18) was assigned to each commenter for purposes of categorizing the comments.

Table 1. Individuals and/or Groups Providing Comments during Scoping Period. *Commenters appear in alphabetical order, and each commenter has been given a unique commenter identification number.*

Commenter	Affiliation (if stated)	Commenter ID Number
Arneson, Scott	Goodhue County Administrator	1
Betcher, Steve	Goodhue County Attorney	2

Crocker, George	Executive Director, North American Water Office	3
CURE	Communities United for Responsible Energy	4
Eide-Tollefson, Kristen	Resident, Florence Township MN	5
Foushee, Lea	Environmental Justice Director, North American Water Office	6
Himanga, Katie	Mayor, Lake City, Minnesota	7
Jackson, Mary	Senior Planner, Dakota County Office Of Planning and Analysis	8
Johnson, Ron	President, Prairie Island Tribal Council & Indian Community	9
Lemon, Gina	Leech Lake Band of Ojibwe	10
Lovejoy, Tom	Environmental Impact Coordinator, Wisconsin Department of Natural Resources	11
Marshman, Joan	Chair, Florence Township Board of Supervisors	12
Muller, Alan	Executive Director, Green Delaware	13
Overland, Carol	none provided	14
PIIC Tribal Council	Prairie Island Indian Community (PIIC)	15
Schultz, Michael	Red Wing City Council	16
Vukmir, Andrija	none provided	17
Wadley, Mike	PINGP Site Vice President, Nuclear Management Company (NMC)	18

In order to evaluate the comments, the NRC staff gave each comment a unique identification code that categorizes the comment by technical issue and also allows each comment or set of comments to be traced back to the commenter and original source (transcript, letter, or e-mail) from which the comments were submitted.

Comments were placed into one of twenty-eight technical issue categories, which are based on the topics that will be contained within the staff's draft supplemental environmental impact statement (SEIS) for PINGP 1 and 2, as outlined by the GEIS. These technical issue categories and their abbreviation codes are presented in Table 2.

Table 2. Technical Issue Categories. *Comments were divided into one of the 28 categories below, each of which has a unique abbreviation code.*

Abbreviation Code	Technical Issue	Abbreviation Code	Technical Issue
AM[(a)]	Aging Management	NW[(a)]	Non-radiological Waste
AS	Alternative Energy Sources	ON[(a)]	Opposition to Nuclear Power
AR	Aquatic Resources	OR[(a)]	Opposition to License Renewal
CI	Cumulative Impacts	OS	Outside of Scope[(c)]
CR	Cultural Resources	PA	Postulated Accidents
EJ	Environmental Justice	RW	Radioactive Waste

Abbreviation Code	Technical Issue
ER	Environmental Report[b]
GW	Groundwater
HH	Human Health
HP	NRC Hearing Process
LR	License Renewal and its Process
LU[a]	Land Use
NO[a]	Noise
NS	Nuclear Safety

Abbreviation Code	Technical Issue
SD	Shutdown and Decommissioning
SE	Socioeconomics
SN	Support of Nuclear Power
SR	Support for License Renewal
SW	Surface Water
TE	Threatened and Endangered Species and Essential Fish Habitat
TR	Terrestrial Resources
UR	Uranium Fuel Cycle

[a] No comments specific to the categories of aging management, land use, noise, non-radiological waste, opposition to nuclear power, or opposition to license renewal were submitted during the PINGP 1 and 2 scoping period.

[b] Comments contained in this category pertain to general quality or content of the applicant's Environmental Report

[c] Outside of Scope are those comments that pertain to issues that are not evaluated during the environmental review of license renewal and include, but are not limited to, issues such as need for power; emergency preparedness; security; terrorism; and spent nuclear fuel storage and disposal.

Presentation of Comments and Responses

Comments Received During the Scoping Period

This document contains a copy of each commenters' submission(s) during the scoping period. For those that provided oral comments at the scoping meetings, comments are taken from the meeting transcripts. Each comment is bracketed and labeled with a unique comment identification number. Note that only those transcript pages on which each individual's comments are contained are included in this document; however, the complete meeting transcripts can be accessed online or in-person from ADAMS at accession numbers ML082470336 and ML082490514. Please refer to the description of ADAMS above for an explanation of how to access these documents.

Responses to Comments Received During the Scoping Period

The NRC staff's responses to each comment received during the scoping period are organized by technical issue. Each response is prefaced by a summary of the issue to which the comment(s) pertain and a list of the unique identification codes of the comments to which the response applies. Similar comments within a technical issue area may be considered together in the provided response. Some comments applied to more than one technical issue category (indicated by a " / " in the comment identification code), and are, therefore, addressed in more than one section of the staff's responses. For example, the 3-c-ER/HH pertains to both the Environmental Report and Human Health and is, thus, addressed under both Environmental Report and Human Health in the staff's responses.

Table 3 provides a complete list of comments received during the scoping period, along with the commenter, comment source (transcript, letter, or e-mail), page number(s) on which the comment and correlating response(s) appears in this document, and ADAMS accession number for the original source of the comment.

The preparation of the SEIS will take into account all the relevant issues raised during the scoping process. The SEIS will address both Category 1 and 2 issues, along with any new information identified as a result of scoping. The SEIS will rely on conclusions supported by information in the GEIS for Category 1 issues, and will include the analysis of Category 2 issues and any new and significant information. The draft SEIS will be made available for public comment. The comment period will offer the next opportunity for the applicant, interested Federal, State, local, and tribal government agencies, local organizations, and members of the public to provide input to the NRC's environmental review process. The comments received on the draft SEIS will be considered in the preparation of the final SEIS. The final SEIS, along with the staff's Safety Evaluation Report (SER), will be considered by the NRC in reaching a decision on the PINGP 1 and 2 license renewal application.

Table 3. Comments Received during Scoping Period. *Comments are listed alphabetically by commenter, and each comment has a unique comment identification code.*

Comment ID	Commenter	Comment Source	Comment Page No(s).	Response Page No(s).	ADAMS Accession Number
1-a-SR	Arneson, S.	transcript[a]	13	163	ML082470336
2-a-SR	Betcher, S.	transcript	15-16	163	ML082470336
3-a-LR	Crocker, G.	transcript	18	157	ML082490514
3-b-HH	Crocker, G.	transcript	19-20	154	ML082490514
3-c-ER/HH	Crocker, G.	transcript	20-22	153, 154, 156	ML082490514
4-a-AS	CURE	letter	25	148, 149	ML083220369
4-b-AR/SW	CURE	letter	26-27	149, 163	ML083220365
4-c-SE	CURE	letter	27	163	ML083220365
4-d-AR/HH	CURE	letter	27	150, 154	ML083220365
4-e-HH	CURE	letter	27	154, 156	ML083220365
4-f-SW	CURE	letter	27-28	163	ML083220365
5-a-ER	Eide-Tollefson, K.	letter	31	153	ML083220377
5-b-GW/SW	Eide-Tollefson, K.	letter	31	153, 164	ML083220377
5-c-LR	Eide-Tollefson, K.	letter	31-32	158	ML083220377
5-d-SE	Eide-Tollefson, K.	letter	32	163	ML083220377
5-e-AR	Eide-Tollefson, K.	letter	32	150	ML083220377
5-f-EJ/RW	Eide-Tollefson, K.	letter	32	152, 161	ML083220377
5-g-CI/LR	Eide-Tollefson, K.	letter	33	151, 157	ML083220377
5-h-CI	Eide-Tollefson, K.	letter	33-34	151	ML083220377
5-i-OS	Eide-Tollefson, K.	letter	34	159	ML083220377

Comment ID	Commenter	Comment Source	Comment Page No(s).	Response Page No(s).	ADAMS Accession Number
5-j-RW	Eide-Tollefson, K.	letter	34-35	161	ML083220377
5-k-OS/RW	Eide-Tollefson, K.	letter	35	159, 161	ML083220377
5-l-OS	Eide-Tollefson, K.	letter	35	159	ML083220377
5-m-CI/RW	Eide-Tollefson, K.	letter	35	151, 161	ML083220377
5-n-RW	Eide-Tollefson, K.	letter	35	161	ML083220377
5-o-CI/RW	Eide-Tollefson, K.	letter	35	151, 161	ML083220377
5-p-RW	Eide-Tollefson, K.	letter	36	161	ML083220377
5-q-CI/LR	Eide-Tollefson, K.	letter	36	151, 158	ML083220377
5-r-CI/LR	Eide-Tollefson, K.	letter	36-38	151, 152, 158	ML083220377
5-s-AS	Eide-Tollefson, K.	letter	38	148	ML083220377
5-t-AS	Eide-Tollefson, K.	letter	38	148	ML083220377
5-u-LR/OS	Eide-Tollefson, K.	letter	38-39	158	ML083220377
5-v-LR	Eide-Tollefson, K.	letter	39	158	ML083220377
5-w-CI	Eide-Tollefson, K.	letter	39-42	151	ML083220377
5-x-CI	Eide-Tollefson, K.	transcript	44	151	ML082490514
5-y-OS/RW	Eide-Tollefson, K.	transcript	44-45	159, 161	ML082490514
5-z-NS	Eide-Tollefson, K.	transcript	45	159	ML082490514
5-aa-RW	Eide-Tollefson, K.	transcript	45-47	161	ML082490514
6-a-HH	Foushee, L.	e-mail	49	154	ML083220386
6-b-EJ/UR	Foushee, L.	e-mail	49	152, 165	ML083220386
6-c-HH	Foushee, L.	e-mail	49-50	154	ML083220386
6-d-HH	Foushee, L.	e-mail	51-52	154	ML083220372
6-e-HH	Foushee, L.	e-mail	52	154	ML083220372
6-f-EJ/RW/UR	Foushee, L.	e-mail	52-53	152, 161, 165	ML083220372
6-g-LR	Foushee, L.	transcript	55-56	157	ML082490514
6-h-HH/LR	Foushee, L.	transcript	57-61	154, 158	ML082490514
6-i-ER/HH	Foushee, L.	transcript	62-63	153, 154	ML082490514
7-a-AR/RW/SW	Himanga, K.	letter	65	149, 161, 163	ML082660657
7-b-AR/CR/SW	Himanga, K.	letter	65-66	149, 151, 163	ML082660657
7-c-RW	Himanga, K.	transcript	68-69	161	ML082470336
7-d-AR/CR/SW	Himanga, K.	transcript	69	149, 151, 163	ML082470336
8-a-AR/PA/SW	Jackson, M.	e-mail	71-72	150, 160, 164	ML083220385
9-a-LR	Johnson, R.	transcript	74-75	157	ML082470336
10-a-CR	Lemon, G.	letter	77	151	ML082660601

Comment ID	Commenter	Comment Source	Comment Page No(s).	Response Page No(s).	ADAMS Accession Number
11-a-AR	Lovejoy, T.	letter	79	149	ML083080277
11-b-NS	Lovejoy, T.	letter	79	159	ML083080277
11-c-AR/SW	Lovejoy, T.	letter	79	149, 163	ML083080277
11-d-EJ/SW	Lovejoy, T.	letter	80	152, 163	ML083080277
11-e-AR	Lovejoy, T.	letter	80	149	ML083080277
11-f-CI	Lovejoy, T.	letter	80	151	ML083080277
12-a-RW	Marshman, J.	transcript	82-83	161	ML082490514
13-a-HH	Muller, A.	transcript	85	154	ML082490514
13-b-LR	Muller, A.	transcript	86-87	158	ML082490514
13-c-ER/LR	Muller, A.	transcript	88-89	153, 158	ML082490514
13-d-LR	Muller, A.	transcript	89-90	158	ML082490514
13-e-SD	Muller, A.	transcript	90	162	ML082490514
13-f-OS	Muller, A.	transcript	90-92	159	ML082490514
13-g-UR	Muller, A.	transcript	93	165	ML082490514
13-h-RW	Muller, A.	transcript	93-94	161	ML082490514
13-i-AS	Muller, A.	transcript	94-95	148	ML082490514
13-j-HH	Muller, A.	transcript	95	154	ML082490514
14-a-LR	Overland, C.	transcript	97-98	158	ML082490514
14-b-AS	Overland, C.	transcript	98-99	148	ML082490514
14-c-LR	Overland, C.	transcript	99	157	ML082490514
15-a-ER	PIIC Tribal Council	letter	103-104	153	ML083200029
15-b-LR	PIIC Tribal Council	letter	104-105	157	ML083200029
15-c-LR	PIIC Tribal Council	letter	105	157	ML083200029
15-d-HH/EJ	PIIC Tribal Council	letter	105	152, 154, 156	ML083200029
15-e-GW	PIIC Tribal Council	letter	105-108	153	ML083200029
15-f-HH/EJ	PIIC Tribal Council	letter	108	152, 154	ML083200029
15-g-ER	PIIC Tribal Council	letter	108	153	ML083200029
15-h-HH	PIIC Tribal Council	letter	108-110	154, 156	ML083200029
15-i-RW	PIIC Tribal Council	letter	110-112	161	ML083200029
15-j-RW	PIIC Tribal Council	letter	112	161	ML083200029
15-k-AS	PIIC Tribal Council	letter	112	148	ML083200029
15-l-TR	PIIC Tribal Council	letter	112-114	164	ML083200029
15-m-CR	PIIC Tribal Council	letter	114-117	151	ML083200029
15-n-TE	PIIC Tribal Council	letter	117-119	165	ML083200029

Comment ID	Commenter	Comment Source	Comment Page No(s).	Response Page No(s).	ADAMS Accession Number
15-o-SE	PIIC Tribal Council	letter	119-120	163	ML083200029
15-p-OS	PIIC Tribal Council	letter	120	159	ML083200029
15-q-SE	PIIC Tribal Council	letter	120	163	ML083200029
15-r-EJ	PIIC Tribal Council	letter	120-121	152	ML083200029
15-s-EJ	PIIC Tribal Council	letter	121	152	ML083200029
15-t-HH	PIIC Tribal Council	letter	121	157	ML083200029
15-u-PA	PIIC Tribal Council	letter	122	160	ML083200029
15-v-CI/OS/RW	PIIC Tribal Council	letter	123	151, 159, 161	ML083200029
15-w-OS/RW	PIIC Tribal Council	letter	123	159, 161	ML083200029
15-x-ER	PIIC Tribal Council	letter	123	153	ML083200029
15-y-ER/LR	PIIC Tribal Council	letter	123-124	153, 158	ML083200029
15-z-CI/ER	PIIC Tribal Council	letter	125	151, 153	ML083200029
15-aa-EJ	PIIC Tribal Council	letter	125	152	ML083200029
15-bb-EJ	PIIC Tribal Council	letter	125-126	152	ML083200029
15-cc-AS	PIIC Tribal Council	letter	126	148	ML083200029
15-dd-SW	PIIC Tribal Council	letter	126	164	ML083200029
15-ee-OS/SW	PIIC Tribal Council	letter	126	159, 164	ML083200029
15-ff-OS	PIIC Tribal Council	letter	127	159	ML083200029
15-gg-HH	PIIC Tribal Council	letter	127	155	ML083200029
15-hh-OS	PIIC Tribal Council	letter	127	160	ML083200029
16-a-SR	Schultz, M.	transcript	132-134	163	ML082470336
17-a-SN	Vukmir, A.	transcript	136	163	ML082470336
17-b-SR	Vukmir, A.	transcript	136	163	ML082470336
17-c-SN	Vukmir, A.	transcript	136-137	163	ML082470336
17-d-RW	Vukmir, A.	transcript	138	161	ML082470336
17-e-SR	Vukmir, A.	transcript	138	163	ML082470336
18-a-SR	Wadley, M.	transcript	140-142	163	ML082470336
18-b-NS	Wadley, M.	transcript	142-144	159	ML082470336
18-c-NS	Wadley, M.	transcript	145	159	ML082470336
18-d-SR	Wadley, M.	transcript	145-146	163	ML082470336
18-e-SR	Wadley, M.	transcript	146	163	ML082470336
18-f-SR	Wadley, M.	transcript	146-147	163	ML082470336

[a] Comments were received orally during one of two scoping meetings held on July 30, 2009, and transcribed by a certified court reporter.

The following pages contain the original comment letters, e-mail messages, and public meeting transcripts pertaining to the PINGP 1 and 2 scoping summary report. Each commented is labeled and identified by a unique comment identification code.

The following pages contain the comments
made by Scott Arneson during the
NRC public scoping meetings held on July 30, 2008

Administrator. With me is Steve Betcher, Goodhue County Attorney.

I just wanted to say a few things for the record today, that Goodhue County is very pleased with the economic impact that Xcel Energy has on the City of Red Wing and Goodhue County and the entire area. We've appreciated the relationship that we have with Xcel.

Just in the past couple of years we've worked through a rate stabilization agreement with them, and we have a great relationship with them.

On August 11th they will be coming to the County Board and having a committee of the whole on the renewal application, after which point the County Board will be considering a resolution supporting the relicensure.

1-a-SR

STEVE BETCHER: And as Goodhue County Attorney, I'd just like to put on the record that we've had a multi-faceted relationship with Xcel Energy over the years; and from the time the nuclear plants opened, that we work closely with them on security issues, we work closely with them on continuing economic support in the tax base of this community, and we believe it's been a very successful

The following pages contain the comments
made by Steve Betcher during the
NRC public scoping meetings held on July 30, 2008

Administrator. With me is Steve Betcher, Goodhue County Attorney.

I just wanted to say a few things for the record today, that Goodhue County is very pleased with the economic impact that Xcel Energy has on the City of Red Wing and Goodhue County and the entire area. We've appreciated the relationship that we have with Xcel.

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STEVE BETCHER: And as Goodhue County Attorney, I'd just like to put on the record that we've had a multi-faceted relationship with Xcel Energy over the years; and from the time the nuclear plants opened, that we work closely with them on security issues, we work closely with them on continuing economic support in the tax base of this community, and we believe it's been a very successful

2-a-SR

collaboration up to this point, and we believe that the necessity of energy to our community has certainly been recognized by the plants that we've had here up to this time.

And I believe the County Board will be considering the full impact of the relationship and offering their opinions on the future and also their opinions on any concerns that may be identified, and we will be reporting back to them on the comments that we're hearing here today as well.

2-a-SR (continued)

Thank you.

MR. RAKOVAN: Thank you, gentlemen.

The last person that I have in terms of filling out the yellow cards is Mike Wadley from Xcel Energy.

MIKE WADLEY: Thank you.

Good afternoon. My name's Mike Wadley. I'm the site vice president for the Prairie Island Nuclear Generating Plant, and I'm here today to provide Xcel Energy's support and perspective of our request for renewal of the operating license for Prairie Island Units 1 and 2.

The mission of everyone that works at Prairie Island is clear: It's safe, clean, reliable,

The following pages contain the comments
made by George Crocker during the
NRC public scoping meetings held on July 30, 2008

GEORGE CROCKER: George Crocker, Executive Director of the North American Water Office.

I've had several people from Wisconsin tell me that they didn't receive notice of this meeting, and I'm wondering if -- if such notice did go out to people on the other side of the river and, if so, when? Or if there could -- if not, if there could be efforts to include people on the Wisconsin side.

3-a-LR

MS. FRANOVICH: I'll have to go back to my project managers to know exactly who was contacted with a formal letter, who was contacted perhaps with some phone calls and get back to you, Mr. Crocker. I'm not sure off the top of my head.

PREMA CHANDRATHIL: Hi. My name is Prema Chandrathil. I'm a public affairs officer out in Region III, which is located down by Chicago.

As soon as we received the press release, we went ahead and -- we went ahead and distributed it to the local media in this area. That does also include folks in Wisconsin.

We also followed up with a couple phone calls, and we did speak to a couple reporters to go

So Andrew -- you'd better take a page from young Andrew. He knows how to treat the public.

Thank you.

MR. RAKOVAN: Okay. Next, George Crocker.

And again, after George we'll go to Alan Muller.

GEORGE CROCKER: Thank you. My name is George Crocker. I'm with the North American Water Office, and I have a comment for the scope of your environmental review relative to considering analyzing, disclosing environmental impacts of continued plant operation.

And the comment that I have relates to the story you just heard about routine releases, because I think that the NRC should require Prairie Island and all of the other commercial reactors to document where reported released radionuclides go. 3-b-HH

Where do they go? I know that you do monitoring. You do a lot of monitoring. If you don't really know what you're looking at when you see all of the little thermal luminescent dosimeter mappings and where the pics are, why you say "Aha, there's monitoring."

But, you see, that monitoring tells us where the released radiation isn't. And we don't care about that for the very simple reason that it's not there.

We want to know where it is. We want to know the isoplats. Like you look at a map of geography and you can see the terrain, we want to see the dispersion pattern for the routine releases.

And we know you can do it.

Remember the Russian spy who died of plutonium 210 and they tracked him months later with minute amounts of radionuclides that they tracked all over Europe?

Remember how the United States busted North Korea a week later from 50,000 feet because of minute quantities of radioactive material?

We know how to track radiation, in exquisite detail. But, you see, we're not applying that ability to the routine releases.

3-b-HH (continued)

So my comment is that any environmental report that does not include the primary routine environmental impactor is bogus.

And you may fool most of the people all of the time about it, but there are some of us that

3-c-ER/HH

you're not fooling, and sooner or later we're going to get some traction on it.

We did pass a bill through the Minnesota House not last year but the year before. We lost it in conference. But it would require Minnesota authority to track the radiation, where does it go, so we can specify the isoplat, the dispersion pattern.

Now, I'm not challenging the NRC's or the federal government's preemption right to say whether or not it's safe. That's not the point. You have the authority to determine what's inspect and what's not.

But the public has the right to know where it goes. And the reason that's important is because the National Academies of Science in its BEIR VII report -- that stands for the Biological Effects of Ionizing Radiation, which came out in June of 2005 -- states clearly and unequivocally that there is no safe dose of radiation, that every exposure to radionuclide increases the risk of deleterious effect.

And because of that the public has a right to know where the hot spots are, where the

3-c-ER/HH (continued)

concentration points may be, what is the dispersion pattern, are they living within that pattern.

And so, please, let's get serious. If this is going to be a technology that's going to be with us for a while -- I have no illusions that until something heads south real fast, which could happen anytime, that we're going to continue living with this threat, but let's at least inform ourselves about what it is. You do not have the right to conceal from the public where the routine reported emissions go. Thank you very much.

3-c-ER/HH (continued)

MR. RAKOVAN: Thank you, sir.

Next we'll go to Alan Muller and then to Carol Overland.

ALAN MULLER: I brought these (indicating) up because these are the paper copies of the license renewal, at least that which has been released to the public. It's not particularly light reading, but I have had a chance to review some of it, and it seems to me that what is in here raises a great many more questions than are answered.

And in fact it answers a lot of rather -- if you look in the index, you can see many references to electrical connections and other design and

The following pages contain the written comments submitted by the Communities for Responsible Energy during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

CURE
Communities United for Responsible Energy
PO Box 8
Frontenac, MN 55026

September 22, 2008

Comments in Response to XCEL Energy's Application for Certificates of Need for Additional Dry Cask Storage and Extended Power Uprate at the Prairie Island Nuclear Generating Plant

Appendix D: Alternative Technologies Screening

Preamble:

Communities United for Responsible Energy (CURE) is an association of citizens, established in 1996 in response to the selection of Florence Township, Goodhue County, MN as the location for an off-site Nuclear Spent Fuel Storage Facility. CURE members have studied the issues surrounding the operation of nuclear power plants for more than a decade.

The recent recognition that the world faces serious climate change and environmental disruptions chiefly due to the rapid infusion of fossil carbon into the earth's atmosphere by human activities coupled with the need to replace an aged generation and distribution infrastructure poses a serious problem for planners, regulators and the electric generation industry. The decisions and choices made by a relatively few people in Minnesota within the next few years will have enormous impact on coming generations and the environment they will inhabit. Reduction of energy demand driven by a significant conservation ethic and dramatically increased product and system efficiencies are the essential component for reducing the impact of energy generation on the environment. Choosing the best "bridge" technologies to carry us through to the ultimate, truly clean renewable energy sources will be critical. The long lead times to build and high capital costs associated with nuclear power and "clean coal/carbon sequestration" technologies suggest that decisions to commit to such system my be overwhelmed by "carbon tax" regulations or simply non-availability of sufficient investment capital to complete a project. A better approach may be to combine shorter lead time existing renewable technologies with short lead time, high efficiency, natural gas fired equipment. This more nimble approach should allow a faster, more cost effective transition to verging energy generation and storage technologies avoiding the pitfalls of "obsolete before completion" stranded costs. 4-a-AS

Proposal for Alternative Technology : Composite Resource Technology

Southern and Southeastern Minnesota and the eastern bank of the Mississippi River have wind resources equal or better than most sites that have been developed in Northern Europe. The geography is very well suited to "cluster" installations of 3 to 10 utility scale wind turbines . These turbine " clusters" will soon have access to the transmission and distribution grid presently being upgraded in the area. The wind turbines are a logical match with contemporary combined cycle and/or combined heat/power turbines fueled with natural gas (from Canada and the mid-West US). Other niche technologies (solar, biofuel, methane digester, etc.) may be combined or integrated to the transitioning generation mix . Pumped hydro might be explored to augment peak –demand capacity.

4-a-AS (continued)

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Comments in Response to XCEL Energy's Application for Certificates of Need for Additional Dry Cask Storage and Extended Power Uprate at the Prairie Island Nuclear Generating Plant

Preamble:

Communities United for Responsible Energy (CURE) is an association of citizens, established in 1996 in response to the selection of Florence Township, Goodhue County, MN as the location for an off-site Nuclear Spent Fuel Storage Facility.

CURE members have studied the issues surrounding the operation of nuclear power plants and the storage and transport of radioactive materials for more than a decade. During the earlier debates about nuclear plant operation and storage, industry and state officials continuously assured us that the risk of harm to the environment, animals and people from resulting from operation of the nuclear generating plant and the spent fuel storage facility was minimal and should not be a concern to us. We continue to maintain a healthy suspicion of that assurance.

We have observed that many modern industrial nations, particularly Scandinavia and the 23-country European Union, have established regulations that require government entities and corporations to demonstrate that their actions and products will not harm the environment or the public, now or in the future. We American citizens, on the other hand, are burdened with the requirement to prove that a government or corporate action is harmful to the environment, ourselves or our progeny.

I. **Impact on Regional Waters.**

Citizens and communities located downstream from Prairie Island have observed the changes that have occurred on the River and Lake Pepin since the PI Plant began operation in the 1970's. They are expressing concern about increased adverse seasonal impact to the character of the river valley and it's ecology. 4-b-AR/SW

During a recent public meeting, representatives of XCEL and the State of Minnesota indicated that the proposed 15% uprate of the Prairie Island plant would require a significant increase in the volume of Mississippi River water used to cool plant systems. They also indicated that the temperature of the water returned to River would be increased by approximately 3°F. There is concern about the impact of seasonal thermal plumes on the nearby and down stream aquatic environment and on the expanse, quality and duration of the ice cover on Lake Pepin. The long tradition of commercial and recreational activities (fishing, snowmobiling and ice boating) on River and Lake ice will surely be threatened by a further increase in water temperature.

4-b-AR/SW (continued)

4-c-SE

Concern was also voiced about the potential increased intentional or unplanned releases of radioactive water or chemicals into the River and the risk of subtle/ long-term impacts on the aquatic biome.

4-d-AR/HH

II. Impact on Regional Atmosphere

Documented and un-documented releases of radioactive gases from Prairie Island facilities continues to be a serious concern for people living in the ellipse southeast of Prairie Island and lying downstream along the Hiawatha Valley. The absence of monitoring for radiation plus lack of a public health base line survey fuel anecdotal rumors of cancer clusters and worry citizens in this zone.

4-e-HH

III. Proposal for Monitoring

The recently opened 35W river crossing bridge in Minneapolis establishes a new precedent for collaborative inspection and continuous independent monitoring of a facility that poses a demonstrated potential risk to the public.

CURE proposes that a similar monitoring program be established to continuously monitor the discharges from the Prairie Island Plant to surrounding environment.

We propose that the National Center for Earth-surface Dynamics (NCED - a research facility established by the National Science Foundation (NSF) and based at the University of Minnesota's St. Anthony Falls Laboratory) be engaged to design an appropriate program and instrumentation system to monitor the PI plant's releases to the environment.

Investigations should include but not be limited to the following:

- Thermal energy added to the river.
- Mapping of thermal plumes and their cycles
- Seasonal anomalies
- Observations of changes to the aquatic biome

4-f-SW

- Continuous monitoring to detect intentional and unplanned airborne release events of radioactive gasses and particles; mapping of distribution, concentration and duration of release of contaminants.
- Monitoring of area Karst formations that are at risk for potential radioactive contamination of ground water.
- Monitoring of run-off water from the plant and spent fuel storage sites.

It is proposed that the monitoring program be a collaborative effort guided by NCED working in cooperation with and supported by XCEL Energy, MN DNR, MN PCA, area governments, businesses and citizen groups. The data and analysis of the monitoring systems should be accessible to a broad spectrum of government, academic, public health and public interest organizations.

Monitoring equipment should be cost effective and data collection and transmission automated at an appropriate scale.

4-f-SW (continued)

The following pages contain the written comments submitted by Kristen Eide-Tollefson during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

PUBLIC COMMENTS: On NRC Environmental Review of Relicensing of The Prairie Island Nuclear Generating Plant (PING); and Xcels Environmental Report (ER) – Operating License Renewal Stage PING (NMC), Units 1 and 2, Docket No. 50-282 and 50-306, License Nos. DPR-42 and DPR-60.

DG-1149

To: Rulemaking, Directives and Editing Branch,
Office of Administraton, U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

From: Kristen Eide-Tollefson, Healingsystems@earthink.net,
P.O. Box 130, Frontenac, MN 55026 651-345-5488

Dear Sir,

I am using the CEQ EIS guidelines to frame my comments. My oral comments can be found in the evening transcript for the Red Wing public hearings. The outline of my comments is as follows:

I. Affected Environments
II. Interdisciplinary Approach
III. Connected Actions and Cumulative Effects
IV. Baselines
V. Recommended Alternatives
VI. Mitigation and Monitoring
VII. Additional Citations

Thank you for your attention to my comments to the scope of environmental review.

Kristen Eide-Tollefson

Sec. 1502.15 Affected environment. The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in a statement shall be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Agencies shall avoid useless bulk in statements and shall concentrate effort and attention on important issues. Verbose descriptions of the affected environment are themselves no measure of the adequacy of an environmental impact statement.

I. Affected Environment. Defining the scope of the affected environment is the foundation of the EIS. The defining of the affected environment either adequate captures, or inadequately constrains considerations in the EIS. This act of defining and describing, impacts interested and affected communities and persons. It is important to interested and potentially affected communities and persons, to be included in the scope and to have their economic, social and natural resource bases identified. See also **IV. BASELINES.**

The scope of the description of the affected environment should not be constrained by the requirement for succinctness in the description itself. Succinctness of description refers to length, not to content.

Prairie Island: The description of the affected environment should adequately describe the social, environmental, economic and health situation of the Prairie Island Indian Community. Xcel's ER is inadequate in this description.
Neighboring Communities/Counties: The scope should also adequately describe the social, environmental, economic and health characteristics of the affected counties listed in Xcel's ER under 2.6.

Xcel's discussion of the Area Economic Base under 2.6 in its ER is entirely inadequate to describe the affected social, economic and natural environments of the directly affected river communities in the listed counties.

5-a-ER

2.9 adequately describes planning concerns for Goodhue County. The county is increasingly looking to the special characteristics of its natural resource base to define its identity and guide future planning. Many of these resources are sensitive and require special consideration and planning treatment. The entire river valley ledge is highly susceptible to groundwater contamination. Surface water protections are increasingly important as well, as noted in 2.8.

5-b-GW/SW

50 Mile Impact zone: In addition, the NRC EIS should also either describe or say why it does not consider communities/counties within the 50 mile potential impact radius of the plant. Communities are very aware of this radius.

Hiawatha Valley: The EIS should particularly concern itself with the affected environment -- the environmental, social, economic and natural resource bases -- that are common to the river communities, across and downriver from Prairie Island. The ecologies and economies of the river valley communities are deeply

5-c-LR

interconnected - both between the shores and along the Great River Road which runs along both sides of the river, Wisconsin (Hwy 35) and Minnesota (Hwy 61). 5-c-LR (continued)

Area Economy: The area's economy is based in large part on tourism, recreational fishing and other water resource attractions. These economies are year round, and are affected by water quality, ice qualities and other features of the river/lake ecology. The scope of affected environments should extend to the southern end of Lake Pepin at least.

Some of the important common features of the Hiawatha Valley can be found in materials on:

- Hiawatha Valley Partnership
  www.nextstep.state.mn.us/res_detail.cfm?id=2380 - 14k
- The Great River Road, http://www.mnmississippiriver.com/
- The Mississsippi River Commission
  http://www.mvd.usace.army.mil/mrc/index.php,
- Mississippi River Regional Planning Commission -http://www.mrrpc.com/;
- Minnesota Mississippi River Parkway Commission
  www.mnmississippiriver.com Carol.Zoff@dot.state.mn.us; and the
- Mississippi Valley Partners business literature.
  http://www.city-image.com/index.php?page=Mississippi-Valley-Partners

Natural resource and waters information, is available from the Department of Natural Resources (Lake City office), and other commenting agencies. 5-d-SE

Sec. 1502.6 Interdisciplinary preparation Environmental impact statements shall be prepared using an inter- disciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts (section 102(2)(A) of the Act)...

II. Interdisciplinary approach. Evaluation of the interdependence of the local river community economies and ecologies -- the natural and "human environments" -- requires a fully interdisciplinary approach (see also connected actions and cumulative effects). The affected river communities should be extended, at least, to the southern border of Lake Pepin, which is directly impacted by PI. 5-e-AR

Special characteristics of PIIC: Analysis must in particular include the effects of the continued operation of the plant and expansion of the ISFSI upon the special characteristics of the of the Native American community at Prairie Island. This includes effects upon spiritual traditions, traditional diet, medicines, psychological well being and other categories, as defined by the Prairie Island Indian Community. 5-f-EJ/RW

Sec. 1508.8 Effects. "Effects" include (a) Direct effects, which are caused by the action and occur at the same time and place. (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.

Sec. 1508.14 Human environment. "Human environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See the definition of "effects" (Sec. 1508.8).) This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment

Sec. 1508.25 Scope: connected, cumulative and similar actions. Scope consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement. The scope of an individual statement may depend on its relationships to other statements (Secs.1502.20 and 1508.28). To determine the scope of environmental impact statements, agencies shall 3 types of actions, 3 types of alternatives, and 3 types of impacts. They include:

(a) (a) **Actions** (other than unconnected single actions) **which may be connected actions**, which means that they are closely related and therefore should be discussed in the same impact statement. **Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.**

(b) **Cumulative actions**, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

(c) **Similar actions**, which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequencies together. such as common timing or geography. An agency may wish to analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement

(d) (b) **Alternatives**, which include: i. No action alternative. ii. Other reasonable courses of actions. iii. Mitigation measures (not in the proposed action).

(e) **(c) Impacts, which may be: (1) Direct: (2) indirect: (3) cumulative.**

Sec. 1508.7 Cumulative impact. "Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

III. Connected Actions and Cumulative Effects: There are at least 4 pending actions which constitute connected actions and have cumulative effects upon these interdependent systems. These are identified below, and should be analyzed accordingly. We will need to depend upon the expertise of others to clarify the relationship of these actions to the 3 types of actions, impacts and alternatives listed in 1508.25, and addressed in the handbooks. The following chart gives an example: www.seeda.co.uk/RES_for_the_South_East_2006-2016/docs/AnnexF-031106.doc -

The scope of these particular comments should not limit definition and analysis of cumulative impacts, nor the definition and scope of the connected actions. They are merely a starting point which the affected and interested local governments should expand upon. <u>Please confirm that there will be an opportunity in the comment process for these affected communities to address cumulative effects and connected, cumulative and/or similar actions as defined in Sec. 1508.25.</u> Please clarify how that will work. 5-g-CI/LR

A. Connected, Cumulative or Similar Actions affected by the PING application. Environmental review under NEPA requires that the potential impacts of related actions present or future, and their **cumulative effects**, be described and analyzed. These actions need not be permitted by the same agency. The following actions, 5-h-CI specifically, are connected to the relicensing of Prairie Island and will be reviewed by both state and federal governments.

Our argument is that the timing of these reviews and the "departmentalization" of the actions is harmful, and blocks adequate EIS analysis of these federal actions, and undermines adequacy of the SER for relicensing. The connected, cumulative and/or similar actions listed below need to be evaluated as connected/cumulative or similar actions and their cumulative effects upon the affected environments must be evaluated. All are dependent upon and interconnected with the NRC relicensing review and permit: 5-h-CI (continued)

1. UPRATE – Certificate of Need Extended Power Uprate – PUC Docket E002/Cn-08-509. Without the extended license there will be no uprate. The license renewal safety review and aging reactor review MUST consider the cumulative effects of the uprate temperatures and pressures upon: a) the safety of the aging reactor, over time, and b) the cumulative environmental and socio-economic effects of increased temperatures on the ecology of the lake; c) new fuel types; d) additional emissions (if any) and timing and frequency of those emissions; e) other concerns raised by other parties, particularly the Prairie Island Indian Community (PIIC).

Scenarios: These assessments should be done for various water level scenarios on the ecology of the lake, and consider potential cumulative effects of warming temperatures (global climate change), with heat and emission factors from the uprate. Climate change effects, including temperature and water, are likely within the period of relicensing. This analysis should expand upon water demand, quality and shortage concerns for the area in addressing these scenarios. 5-i-OS

2. Site Permit Extended Power Uprate – PUC Docket Eoo2/GS-08-690. Without relicensing, there would be no site permit process. And it is the location of the uprate, at the PI facility, that creates the context for the connected actions and their cumulative effects upon the affected environments.

3. Additional Dry Cask Storage Certificate of Need PUC Docket E002/CN-08-510. Additional dry cask storage is needed to accommodate waste from relicensed reactors. There is no federal plan for this waste. It is therefore, reasonably speaking, beyond the reach of the confidence decision, regardless of its wording. Even if NRC judges, as it must, the adequacy of the confidence ruling, this does not eliminate the need to address the effects, as connected/cumulative/similar actions in the EIS.

There are a number of related actions that reach beyond the current license and relicensing period that involve decommissioning, long term storage of wastes at the reactor site, and an unspecified set of scenarios including federal actions (take title; regional interim storage etc) that impact the affected communities and local governments. While we have no illusions that we will significantly change the way in which NRC has delt with this issue in the past, there are specific impacts that we 5-j-RW would like addressed in the EIS that have to do with future funding, land use, and responsibility for at reactor site waste management. These socio-economic factors directly affect local governments, and it is not reasonable that they should not be addressed at the point of relicensing. Others may have other requests. 5-j-RW (continued)

Commitment of Resources: Local governments have ultimate responsibility for the safety and well being of their communities. They must define and defend their interests, as it relates to any actions or non-actions affecting their economic, social and natural environments. The lack of resolution of the storage issue, in the context of NRC extension of uprate, license and cask storage permits, creates significant burdens for these local governments, including but not limited to PIIC. These impacts include lobbying, time, money and expertise needed to provide adequate local oversight of the issues and respond to utility, state and federal initiatives. 5-k-OS/RW

Local Government impacts: Most importantly, where these local governments are unable or unwilling to commit resources to provide for the representation and defense of these interests, the intention of NEPA for public involvement, and a number of other NRC, state and federal principles - is undermined. 5-l-OS

Funding scenarios: Like NRC, the ability of local governments to 'do their job' depends upon funding. Should NRC's or DOE's funding continue to be reduced, or should fail - or their ability to perform adequately to their mandate be undermined by funding shortages, the primary burdens for protecting the safety and well being of the affected communities falls to their local government. It is in the context of the cumulative effects of current, and future actual and potential failures of funding (this includes Yucca Mountain) for the NRC/DOE mandates related to waste management, that the unresolved waste issue must be addressed in the EIS. See: www.naruc.org/Resolutions/Nuclear%20Waste%20Disposal.pdf 5-m-CI/RW

Xcel's responsibility: While Xcel, under the federal waste contract, is responsible for the waste until the federal government takes it, Xcel has provided for no mechanisms to ensure the responsible management, monitoring, or funding of indefinite storage; nor has Xcel done contingency planning in the event of federal funding shortages or failure. In fact, Xcel has continued to claim in related dockets that the waste storage is temporary and that their responsibility is subordinate to that of the federal government, despite the clear terms of the contract title. Neither PUC, nor NRC, nor DOE has addressed this gap in responsibility. And none of the 'responsible' entities has provided a reasonable set of factors, funding or timeline for the facility and cask replacement recommended by DOE, at each 50 to 100 years. 5-n-RW

No-Action: Because there is no federal plan for waste from relicensed reactors, there is no timeline for removal, no specified place for the waste to go, and no known facilities/cask replacement timeline, the cumulative effects of indefinite storage should be assessed. 5-o-CI/RW

Deterioration factor impacts line up for PI: The engineering studies for the Yucca Mountain D/EIS use 3 factors to evaluate the vulnerability of the designated regions to the effects of the no action (indefinite at reactor site storage) alternatives: proximity to populations, amount of precipitation, and the freeze thaw cycle, which are the primary factors in cask and facility deterioration rates. All three of these factors are present at Prairie Island.

Impact on commitment of resources, land use: The waste from the original license period is scheduled (in the YM queue) to be gone @2045. At this point the casks with waste from the initial license period/ISFSI will be between 40 and 50 years old. According to the Yucca Mountain DEIS timeline, this is also the point at which breakdown of containment could begin. The pool will be @ 70 years old.

With the casks gone, the site could be restored as early as @2045. If the plant is relicensed, then the site cannot be restored. Because it is so close to the business and residential environments of PIIC, the condition of the site will affect the quality of the environment in which they are doing business and residing. Indefinite storage creates an unacceptable level of unknowns and will not only deprive the Community of a restored environment, but will require expenditures related to due diligence and necessary vigilance in overseeing and responding to conditions at the storage site. These burdens threaten the quality of life and economic vitality of present and future generations.

5-p-RW

NEPA requirements: While NRC Rules allows these actions to be analyzed in a vacuum, NEPA and CEQ rules (arguably) do not. These actions can have significant, ongoing and cumulative effects upon the economies and ecologies, security and health of the area; and particularly upon future generations.

5-q-CI/LR

IV. BASELINES [7. Define a baseline condition for the resources, ecosystems, and human communities.]. The following baselines (at least) need to be established for the assessment of cumulative impacts, and to allow for meaningful monitoring of the affected environment into the future. These comments should in no way limit the work of EIS analysts, or the types and numbers of baselines to be established. Baselines need to be identified and represented in an accessible way; the data and analysis should be understandable to community members and local officials.

A. **Groundwater baseline:** Minnesota statute provides parameters for groundwater protection, that require a baseline to be established.

116C.76 NUCLEAR WASTE DEPOSITORY RELEASE INTO GROUNDWATER.

Subdivision 1. Radionuclide release levels. Radioactive waste management facilities for spent nuclear fuel or high-level radioactive wastes must be designed to provide a reasonable expectation that the undisturbed performance of the radioactive waste management facility will not cause the radionuclide concentrations, averaged over any year, in groundwater to exceed:

5-r-CI/LR

(1) five picocuries per liter of radium-226 and radium-228;
2) 15 picocuries per liter of alpha-emitting radionuclides including radium-226 and radium-228, but excluding radon; or
(3) the combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body of any internal organ greater than four millirems per year if an individual consumed two liters per day of drinking water from the groundwater.
Subd. 2. Disposal restricted. The location or construction of a radioactive waste management facility for high-level radioactive waste is prohibited where the average annual radionuclide concentrations in groundwater before construction of the facility exceed the limits in
subdivision 1.
Subd. 3. Protection against radionuclide release. Radioactive waste management facilities must be selected, located, and designed to keep any allowable radionuclide releases to the groundwater as low as reasonably achievable.
History: 1986 c 425 s 11

Epri: "Groundwater Protection Guidelines for Nuclear Power Plants, 2008." www.epriweb.com/public/000000000001016099.pdf

B. **Historic cancer rates** for Goodhue, Dakota, Peirce, and Wabasha Counties through 2006. We have been unable to access these statistics.

C. **Thermal conditions** south of PI to the southern border of Lake Pepin.

D. **Fish populations** south of PI to the southern border of Lake Pepin

5-r-CI/LR (continued)

In addition, the following information would be useful to local communities in understanding the 'baseline' trajectory and flux of emissions/releases over time. Without historic information, current information can be unduly alarming, and difficult to evaluate:

1. Air emission releases (See CURE comments), historic, through 2007
2. Thermal discharges, historic through 2007
3. Effluent discharges - type, timing and frequency, historic through 2007
4. Tritium discharges, historic through 2007.

Table 1-5. Steps in cumulative effects analysis (CEA)
to be addressed in each component of environmental impact assessment (EIA)

Scoping

1. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.

2. Establish the geographic scope for the analysis.

3. Establish the time frame for the analysis.

4. Identify other actions affecting the resources, ecosystems, and human communities of concern.

Describing the Affected Environment

5. Characterize the resources, ecosystems, and human communities

Environment identified in scoping in terms of their response to change and capacity to withstand stresses.

6, Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds,

7. Define a baseline condition for the resources, ecosystems, and human communities.

Determining the Environmental
8. Identify the important cause-and-effect relationships between human
Consequences activities and resources, ecosystems, and human communities.

9. Determine the mognitude and significance of cumulative effects.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

11. Monitor the cumulative effects of the selected alternative and adapt management.
http://orf.od.nih.gov/Environmental+Protection/NEPA/EnvironmentalAssessments.htm

5-r-CI/LR (continued)

V. Recommended Alternatives:

1. Replacement Option: Combined technologies, specifically wind paired with existing/refurbished gas facilities, should be the primary baseload alternative evaluated by Xcel. Xcel's gas fleet is aging. Its assessment of refurbishment should maximize opportunities for gas/wind combinations, optimizing flexible use of these facilities and avoiding the costs and climate impacts of new gas plants.

5-s-AS

2. Conversion option: An energy and R&D park at Prairie Island, would be a conversion option for the PI site and plant. It would utilize existing equipment, add modular generation and take advantage of the transmission at PI. Hydrogen could be generated during off peak hours and PI could become a hydrogen fueling and experimental station, among other R&D projects. This would bring an alternative selection of high paing 'green' jobs into the area, develop new capacities and provide opportunities to capture funding opportunities as new federal energy initiatives unfold.

5-t-AS

1502.22 - Incomplete or unavailable information.

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

(a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

(b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement: (1) A statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the

5-u-LR/OS

purposes of this section, reasonably foreseeable includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.

(c) The amended regulation will be applicable to all environmental impact statements for which a Notice of Intent (40 CFR 1508.22) is published in the Federal Register on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

While the "foreseeable future" is difficult to define with nuclear waste, the scope of incomplete and missing information regarding the fate of waste from relicensed reactors is significant. There is no rational plan, no maintenace or facility replacement schedule for relicensed reactors at Monticello or Prairie Island. There is no contingency planning; no scenario development. The missing information is not only factual, but procedural. This situation should be described, and elaborated, under this section of the EIS.

5-u-LR/OS (continued)

VI. 1508.20 Mitigation and Monitoring: Mitigation includes:
(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
(e) Compensating for the impact by replacing or providing substitute resources or environments.

From the perspective of a planning commission member in a downriver community that is part of the affected environment of the PING, the most useful kind of mitigation to consider in conjunction with relicensing the plant, is an exploration of long term joint stakeholder mechanisms would allow affected communities and local governments to participate meaningfully in the ongoing decisions involving PING. Several references are included below.

"Stepwise approach to decision-making for long term radioactive waste". www.nea.fr/html/rwm/reports/2004/nea4429-stepwise.pdf

"Uncertainty, innovation, and dynamic sustainable development (applied to nuclear waste)" Lenore Newman School of Environment and Sustainability, Victoria, B.C., Canada V9B 5Y2(e-mail: lenore.newman@royalroads.ca) http://ejournal.nbii.org/archives/vol1iss2/0501-001.newman.html

5-v-LR

VII. Citations: The following set of citations from CEQ rules is included for the benefit of other public commentators. For NRC, the inclusion of these sections creates a framework of our expectations regarding the importance and scope of connected/cumulative effects analysis (CEA). We have used primarily CEQ references since this is the standard that NRC uses:

5-w-CI

Table 1-2 Principles of Cumulative Effects Analysis http://ceq.hss.doe.gov/nepa/ccenepa/sec1.pdf

Cumulative Impacts are caused by the aggregate of past, present, and reasonably foreseeable future actions.
The effects of a proposed action on a given resource, ecosystem, and human community include the present and future effects added to the effects that have taken place in the past. Such cumulative effects must also be added to effects (past, present, and future) caused by all other actions that affect the same resource.

2. Cumulative effects are the totai effect,Including both direct and indirect effects.on a given resource, ecosystem, and human community of ail actions taken, no mat?er who (federai, nonfederal, or private) has taken the actions.
Individual effects from disparate activities may add up or interact to cause additional effects not apparent when looking at the individual effects one at a time. The additional effects contributed by actions unrelated to the proposec action must be included in the analysis of cumulative effects.

3. Cumulative effects need ta be analyzed in terms of the specific resource, ecosystem, and human community being affected.
Environmental effects are often evaluated from the perspective of the proposed action. Analyzing cumulative effects requires focusing on the resource, ecosystem, and human community that may be affected and developing an adequate understanding of how the resources are susceptible to effects.

4. It IS not practical to analyze the cumulative effects of an action on the universe; the ilst of environmental effects must focus on those that are truly meaningful.
For cumulative effects analysis to help the decisionmaker and inform interested parties, it must be limited through scoping to effects that can be evaluated meaningfully. The boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to affected parties.

5. Cumulative effects on a given resaurce, ecosystem, and human community are rarely aligned with poiitical or administrative boundaries..
Resources typically are demarcated according to agency responsibilities, county lines, grozing allotments, or other administrative boundaries. Because natural and sociocultural resources are not usually so aligned, each political entity actually manages only a piece of the affected resource or ecosystem. Cumulative effects analysis on natural systems must use natural ecological boundaries and analysis af human communities must use actual sociocultural boundaries to ensure including all effects,

6. Cumulative effects may resuit from the accumulation of simliar effects or the synergistic interaction of different effects.
Repeated actions may cause effects to build up through simple addition (more and more of the same type of effect), and the same or different actions may produce effects that interact to produce cumulative effects greater than the sum of the effects.

7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
Some actions cause damage lasting far longer than the life of the action itself (e.g., acid mine drainage, radioactive waste contamination, species extinctions). Cumulative effects analysis needs to apply the best science and forecasting techniques to assess potential catastrophic consequences in the future.

8. Each affected resource, ecosystem, and human community must be analyzed in terms of he capacity to accommodate additional effects, based on its own time and space parameters.
Analysts tend to think in terms of how the resource, ecosystem, and human community will be modified given the action's development needs. The mast effective cumulative effects analysis focuses on what is needed to ensure long-term productivity or sustainability of the resource.

Table 1-4 Types of Cumulative Effects

In simplest terms, cumulative effects may synergistic-where the net adverse cumulative arise from single or multiple actions and may effect is greater than the sum of the individual result in additive or interactive effects. Interac- effects. This combination of two kinds of tive effects may be either countervailing— actions with two kinds of processes leads to four where the net adverse cumulative effect is less basic types of cumulative effects (Table 1-3; see than the sum of the individual effects-r Peterson et al. 1987 for a similar typology).

Type 1 — Additive - **Repeated "additive" effects from a single proposed project.**
Example: Construction of a new road through a national park, resulting in continual draining of road salt onto nearby vegetation.

Type 2 – Interactive - **Stressors from a single source that interact with receiving biota to have an "interactive"**

5-w-CI
(continued)

(nonlinear) net effect.
Example: Organic compounds, including PCBS, that biomagnify up food chains and exert disproportionate toxicity on raptors and large mammals.

Type 3 – Additive - Effects arising from multiple sources (projects, point sources, or general effects associated with development) that affect environmental resources additively.
Example: Agricultural irrigation, domestic consumption, and industrial cooling activities that all contribute to drawing down a groundwater aquifer.

Type 4 - Interactive - Effects arising fram multiple sources that affect environmental resources in an interactive (i.e., countervailing or synergistic) fashion.
Example: Discharges of nutrients and heated water to a river that combine to cause an algal bloom and subsequent loss of dissolved oxygen that is greater than the additive effects of each pollutant.

Criteria. In determining whether a proposed action will or will not "significantly affect the quality of the human environment," OPDIVs/STAFFDIVs should evaluate the expected environmental consequences of a proposed action by means of the following steps, utilizing the guidance provided in 40 CFR 1508.27:

Step One -- Identify those things that will happen as a result of the proposed action. An action normally produces a number of consequences. For example, a grant to construct a hospital may terminate human services; will involve destruction and construction; will provide a service. Actions may be connected, cumulative, or similar (see 40 CFR 1508.25(a)).

Step Two -- Identify the "human environments" that the proposed action will affect. In accordance with 40 CFR 1508.27, the significance of an action must be analyzed in several contexts, such as society as a whole (human, national), the affected region, the affected interests, and the locality. The significance of an action will vary with the setting of the proposed action. Environments may include terrestrial, aquatic, subterranean, and aerial environments, such as islands, cities, rivers or parts thereof.

Step Three -- Identify the kinds of effects that the proposed action will cause on these "human environments." A change occurs when a proposed action causes the "human environment" to be different in the future than it would have been, absent the proposed action. These changes involve the introduction of various "resources" (including those often characterized as waste).

Example: A decrease in the amount of soil entering a stream; the introduction of a new chemical compound to natural environments.

In addition to organisms, substances, and compounds, the term "resources" include energy (in various forms), elements, structures, and systems (such as a trash collection service in a city). Present environmental impacts and reasonably foreseeable future environmental impacts must be considered.

In identifying changes caused by the proposed action, OPDIVs/STAFFDIVs should identify the magnitude of the changes likely to be caused within smaller and larger "human environments" affected (e.g., part of a city, the whole city, the metropolitan area).

The impacts resulting from the proposed action may be direct, indirect, or cumulative (see 40 CFR 1508.25(c)).

Step Four -- Identify whether these changes are significant. The following points should be considered in conjunction with 40 CFR 1508.8 (effects), 40 CFR 1508.14 (human environment), and 40 CFR 1508.27 ("significantly") in making a decision concerning significance:

- A change in the characterization of an environment is significant (e.g., from terrestrial to aquatic.
- The establishment of a species in or removal of a species from an environment may be significant
- The more dependent an environment becomes on external resources, the larger the magnitude of change (and the more likely it is to be significant);
- The larger the environment under consideration, the lower the amount of change needed before the change may be significant.

The CEQ regulations in 40 CFR 1508.27 describe a number of factors that should be considered in evaluating severity (intensity) of an impact. OPDIVs/STAFFDIVs should consider the cumulative effect of the proposed action. An action may

5-w-CI
(continued)

be individually insignificant but cumulatively significant when the action is related to other actions. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

Sec. 1508.27 Significantly. "Significantly" as used in NEPA requires considerations of both context and intensity:

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.
- The degree to which the proposed action affects public health or safety.
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
- The degree to which the effects on the quality of the human environment are likely to be highly controversial.
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

5-w-CI (continued)

Respectfully submitted,
Kristen Eide-Tollefson
HealingSystems@earthlink.net
P.O. Box 130 Frontenac, MN 55026
651-345-5488/612-331-1430

About the commentator: Eide-Tollefson served on the MN Environmental Quality Board Citizen's Site Advisory Committee for the Goodhue Storage Facility exercise in 1995. After the Florence Township sites were eliminated from consideration, she continued to work as a citizen advocate in state regulatory and legislative arenas., submitting numerous comments on integrated resource planning, and other nuclear and energy resource proposals.

In 2006 she graduated from the Humphrey Institute MPA program with a concentration in "Public Engagement in Energy Policy, Planning and Infrastructure Development". She has served on Environmental and legislative stakeholder and advisory committees and from 1999-2003, was active in the Nuclear Waste Strategy Coalition. She is currently a planning commissioner for Florence Township, Goodhue County. She is, however, not an environmental lawyer or professional and must depend upon the expertise of NRC professionals in evaluating and acting upon her comments and recommendations.

The following pages contain the comments
made by Kristen Eide-Tollefson during the
NRC public scoping meetings held on July 30, 2008

MR. RAKOVAN: That was the last card that I had for comments. If someone else has a comment that they'd like to make, if you could just come on up to the mike, and if you could please introduce yourself.

KIRSTEN EIDE TOLLEFSON: I am Kirsten Eide Tollefson, and I live in Florence Township, just down the road a little bit.

I've been reading nuclear documents for about 12 years and have not, I have to admit, made my way all the way through this one; but I do have a pretty fundamental concern that I would appreciate being addressed by the environmental review.

Under NEPA and environmental review in general, the consideration of connected actions and cumulative effects are very important elements to be reviewed, and there are a number of processes concurrently happening.

5-x-CI

There is the application for the relicensing; there is the fuel change that was mentioned; and then there's a fuel upgrade application, and there's also an extended storage application. And all of these are being simultaneously considered by NRC and by the Minnesota

5-y-OS/RW

Public Utilities Commission.

I'm extremely concerned about the timing of the fuel uprate application. It seems to me that if the plant is going to be run longer and hotter and to a greater capacity, that's going to affect -- and with a different fuel type, that's going to affect both the operations and the pool storage; it's going to affect the safety of the pool; it's of course going to affect the particulars on the long-term storage of the waste at the reactor site, and I'm very, very concerned that that fuel uprate be part of the review of the safety analysis. 5-y-OS/RW (continued)

And it seems very inappropriate for there to be significant factors like heat that are not included in the safety review of an aging reactor. I'm just very, very concerned about that and, again, how that also may affect the pool safety.

I'm -- the pool is in the plant, so I'm hoping we consider that part of operations. But I realize we might have cordoned it off into storage areas -- into storage. 5-z-NS

I also have a question that I wish I had asked earlier. It's a concern about what seems to me to be a changed circumstance in the storage of 5-aa-RW

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nuclear wastes at the reactor site.

If someone would like to explain this to me later, that would be great, but it seems to me that the difference in waste -- in the confidence decision that waste is safe at a reactor site for 30 years after the closure of the plant, which would, of course, put it out into the '70s somewhere -- or -- I have -- I'm not going to add that right now -- there is -- the difference that it makes is that there's not a federal plan that I'm aware of for the waste for the relicensed reactors, and so that confidence has -- doesn't to me have the same bases as the confidence that the waste that has already been generated which is the in queue will have a place to go.

So none of the waste for the relicensed reactors has a queue that's in to go anywhere, and I think that's a significant changed circumstance that should be considered in this proceeding.

I read the background documents for the EIS for Yucca Mountain for the no-action alternative. And these are the engineering studies upon which they base the recommendation for the no-action alternative.

5-aa-RW (continued)

The no-action alternative recommended that any site where the waste -- the no-action alternative assumed that waste would not be removed from the site but that it would be there for -- it may have been 10,000 years. I think that was the basis. I didn't bring it.

But the three factors that were considered in that review that made -- that were the factors for the breakdown of the storage containment which the EIS recommended be replaced fully every 50 years, there were three factors in the engineering studies: Precipitation, freeze/thaw cycle, and proximity to populations.

And I believe that in Minnesota the precipitation, the freeze/thaw cycle, and the proximity to populations are an extremely critical factor.

And so if we have waste that has nowhere to go, isn't in a queue, and doesn't have a federal plan for its removal, I would submit that this is a serious cumulative issue and would like to understand more how that's going to be handled.

Thank you.

MR. RAKOVAN: Any other comments tonight?

5-aa-RW (continued)

The following pages contain the written comments submitted by Lea Foushee during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

From: Lea Foushee [lfoushee@nawo.org]
Sent: Friday, August 22, 2008 4:43 PM
To: PrairieIslandEIS Resource
Subject: Testimony additions

I was unable to access the Annual 2007 Radioactive Effluent Release Reports for Prairie Island
Nuclear Reactors a timely fashion for the Public Hearing in Red Wing on July 30th, even after
calling the Minnesota Department of Health, the Nuclear Management Company, and the Office
of Public Assistance at the Nuclear Regulatory Commission.
I have been told a multiple of excuses of why these "routine"
documents were not posted on the ADAMS electronic website, perhaps the most disturbing is
sensitivity screening or scrubbing. The VP of Plant Operations, Mike Wadley sent them to me
immediately "the morning after" the Public Hearing was over. After reviewing the actual
documents, I realize the "why" of their lateness and lack of availability. There was an undetected
gaseous radioactive leak that went on for six months. There was an additional failure that caused
a liquid release in 2007. The radioactive effluents reported in both abnormal releases to the
environment were extrapolations, NMC
Engineering staff calculations. In 2006 during a routine refueling
cycle there were 10 abnormal releases of radioactive effluents due to breaking reactor parts.
The NRC staff professed that no number scrubbing would ever be done by them, but if Utility
staff has to make them up, the numbers are effectively scrubbed, and we will not know what
the real releases to the public health and environment may have been. 6-a-HH

Additionally I was assured (Nathan Goodman) that a real Environmental Justice analysis would
be performed for the plant specific EIS. If this is in fact correct the point of origin of the uranium
ore and its fabrication into fuel, and the ultimate disposal of all radioactive wastes generated
must be included. 6-b-EJ/UR

Furthermore we were assured/promised (Brian -- Our Regional Director) specific monitoring of 6-c-HH

the routine radiation effluent releases would be done, including isopleths dispersion to determine
where the hundreds and sometimes thousands of curies of radiation actually goes in our environment.

6-c-HH (continued)

Lea Foushee
North American Water Office
Lake Elmo, MN 55042

From: Lea Foushee [lfoushee@Nawo.org]
Sent: Monday, September 22, 2008 11:52 AM
To: PrairieIslandEIS Resource
Subject: Fwd: DG-1149 Prairie Island EIS scoping

Sorry if this is a duplicate submission there was no advisory sent to me when the broken link was
repaired. I have however added additional points in this submission from the earlier email that
was sent.

Begin forwarded message:

From: Lea Foushee <lfoushee@Nawo.org>
Date: September 21, 2008 9:05:27 PM CDT
To: NRCREP@nrc.gov
Subject: Fwd: DG-1149 Prairie Island EIS

Begin forwarded message:

From: Lea Foushee <lfoushee@nawo.org>
Date: September 21, 2008 8:11:43 PM CDT
To: NRCREP@nrc.gov
Subject: DG-1149 Prairie Island EIS

These comments are in addition to the verbal testimony given on July 30, 2008 at the Red Wing Public Hearing on the Relicensing of the Prairie Island Nucular Plant as well as a written information sheet that NAWO was requested to produce by the public on Tritium. The document was given to the Hearing Record Court Reporter, and is titled Health Risks of Tritium.

I was unable to access the Annual 2007 Routine Radioactive Effluent Release Reports for Prairie Island Nuclear Reactors in a timely fashion for the Public Hearing in Red Wing on July 30th, even after calling the Minnesota Department of Health, George Johns, the Nuclear Management Company staff person, Amy Hass, both her office line and cell phone, and the Office of Public Assistance at the Nuclear Regulatory Commission, Scott Burnell. I have been told multiple excuses why these "routine" documents were not posted on the ADAMS electronic website in advance of the Relicensing Hearing, perhaps the most disturbing was sensitivity screening or scrubbing. It was made abundantly clear 6-d-HH that I would not be given access to this document before the Public Hearing was over.

The VP of Plant Operations, Mike Wadley sent them to me immediately "the morning after" the Public Hearing was over, too late for questions or media coverage of the contents. After reviewing the actual documents, I realize the "why" of their lateness and lack of availability. There was an undetected gaseous radioactive leak that went on for six months that released 3,000 cubic feet of radioactive gas (extrapolation). There was an additional failure that caused a liquid release in 2007. The radioactive effluents reported in both abnormal releases to the environment were extrapolations, NMC Engineering staff calculations. The NRC staff professed that no number scrubbing would ever be done by them, but if Utility staff has to make them up, the numbers are effectively scrubbed, and we will not know what the real releases to the public health and environment may have been. In 2006 during a routine refueling cycle there were 10 abnormal releases of radioactive effluents due to breaking reactor parts.

6-d-HH (continued)

It is also disturbing that there is no longer a total number calculated for number of curies per year from the reactors in question of all isotopes released in the annual radioactive effluent release report document contrary to previous years. A lay person must calculate scientific notation across all releases and quarters to get a total number of curies released. A site specific EIS must contain total curies for all Routine Radioactive Effluent Releases (solid, liquid and gaseous) since the opening of the facility and projections for potential minimum and maximum releases for the additional years that the facility is requesting operations into the future. There must be a discussion about the total radioactivity released that is remaining, still circulating in the environment from those historic releases, and where the concentrations of such releases have been deposited. Without this information provided the document is inadequate in terms of identifying health risk to the public as well as other living creatures. Furthermore we were assured/promised (Brian Holian, Our Regional Director) specific monitoring of the routine radiation effluent releases would be done in a site specific EIS for Prairie Island, including dispersion isopleths to determine where the hundreds and sometimes thousands of curies of radiation actually go in our environment.

6-e-HH

Additionally I was assured (Nathan Goodman) that a real Environmental Justice analysis would be performed for the Prairie Island plant specific EIS. If this is in fact correct, the entire nuclear fuel chain must be assessed for the specific additional exposure risks including the point of origin of the uranium ore and its enrichment and fabrication into fuel, transportation of the fuel, and the ultimate transportation and disposal of all radioactive wastes generated throughout the relicense period. The risk of radiation exposure to Indigenous Peoples, other

6-f-EJ/RW/UR

Communities of Color, and economically disadvantaged individuals from this expansion far exceeds the fifty mile radius proposed for such an analysis. The fifty mile limitation biases the Environmental Justice analysis and excludes many impacted EJ Communities whose health will be affected by this proposal.

6-f-EJ/RW/UR (continued)

Lea Foushee
North American Water Office
Lake Elmo, MN 55042

The following pages contain the comments
made by Lea Foushee during the
NRC public scoping meetings held on July 30, 2008

have.

CAROL OVERLAND: Then what can I say?

LEA FOUSHEE: I'm Lea Foushee. I work with the North American Water Office, and we've been involved with this Prairie Island process for over 25 years, and we did not receive a notice either.

Just to make it very clear that those of us that have been working on this reactor site historically have not received notice from the NRC period.

I got a copy of the NRC notice from another anti-nuclear organization in Washington, D.C. They said, "Hey, do you know about this?"

And I said, "Well, yeah, I do, but not because they told me about it."

6-g-LR

MS. FRANOVICH: You're talking about the notice for the public meeting?

LEA FOUSHEE: I'm talking about the notice for this meeting, this --

MS. FRANOVICH: For the meeting.

LEA FOUSHEE: This -- right.

MS. FRANOVICH: I understand.

LEA FOUSHEE: And we are in the 50-mile zone for an environmental justice notification, and

6-g-LR (continued)

I'm the Director of Environmental Justice for my organization and I did not receive any kind of notice whatsoever.

6-g-LR (continued)

MS. FRANOVICH: Okay. Thank you.

MR. RAKOVAN: Any further questions?

Okay. You want me to come to you or --

JEFF ERPINE: Jeff Erpine. I'm just a resident.

I was wondering as far as Units 1 and 2 are concerned, will there be any talk about the critical components they're talking about as far as, like, the aging process, you know, what's being done to manage it?

MS. FRANOVICH: Okay. Can you repeat your question? I'm not quite sure I understood you.

JEFF ERPINE: Oh, I'm sorry. Will there be a meeting to discuss the critical components?

MS. FRANOVICH: The critical components that are being evaluated?

JEFF ERPINE: Yes, and what's being done to manage the aging process there?

MS. FRANOVICH: Right. We just received the application in mid April, and so we're going through the process now of evaluating what's called

I'm Lea Foushee. I'm the Environmental Justice Director for the North American Water Office.

About two months ago I received an anonymous letter telling me that the Routine Radioactive Effluent Release Report for Prairie Island was not available to the public as it ordinarily is in May of the following year that the emissions have been generated.

And I said, "Well, you know, maybe it will come out later," and so I didn't do anything about it.

48 hours ago I got a request to update a flyer that we produced on Monticello when the Monticello nuclear reactor was being relicensed and make it specific for Prairie Island instead of Monticello, and I said, "Well, okay."

And so I went and looked for those reports thinking that by now it's got to be there, it's two months later.

It wasn't there. It wasn't there.

Every other year it was there, 2008 -- or 2006 all the way back to 1999. So I downloaded all those, and so I have all those and it's on my hard drive.

6-h-HH/LR

And I said, "Well, you know, let's go see if we can find the missing report."

So I called the Health Development; they of course are totally unavailable. And kept calling them.

And I called and they gave me the name of the worker at the plant that supposedly deals with those sort of things, Amy -- Amy what? I can't remember Amy's last name.

She didn't answer her phone. I left her a message. She still didn't answer her phone two days later. I called her cell phone; she didn't answer that either.

So I called the NRC themselves after looking over and over again for the missing information, and I called the Office of Public Assistance finally and got a warm body. And I was really surprise, because you ordinarily don't get a warm body, you get an answering machine.

And they said that I should send them an email with the request for the information and they'd send me a link and give me that information that afternoon.

And I thought, "Well, great. Great.

6-h-HH/LR (continued)

Talk about service."

And lo and behold the afternoon came and went, of course no email. Of course no email.

So I called them back in the morning, and they of course said that they would have to forward that request to a man named Scott Burnell.

And said, "Well, how about a" -- "Can I talk to a warm body? Can I really talk to the guy?"

They put him on the phone. And so I talked to him, and he said he would talk to the staff of the project and see what he could do, but there was -- he was surprised that it wasn't there, obviously, but there was nothing he could do anyway.

So I ended up talking to J.P. Leous. I don't -- I don't know who J.P. is, but he told me that the report was being put through a sensitivity review.

Now, I don't know what that means or why the document is two months late and has to go through a sensitivity review, but in 2006, when it was down for refueling, there were ten abnormal releases. Ten abnormal releases.

And the routine radioactive effluent releases were over 800 curies when they're ordinarily

6-h-HH/LR (continued)

around 500. Some years they have -- historically have been in the thousands of curies.

So my question is what are you covering up? What are you covering up? Why aren't you releasing it in a routine manner if it's routine releases?

Monticello is already up there, no problem. Prairie Island, sensitivity scrubbing. Sensitivity scrubbing.

So that means one of two things to me.

Now, speculation, obviously, but if 2006 was several orders of magnitude more radioactive effluent releases than normal, I can only hazard to think what your refusal to release that to the public in a timely fashion might mean.

I was summarily told that I was not going to get that information. And there was probably some not-so-happy feelings about that, but nonetheless I think I was denied a public document because of where I work and my history of long-term opposition to this facility.

Now Andrew, he told me he would get it to me right away. He was very nice. He said he'd send me a CD and he'd send me the entire thing.

6-h-HH/LR (continued)

So Andrew -- you'd better take a page from young Andrew. He knows how to treat the public.

Thank you.

6-h-HH/LR (continued)

MR. RAKOVAN: Okay. Next, George Crocker.

And again, after George we'll go to Alan Muller.

GEORGE CROCKER: Thank you. My name is George Crocker. I'm with the North American Water Office, and I have a comment for the scope of your environmental review relative to considering analyzing, disclosing environmental impacts of continued plant operation.

And the comment that I have relates to the story you just heard about routine releases, because I think that the NRC should require Prairie Island and all of the other commercial reactors to document where reported released radionuclides go.

Where do they go? I know that you do monitoring. You do a lot of monitoring. If you don't really know what you're looking at when you see all of the little thermal luminescent dosimeter mappings and where the pics are, why you say "Aha, there's monitoring."

in the same timeframe we had hoped. We were looking to start it around June 30th; it didn't actually start until I believe it was July 22nd. And so we have extended the scoping period to give the public a full 60 days, so I think we've already accommodated that request.

And so with that, I just wanted to remind everyone Lance had indicated that there are public meeting feedback forms that were provided when the meeting first started, so if there are ways we can improve our meetings, make them better, do them differently, please do fill out one of these feedback forms and leave it on the table, or you can mail it to us. The postage is pre-paid. And I know a couple of you have questions; what I'd like to do is go on and close the meeting and then get with you to talk about your questions.

LEA FOUSHEE: I want this on the record.

MR. RAKOVAN: She wants something on the record.

LEA FOUSHEE: The document is Routine Radioactive Effluent Releases.

MS. FRANOVICH: Okay.

LEA FOUSHEE: That document -- the

6-i-ER/HH

results of that document, the radiation that is contained in that document is nowhere in the application to demonstrate that there is anything relating with radiation and health impact.

6-i-ER/HH (continued)

MS. FRANOVICH: I understand. Okay.

LEA FOUSHEE: It needs to be in there, the routine radiation releases from Prairie Island 1 and 2 must be in the environmental impact statement, and they are not.

And in fact there should be a historical record, because the radiation doesn't just go away in a year.

6-i-ER/HH (continued)

MS. FRANOVICH: I'm thinking that the plants are required to submit effluent reports annually to the NRC, so --

LEA FOUSHEE: Yes, but the application should have a summary of at least the last 10 years, and certainly the last 20, if possible.

6-i-ER/HH (continued)

MS. FRANOVICH: Point noted. But just so you're -- I just want to --

LEA FOUSHEE: But it's not there.

MS. FRANOVICH: I just want to assure you that the NRC staff, when we go through the application, the environmental report is a starting

The following pages contain the written comments submitted by Katie Himanga during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

City of Lake City

205 West Center Street
Lake City, Minnesota 55041
(651) 345-5383
Fax: (651) 345-3208
www.ci.lake-city.mn.us

September 10, 2008

7/22/08
73 FR 42628
2

RECEIVED
2008 SEP 15 PM 4:57
RULES AND DIRECTIVES BRANCH USNRC

Chief; Rules, Directives, and Editing Branch
Division of Administrative Services
Mailstop T-6D59
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Chief:

This letter supplements my remarks made at the License Renewal and Environmental Scoping Review Process meeting for the proposed license renewal at Prairie Island Nuclear Generating Plant, Units 1 and 2, held July 30, 2008 in Red Wing, Minnesota.

Concerns for the Lake City community that emerged from conversation at meetings of both the Lake City Utility Board and Lake City Common Council are a follows:

1. Long-term storage of nuclear waste
2. Thermal impact of service water discharge on the Mississippi River and Lake Pepin.

7-a-AR/RW/SW

We ask that the best available water dispersion modeling be used to assess the natural ecosystem and cultural impacts of thermal discharge and that there be a plan put in place to mitigate adverse impacts. What follows is expanded development of our concerns related to thermal impacts. We recognize Lake Pepin, the Mississippi River, and its tributaries as interacting components of the world's third largest river system. The thermal plume of any water discharge has potential to impact:

<u>Vertebrates and invertebrates.</u> A thermal plume can have direct impacts such as changes in distribution of aquatic organisms (e.g. attracting fish to warmer water during winter), or cause indirect impacts such as increased exposure to predators (e.g. through concentrating prey fish in warmer waters during winter).

<u>Ice.</u> A thermal plume can affect the characteristics of ice or the length of the ice cover season on Lake Pepin. It is a safety consideration, but also cultural in that recreation on the ice is a long-standing community tradition that could be altered because of safety concerns.

<u>Distribution of Sediment.</u> A thermal plume can affect the hydrodynamics of a river which

7-b-AR/CR/SW

SUSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = R. Plasse (RAP 10)

Birthplace of Waterskiing - 1922

City of Lake City Letter
September 10, 2008
Page 2

then affect the distribution of sediment in the immediate channel and downstream. Water temperature affects the ability of water to carry sediment (colder water can carry more). The Pollution Control Agency, acting as it is legally required to do under the federal Clean Water Act, is working to develop a Total Maximum Daily Load (TMDL) for Lake Pepin. It is a restoration project with set goals for the dose of pollution that the river system can handle and still be used for specific purposes such as drinking water, fishing or swimming.

Dissolved Oxygen. Water temperature affects dissolved oxygen levels. Increasing water temperature decreases water's ability to carry oxygen.

Endocrine Disruptors. If a thermal plume interacts with a municipal wastewater discharge plume, organisms (e.g. catfish, smallmouth bass) congregating in the warmer water may be subject to prolonged exposure to chemicals such as those found in birth control pills.

Phytoplankton and Zooplankton. Heat can result in increased production of organisms that ultimately can lead to a decrease in light and oxygen in the river and in Lake Pepin.

Parasites. Thermal effluent has been reported to influence the prevalence and abundance of parasites of fish.

As a result of these potential impacts and affects, we ask that changes in seasonal mean temperature be assessed related to the facility upgrade for the entire dispersion plume, both in the main channel of the Mississippi River and on each shore of Lake Pepin.

Please feel free to contact me if you have any questions. I can be reached at (651)345-5383, extension 118 or at khimanga@embarqmail.com.

7-b-AR/CR/SW (continued)

Sincerely,

Katie Himanga

Katie Himanga
Mayor

The following pages contain the comments
made by Katie Himanga during the
NRC public scoping meetings held on July 30, 2008

federally-recognized Indian tribe, and as such we expect to work with the federal agencies, including the Nuclear Regulatory Commission, on a government-to-government basis, and we are pleased that the NRC has approved our request for a cooperating agency for purposes of preparing parts of the -- for the environmental impact statement for the license renewal.

We look forward to working with the NRC over the next two years on this important issue. We will be submitting extensive written comments to the NRC relative to environmental and safety concerns.

And I thank you for this opportunity to speak in front of you today. Thank you.

MR. RAKOVAN: Thank you, sir.

Next will go to Katie Himanga.

KATIE HIMANGA: Good afternoon. My name is Katie Himanga. I'm the mayor of the City of Lake City. We're located about 15 miles down river.

Thank you for the opportunity to say a few words. The community of Lake City is impacted by the Prairie Island Nuclear Plant, just as other communities in the area are.

The Lake City Utility Board had an

7-c-RW

opportunity to talk about the license renewal at its last meeting, and my City Council spoke about it very briefly this past Monday evening.

And I bring to you the top two concerns, environmental concerns related to operation of the nuclear plant and ask that they be considered in plans for mitigation through this process.

7-c-RW (continued)

First and foremost the item of concern for us is the long-term storage of nuclear waste.

The second concern for us is the thermal impacts of the discharge of water, warm water into the Mississippi River, and we ask that it be considered, both the impacts on the Mississippi River and on the Lake Pepin ecosystem, and also its cultural impacts such as how it might affect ice, for example.

7-d-AR/CR/SW

And we would ask that the best available modeling be used to determine what those impacts are and plans made for mitigation.

Thank you.

MR. RAKOVAN: Thank you.

Next we'll go to Scott Arneson.

SCOTT ARNESON: Thank you.

I'm Scott Arneson, Goodhue County

The following pages contain the written comments submitted by Mary Jackson during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

From: Jackson, Mary [Mary.Jackson@CO.DAKOTA.MN.US]
Sent: Monday, September 22, 2008 5:19 PM
To: PrairieIslandEIS Resource
Cc: Beeman, Michelle; Welsch, Heidi; Chatfield, Kurt
Subject: Prairie Island Relicensing SEIS scoping comments

RE: Prairie Island Nuclear Generating Plant (PINGP) Re-licensing EIS Scoping Comments
To Whom It May Concern,
Staff from Dakota County, Minnesota prepared the following comment for the NRC's consideration,
based on review of the required SEIS scope for relicensing nuclear generation facilities and the Prairie
Island Environmental Report prepared by Xcel Energy.
1) No additional SEIS scope items are suggested.
2) Additional NRC evaluation within the pre-defined SEIS scope is suggested related to PINGP's
reliance on Mississippi River water for cooling (circulation) water. Xcel Energy's Environmental Report
refers to a future federal project near PINGP to correct a long standing navigation safety issue at Lock
and Dam 3. This lock-and-dam complex is one mile downstream of PINGP and forms Upper Mississippi
River Pool 3. The navigation safety issue is described on the U.S. Army Corps of Engineers website as
follows:
Lock and Dam 3 is a navigation dam and lock on the Mississippi River 6 miles upstream from Red Wing, Minnesota. Its position on a bend in the river makes down bound navigation difficult because of an out draft current that tends to sweep towboats and barges away from the lock toward the gated part of the dam. The out draft current has resulted in many accidents, including 11 incidents since 1968 when tows collided with the
gated part of the dam. A related problem is with the low and weak embankments on the Wisconsin side.

Navigation accidents can render the four roller gates inoperable, resulting in overtopping and erosion of the embankments. The three Wisconsin side embankments divide the 8-foot head at the dam into three steps and work together as part of Lock and Dam 3. Failure
of the embankment system could result in accidental drawdown of Pool 3 with significant economic and environmental consequences.
The Corps has stated that without repair, the Wisconsin embankments at Lock and Dam 3 are
likely to fail within the decade, causing a rapid drawdown of Pool 3. The project to correct the

8-a-AR/PA/SW

Lock 3 approach hazard and strengthen the embankments currently is in design and is partially
funded. The Corps' website indicates that the project is programmed for 2010-2017 construction.

Although Xcel's Environmental Report notes the existence of this issue and the Corps' repair
project, it did not identify impacts of an accidental loss of its Pool 3 cooling water supply to
PINGP, how these impacts would be addressed, and possible subsequent impacts to local communities and the region.
Thank you for the opportunity to comment on the relicensing process.
Sincerely,

8-a-AR/PA/SW (continued)

Mary Jackson
Senior Planner
Dakota County Office of Planning and Analysis
952-891-7039

The following pages contain the comments
made by Ron Johnson during the
NRC public scoping meetings held on July 30, 2008

of Minnesota's electric power supply system for another 20 years; and

"Be it further resolved that the City of Red Wing will present a copy of this resolution to the Nuclear Regulatory Commission."

Thank you.

MR. RAKOVAN: Thank you, sir.

Next we'll go to Ron Johnson, followed by Katie Himanga and Scott Arneson.

RON JOHNSON: Good afternoon. My name is Ron Johnson. I'm president of the Prairie Island Tribal Council and the Prairie Island Indian Community.

I've represented my community for several years, and as president I have the obligation to ensure the health and welfare of the community, which includes also the environment down there.

I'm here today as the continuing operation of the Prairie Island Nuclear Generating Plant is one of our most important issues for our community. In fact, most community members have had concerns about the plant since it went online in 1973.

The Prairie Island Indian Community is a

9-a-LR

federally-recognized Indian tribe, and as such we expect to work with the federal agencies, including the Nuclear Regulatory Commission, on a government-to-government basis, and we are pleased that the NRC has approved our request for a cooperating agency for purposes of preparing parts of the -- for the environmental impact statement for the license renewal.

We look forward to working with the NRC over the next two years on this important issue. We will be submitting extensive written comments to the NRC relative to environmental and safety concerns.

9-a-LR (continued)

And I thank you for this opportunity to speak in front of you today. Thank you.

MR. RAKOVAN: Thank you, sir.

Next will go to Katie Himanga.

KATIE HIMANGA: Good afternoon. My name is Katie Himanga. I'm the mayor of the City of Lake City. We're located about 15 miles down river.

Thank you for the opportunity to say a few words. The community of Lake City is impacted by the Prairie Island Nuclear Plant, just as other communities in the area are.

The Lake City Utility Board had an

The following pages contain the written comments submitted by Gina Lemon during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

Leech Lake Band of Ojibwe

Arthur "Archie" Larose, Chairman
Mike Bongo, Secretary/Treasurer

District I Representative *Robbie Howe* | District II Representative *Lyman L. Losh* | District III Representative *Eugene "Ribs" Whitebird*

September 9, 2008

7/22/08
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Chief, Rules and Directives Branch
Division of Administrative Services, MS T-6D59
US Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: **Proposed License Renewal for Prairie Island Nuclear Generating Plant**
Goodhue County, Minnesota
LL-THPO Number: 08-169-NCRI

To Whom It May Concern:

Thank you for the opportunity to comment on the above-referenced project. It has been reviewed pursuant to the responsibilities given the Tribal Historic Preservation Officer (THPO) by the National Historic Preservation Act of 1966, as amended in 1992 and the Procedures of the Advisory Council on Historic Preservation (38CFR800).

I have reviewed the documentation; after careful consideration of our records, I have determined that the Leech Lake Band of Ojibwe does not have any concerns regarding sites of religious or cultural importance in this area. Please keep in close contact with the Prairie Island Community.

Should any human remains or suspected human remains be encountered, all work shall cease and the following personnel should be notified immediately in this order: County Sheriff's Office and Office of the State Archaeologist. If any human remains or culturally affiliated objects be inadvertently discovered this will prompt the process to which the Band will become informed.

Please note: The above determination does not "exempt" future projects from Section 106 review. In the event of any other tribe notifying us of concerns for a specific project, we may re-enter into the consultation process.

You may contact me at (218) 335-2940 if you have questions regarding our review of this project. Please refer to the LL-THPO Number as stated above in all correspondence with this project.

10-a-CR

Respectfully submitted,

Gina M. Lemon
Tribal Historic Preservation Officer

Leech Lake Tribal Historic Preservation Office * *Established in 1996*
An office within the Division of Resource Management
115 Sixth Street NW, Suite E * Cass Lake, Minnesota 56633
(218) 335-2940 * FAX (218) 335-2974
glemon@live.com or www.nathpo.org (Members since 1998)

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = R. Plasse (RAP10)

The following pages contain the written comments submitted by Tom Lovejoy during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary
Scott Humrickhouse, Regional Director

West Central Region Headquarters
1300 W. Clairemont Avenue
PO Box 4001
Eau Claire, Wisconsin 54702-4001
Telephone 715-839-3700
FAX 715-839-6076
TTY Access via relay - 711

September 8, 2008

Nathan Goodman
US Nuclear Regulatory Commission
Mail Stop: O-11F1
Washington, DC 20555-0001

Subject: Prairie Island (MN) Nuclear Generating Plant (PINGP) License Renewal - EIS Issue Scoping

Dear Mr. Goodman:

Thank you for inviting Wisconsin Department of Natural Resources (WDNR) to the Nuclear Regulatory Commission (NRC) relicensing "audit" at the PINGP plant on August 20, 2008. It was very informative. At that meeting you invited WDNR to prepare and submit a list of issues we feel should be addressed in NRC's Environmental Impact Statement prepared as part of PINGP relicensing process.

1. Fish Impingement and Entrainment at Water Intake

   Information should be provided describing the extent of fish entrainment and impingement at the water intake and associated fish mortality. What is the incremental effect on fish populations? What measures are in place or proposed to minimize losses? 11-a-AR

2. Upper Mississippi River Navigation Pool 3 Drawdowns for Habitat Enhancement

   A consortium of federal and state agencies is considering use of temporary Pool 3 water level manipulations (i.e. 1-2' drawdowns) for purposes of improving aquatic habitat conditions. We have heard there may be PINGP concerns, such as for fire control or design limits of water intake structure(s), that may conflict with the idea of pool drawdowns. Please describe any such concerns and identify measures that are proposed or could be employed to prevent conflicts with any such drawdowns. 11-b-NS

3. Cooling Water Discharge Thermal Effects to:

   A. Mississippi River Biological Resources
   Describe past fish kills, particularly those associated with effluent thermal mixing during cold water conditions, resulting from past plant operations. Describe the make-up and extent of other biological resources (i.e. mussel community, etc.) in the discharge canal and Mississippi River mixing zone. What studies/monitoring has been done in effort to document thermal discharge impacts to aquatic organisms? What design and/or operational measures have been employed to minimize adverse effects and how successful have they been? What additional remedial measures are proposed or could be used to further avoid or minimize adverse impacts? 11-c-AR/SW

B. Mississippi River Public Recreation Use Opportunities
We have routinely received seasonal complaints from the ice fishing public that access to historic fishing areas in upper Lake Pepin is adversely impacted by warm water discharges, resulting in delayed ice formation at winter's onset and more rapid ice deterioration before spring ice-out. The EIS should describe PINGP discharge effects on winter ice cover and usability of traditional ice fisherman access points. Feasible measures to offset adverse impacts should be identified and incorporated as license conditions. 11-d-EJ/SW

4. Zebra Mussel Control Impacts to Native Mussels and Other Aquatic Resources

Best management practices for control of biofouling from zebra mussels and other exotic species continues to evolve. What measures (molluscicides, other) are currently employed to control zebra mussels and has there been any monitoring to determine if such practices result in impacts to native mussels or other aquatic life? Measures to minimize adverse impacts should be identified. Given the evolving identification of best management practice control technology the license should provide for a periodic re-assessment and an adaptive management approach to exotic species management and remedial methods. 11-e-AR

5. Identification of Planned or Foreseeable Future (over new NRC license term) Physical Improvements (i.e. new/upgraded transmission lines, new/modified water intake structures, etc.) and Any Associated Impacts in Wisconsin

Would relicensing set a precedent that would result in an interest by Xcel in constructing new or upgraded transmission lines or other physical improvements that directly or indirectly impact Wisconsin? At our meeting it was explained that no such improvements are proposed or expected and that a license condition would be incorporated indicating no such improvements would be authorized as part of relicensing. We interpret this to mean that any such unforeseen future improvements would be subject to applicable federal and/or state regulations, including NEPA if appropriate, as a separate action. Please confirm this in the EIS. 11-f-CI

As stated at our meeting I am currently the primary WDNR contact person for this project and that Mr. Nick Schaff will serve in that capacity starting in April 2009. If there are any questions regarding the above I would be happy to discuss them. I'm also available to make arrangements for WDNR fisheries, water quality or other program experts to meet with you or other NRC staff, Xcel personnel or representatives from other resource management agencies, to discuss issues of common interest.

Thank you for the opportunity to submit WDNR scoping comments for this project.

Sincerely,
TL 9/8/08

Tom Lovejoy
Environmental Impact Coordinator

cc:
Dave Siebert – Director, WDNR Office of Energy/Environmental Analysis
Nick Schaff - WCR
Gretchen Benjamin, John Sullivan, Ron Benajmin - LaX, WI
Gary Wege – US FWS, Bloomington, MN
Dan Wilcox – Corps of Engineers, St. Paul, MN
Matt Langan – MDNR, St. Paul, MN
Tim Schlagenhaft – MDNR, Lake City, MN

2

The following pages contain the comments
made by Joan Marshman during the
NRC public scoping meetings held on July 30, 2008

(The following text was submitted prior to the meeting:

"Permanency or Term of Storage.

"Good evening. I am Joan K. Marshman of Frontenac Station, Minnesota. I am the chair of the Florence Township Board of Supervisors and have had ongoing concerns pertaining to the permanency issues with the cask storage at the Prairie Island Nuclear Plant.

"As I stated in testimony before the Minnesota Environmental Quality Board on January 18, 1996, 'The permanency issue is a major concern for many residents of Florence Township, as it should be for the rest of the State of Minnesota.' This has been my concern for the past 12 years.

"High-level radioactive waste storage must be sited away from growing centers of population, major highways, and waterways. Waste management is the responsibility of this generation. Centralized off-site storage such as the Yucca Mountain

12-a-RW

repository is by far preferable to on-site storage at reactor reactor sites throughout the United States.

"The question of permanency is still unresolved. To date, the Yucca Mountain repository is ten years past due in accepting the first shipment of irradiated fuel. The Department of Energy (DOE) had a responsibility to remove spent fuel from reactors beginning in 1998. Now the DOE must take immediate action to ensure that the necessary infrastructure is in place to accept the spent fuel that is now in storage on-site at all the nuclear plants across the country.

12-a-RW (continued)

"Thank you for considering my concerns. "Joan K. Marshman, resident of Frontenac Station, Goodhue County, Minnesota; Chair, Florence Township Board of Supervisors.")

The following pages contain the comments
made by Alan Muller during the
NRC public scoping meetings held on July 30, 2008

And I might mention that -- and I might be there, but I'm here -- a study has been carried out in the vicinity of the Salem nuclear complex and other places in the country where baby teeth were collected, the teeth of babies who were born and lived some stage of their lives in the vicinity of the reactor; and people took a look to see if there was more -- were more radioactive elements in those teeth than in the teeth of babies who lived further away, and the answer appears to be yes.

I haven't seen the raw data, but this is certainly something that the NRC ought to take a very close look at, because it would not be appropriate to relicense a facility if doing that was going to have major negative health impacts. 13-a-HH

Okay. That's what I have to say. Thank you.

MR. RAKOVAN: I think she's following me up here, but Carol Overland.

CAROL OVERLAND: That's correct.

Well, I'm Carol Overland, and I don't have all that much to say other than it is correct that it was really hard to get a copy of this application, and I do want to make sure for the and so because license renewal involves the aging of a facility, our concern really is managing of that aging.

And so recognizing that there are performance issues that occur at these plants, we have the reactor oversight process that evaluates the significance of those and characterizes the findings in a process by which the regulatory response is determined.

Because of that and because we're confident that that process is working to ensure that the plants are operating safely today, we can just focus on aging for license renewal.

BRIAN HOLIAN: Can you mention operating experience?

MS. FRANOVICH: We also apply that operating experience that we glean from those performance issues to the extent they're relevant to aging management. We incorporate that into our aging management reviews for relicense renewal.

Thank you, Brian.

ALAN MULLER: Well, I'm not particularly familiar with the operating history of these two reactors, but it does seem to me what you said has

13-b-LR

the effect of inappropriately narrowing the re-licensing proceeding almost to the point of tending to render it meaningless.

13-b-LR (continued)

MS. FRANOVICH: I understand your view. I understand your view on that.

ALAN MULLER: Okay. Thank you.

MS. FRANOVICH: Umhum.

MR. RAKOVAN: Any other --

Yeah, sure. Why not.

Unfortunately, I don't have a handheld, so I have to use this lapel.

Please introduce yourself.

KIRSTEN EIDE TOLLEFSON: I'm Kirsten Eide Tollefson, and I live down in Frontenac, which is about 10 miles down river, 10, 15 miles down river.

And I'm a little confused as to whether or not I am part of the scope. I mean I've been involved in Prairie Island reactors. In Frontenac we had our own review process down there for waste, and we had a very difficult time being recognized for notice. Our newspaper, the Lake City Graphic, which is one of closest newspapers, was not on the notice list in the application and in fact never received notice.

concentration points may be, what is the dispersion pattern, are they living within that pattern.

And so, please, let's get serious. If this is going to be a technology that's going to be with us for a while -- I have no illusions that until something heads south real fast, which could happen anytime, that we're going to continue living with this threat, but let's at least inform ourselves about what it is. You do not have the right to conceal from the public where the routine reported emissions go. Thank you very much.

MR. RAKOVAN: Thank you, sir.

Next we'll go to Alan Muller and then to Carol Overland.

ALAN MULLER: I brought these (indicating) up because these are the paper copies of the license renewal, at least that which has been released to the public. It's not particularly light reading, but I have had a chance to review some of it, and it seems to me that what is in here raises a great many more questions than are answered.

And in fact it answers a lot of rather -- if you look in the index, you can see many references to electrical connections and other design and

13-c-ER/LR

engineering details; but if you look for something like health effects, this application is silent. At least it's silent to me. Perhaps I missed something.

But as Ms. Overland commented, it has not been particularly easy to obtain copies of this. It certainly required some agitation on her part to obtain this one, which I borrowed.

And I'm wondering -- and I guess this is question -- if the applicant is expected by the NRC to provide copies of the applications to interested citizens, you might want to --

Can I -- is it appropriate for me to pose that as a question?

13-c-ER/LR (continued)

MR. RAKOVAN: We're kind of taking comments right now.

ALAN MULLER: Okay.

MR. RAKOVAN: I mean if you want, we can handle that after the period, but we were -- I think we're just looking for specific comments right now, if you don't mind, sir.

ALAN MULLER: Okay. My comment, then, is that the applicant ought to provide copies of the application to anybody who wants one. I suppose it costs a few bucks to reproduce these two books, but

13-d-LR

there are other prices that will be paid by the residents of the world for the continued operation of this facility.

13-d-LR (continued)

Now, one of the interesting things in this book is that the one operating license expired in 2013 and the other one in 2014. That's not very far from now, and it's difficult not to form the impression that the license renewal is regarded as a done deal, because it's a little bit hard to believe that in fact if there was a serious possibility that that wasn't to be approved, that NSP is actually prepared to carry out the process of shutting the facility down and obtaining substitute sources of power.

I have looked at the filed resource plan of Xcel, and there was no mention of the possibility that the facility might not be allowed to continue to operate. In fact, contained in their resource plans are the assumption that the electrical output is going to be increased by some tens of megawatts from each reactor.

13-e-SD

Now, I also noticed an interesting item in here, and this is page 2.1-9, and it's section 2.1.1.5.2. It says "Fuel transition." And I'll read

13-f-OS

this paragraph to you:

"A licensed amendment request requesting NRC approval for the transition to a new fuel type for use in Prairie Island Units 1 and 2 reactors is expected to be submitted concurrent with the NRC review of the license renewal application. A review of the effect of the transition to a new fuel type on the LRA has been completed with the following results:

"Scoping the transition to a new fuel type will have no effect on the application of the system scoping criteria or the results of system scoping," and so on and so forth, which to me says in nuclear regulatory lingo that this is another major aspect relating to the continued operation of this plant that is being handled in isolation from the license renewal, and that's not appropriate.

If anyone is going to make an informed judgment about whether this facility ought to continue to operate, that ought to include the future plans for changes there. How do we know that a, quote/unquote, "new fuel type" doesn't pose additional hazards or whatever that we don't know anything about?

13-f-OS (continued)

Very likely that might involve, you know, the use of plutonium in the plant, plutonium mixed with something else, and that has a whole range of implications of its own.

So I think as always seems to me to be the case with the NRC, there's sort of a blinders-on proceeding here, which, unless one is very persistent, has more the effect of obscuring what's going on than shedding light on it.

13-f-OS (continued)

Now, just a couple of comments and then I'll shut up.

There's mention here of environmental justice as something to be considered within a 50-mile radius of the site.

Now, in my world, in my concept of this, it seems obvious that if the plant is going to operate for 20 more years, that's going to result in the mining and processing of more uranium; and the doing of that is going to have major health impacts that are far beyond 50 miles.

It's going to have impacts in Navajo communities many hundreds of miles away from here. It may have impacts in the state of Virginia, where uranium mining is being proposed. And anybody who

13-g-UR

knows thing anything about uranium mining knows that it's left a trail of sick and dying people behind it.

So my suggestion is that the NRC ought to forget about this 50-mile business and look at the actual impacts of the continued operation of these two nuclear reactors.

13-g-UR (continued)

Now, looking a little bit further down the fuel cycle, it's obvious that more nuclear waste is going object generated by 20 more years of operation and that something is going to happen to that.

If in fact, as seems unlikely to me, what happens is that it ends up in Nevada at a proposed nuclear waste dump there, that will certainly have an impact on people in that area. And there are many opinions about that that have been expressed by the State of Nevada's Nuclear Projects Office, the congressional delegation from that state and so on. Also, by the western Shoshone, who live in the area and whose concerns have been disregarded by the federal agencies that are trying to permit that nuclear dump.

13-h-RW

So my testimony to you now is that those impacts in additional nuclear waste disposal ought to be fully considered in the relicensing proceeding for Prairie Island. 13-h-RW (continued)

Now, maybe that's all that I should take the time to say, but another interesting aspect of this application is the consideration of alternatives, which is something that's required under the National Environmental Policy Act. And the alternatives that are brought forth by NSP or Xcel in the application are burning gas, burning coal, and purchased power.

But that does not strike me as an appropriate scope of alternatives to be considered. The investment that would go into the continued operation of this plant could go into demand side management activities such as load response and conservation and efficiency programs; it could go into solar-thermal electricity-generating facilities; it could go into electrical storage facilities to be associated with the growing wind industry in Minnesota. 13-i-AS

There are lots of alternatives, all of which would make more sense -- or many of which would make more sense than coal and gas and purchased power; and the impression one gets from reading the

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discussion of alternatives is that the applicant has chosen his alternatives carefully in order to support the conclusion that the plant should continue to operate.

But I think the NRC has broader responsibilities to the public and should extend the scope of the review of alternatives far beyond what we've seen in the application.

13-i-AS (continued)

I mentioned earlier that there's little or nothing in here said about health effects; but as Mr. Crocker pointed out, quite rightly, there is a continuous release of radioactivity from this kind of a facility, particularly release of radioactivity into the Mississippi River and also into the air breathed by the community, the host community for the facility.

So there ought to be a full evaluation of the cumulative health impacts of an additional 20 years of radioactive releases from these two reactors, and it ought to be a real review, not a review carried out by a certain establishment of tamed scientists who believe with religious intensity that radiation is either harmless or perhaps it's even good for you.

13-j-HH

The following pages contain the comments
made by Carol Overland during the
NRC public scoping meetings held on July 30, 2008

And I might mention that -- and I might be there, but I'm here -- a study has been carried out in the vicinity of the Salem nuclear complex and other places in the country where baby teeth were collected, the teeth of babies who were born and lived some stage of their lives in the vicinity of the reactor; and people took a look to see if there was more -- were more radioactive elements in those teeth than in the teeth of babies who lived further away, and the answer appears to be yes.

I haven't seen the raw data, but this is certainly something that the NRC ought to take a very close look at, because it would not be appropriate to relicense a facility if doing that was going to have major negative health impacts.

Okay. That's what I have to say. Thank you.

MR. RAKOVAN: I think she's following me up here, but Carol Overland.

CAROL OVERLAND: That's correct.

Well, I'm Carol Overland, and I don't have all that much to say other than it is correct that it was really hard to get a copy of this application, and I do want to make sure for the 14-a-LR record that everyone who requests an application should get an application.

There aren't that many of us odd people that like to read this stuff, and if we really want to put the time in, give us the application. It will make your lives a lot easier.

14-a-LR (continued)

And actually, you know, Alan Muller addressed many of the things I wanted to raise, but as far as replacement power goes, there was this great study a while back -- Kirsten Eide Tollefson will remember it -- of the Prairie Island replacement power using a wind/gas combo.

Was that wind/gas? It was. Right?

Anyway -- right.

KIRSTEN EIDE TOLLEFSON: It was a conversion, a gas conversion.

CAROL OVERLAND: Right.

KIRSTEN EIDE TOLLEFSON: It was an integrated resource plant.

CAROL OVERLAND: So it was strictly gas?

14-b-AS

MR. RAKOVAN: Miss, if you're going to talk, I'm going to have to get you on the transcript. I'm sorry.

CAROL OVERLAND: Oh. Well, I'm just --

I'm trying to make sure -- I referred to -- I thought it was a wind/gas combo, but maybe I'm not right. Maybe it was just gas conversion. But we'll get a copy of that into the record, so that will show one more alternative that is possible.

And speaking of wind/gas conversions, I also want to bring up that that is a very real possibility, and the state of Delaware has just ordered an off-shore wind project, and that's to have gas back-up to make it for power. If Delaware can do it, Minnesota can do it. You know, there are things that we can do that are alternatives to this.

14-b-AS (continued)

And I'll submit further comments by the deadline.

And as far as notice goes, you know, this obviously is a problem. Many of us did not get notice who have been participating in nuclear issues for a long time.

And because of that, the comment period should be extended at least as long as the defective -- the notice was defective. So if notice didn't go out until the 25th and should have gone out when, extend it the other way. That only fair.

14-c-LR

Thank you.

The following pages contain the written comments submitted by the Prairie Island Indian Community during the scoping period for the Prairie Island Nuclear Generating Plant license renewal

Ronald Johnson
President

Lucy Taylor
Secretary

Johnny Johnson
Vice President

Victoria Winfrey
Treasurer

Shelley Buck-Yeager
Assistant Secretary/Treasurer

September 22, 2008

Chief, Rulemaking, Directives and Editing Branch
Division of Administrative Services
Office of Administration
Mailstop T-6D 59
US Nuclear Regulatory Commission
Washington, DC 20555-0001

RE: Environmental scoping for the relicensing of the Prairie Island Nuclear Generating Plant, Units 1 and 2

Dear Rulemaking, Directives, and Editing Branch Chief:

The Prairie Island Indian Community (Community or Tribe) would like to offer the following suggestions and comments regarding the scope of the draft Supplemental Environmental Impact Statement (SEIS) that will be prepared by the US Nuclear Regulatory Commission (NRC) for a 20-year operating license extension, as required by the National Environmental Policy Act (NEPA). The comments are offered in response to the notice in the Federal Register on July 22, 2008 (73 FR 42628).

It should be noted that views expressed in this document are the views of the Tribal Council, on behalf of the Community. Individual community members, of course, are free to express their own views, which may or may not be the same. Individual tribal members may express their concerns in writing.

Community Background

The Prairie Island Indian Reservation is located on Prairie Island, which is formed at the confluence of the Vermillion and Mississippi Rivers in southeastern Minnesota (approximately 35 miles SE of the Twin Cities of Minneapolis and St. Paul, MN). The size of the Prairie Island Indian Community has grown through several federal reorganization acts and direct purchases by the Tribal Council, and now totals over 3,000 acres (land and water) (Figure 1).

The United States Congress passed "The Prairie Island Land Conveyance Act of 2005," which transferred an additional 1300 acres of US Army Corps of Engineers land (approximately 485 acres of forested wetlands and prairie and approximately 819 acres of

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open water) to the Prairie Island Indian Community. These tribal lands provide a diverse habitat for fish and wildlife, including open prairie, forested wetlands, shrub swamps, and many other palustrine wetland types. In addition, this area is part of the Mississippi River flyway that provides resting and feeding areas for many migratory bird species.

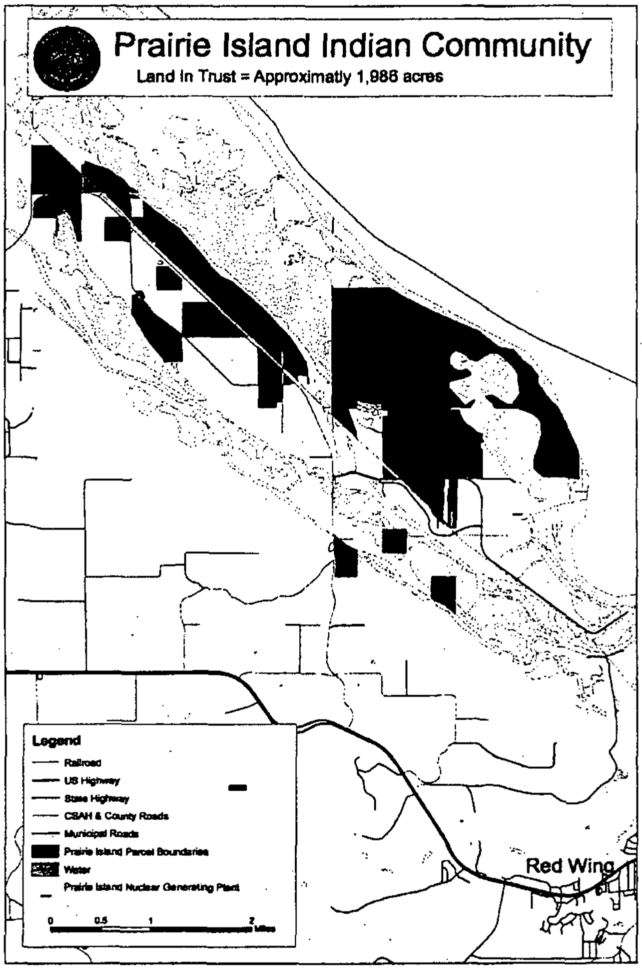


Figure 1

2

The Mdewakanton, "those who were born of the waters," have lived on Prairie Island for countless generations.[1] Archaeological evidence, including village sites and burial mounds, conclusively demonstrate that Prairie Island has been a place of historical and cultural significance for thousands of years. In more recent times, descendants of those earliest known inhabitants, the members of the Mdewakanton Dakota (Sioux), traditionally used Prairie Island as a summer encampment for fishing, hunting and raising crops. At least by the late 1880s, a small permanent Mdewakanton settlement was established. Congress appropriated funds and purchased land for the Mdewakanton on Prairie Island in the late 1880s. The Prairie Island Indian Community was formally organized under the Indian Reorganization Act of 1934, additional lands were acquired, and a formal reservation established. A tribal constitution and bylaws were approved by the Secretary of the Interior in 1936. The Prairie Island Indian Community is governed by the Community Council (sometimes referred to as the "Tribal Council"), which is comprised of five elected tribal members who each serve a two-year term.

Our community has grown substantially since the plant first went on-line in 1973. There are now 767 enrolled band members; approximately 250 members reside on tribal lands within 2 miles of the PINGP. We expect our enrollment to double over the relicensing period. The Prairie Island Indian Community owns and operates the Treasure Island Resort and Casino, which employs more than 1,500 people. In addition, the Community owns and operates a RV Park and a Marina, which attract many hundreds of visitors during the summer months. On any given day there may be as many as 9,000 visitors to our Community.

General Environmental Report Comments

We understand that the NRC will be developing a Supplemental Environmental Impact Statement (SEIS), as part of its review of the application to renew the operating licenses of the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. The starting point for the SEIS is the Environmental Report (ER) submitted by the Nuclear Management Company (NMC) with the application for license renewal. The Community is deeply 15-a-ER

[1] The Prairie Island people are part of a larger group called the "Dwellers of the Spirit Lake;" in the Dakota language the Mde wakan ed otunwahe. Over the years this name has been shortened to Mdewakantonwan or Mdewakanton (pronounced M'DAY-wah-kahn-tahn). The Mdewakanton are one of the seven sub-tribes who make up the alliance called Oceti Sakowin - the Seven Council Fires. Most of the world knows our alliance as the Sioux, which comes from an Ojibwe word nadowessi – "Little snakes." The French changed it to Nadowesioiux or simply Sioux. We call ourselves Dakota, Lakota, or Nakota, a word that means "allies" or "friends" in all three dialects. The Dakota/Lakota/Nakota have reservations in the states of Minnesota, Nebraska, South Dakota, North Dakota, and Montana, and in the Canadian provinces of Manitoba and Saskatchewan.

3

concerned about the general lack of attention given to the Community in the ER by NMC and its parent company Xcel Energy.

Overall, the ER minimizes the presence of the Tribe, tribal land-holdings, the tribal population, and tribal resources. For example, Section 2.1 of the ER (General Site Description) makes no mention of the Community but mentions other governmental units. The Community is mentioned in Section 2.1.2, PINGP Site Features. The Prairie Island Indian Community, however, is not a feature of the PINGP. Our lands and people pre-date the existence of the PINGP. Furthermore, no detail is provided on Community land holdings, water supply system, home sites, and population, Figure 2.1-2 does not correctly show the Community's lands. We have included Figure 1 that more accurately identifies the Tribe's land holdings. Other examples of the lack of data on impacts to the Community are the absence of information on Community demographics, including population growth, the tourist population related to the Community's casino, hotel, and marina. The fact that Treasure Island is Goodhue County's largest employer is also overlooked. Moreover, there is no treatment of the Community's land use planning activities, although the land use plans of other governmental units (Goodhue and Dakota Counties in Minnesota and Pierce County in Wisconsin) in the vicinity of the site were evaluated. 15-a-ER (continued)

Trust Responsibility of the Federal Government

Although it was written in 1996, at a time when most federal agencies had well-developed and well-implemented Indian policies, the Generic Environmental Impact Statement (GEIS, NUREG-1437), the basis of the SEIS, does not recognize or mention Tribes or tribal sovereignty. Federally recognized Indian Tribes are governments, with unique legal and political standing and rights. Indian Tribes enjoy a Government-to-Government relationship with the Federal Government, including the NRC.

In June of this year, the Prairie Island Indian Community entered into a Memorandum of Understanding (MOU) with the NRC that established a cooperating agency relationship for the purpose of preparing the SEIS for the renewal of the licenses for the PINGP, Units 1 and 2. The Community's Cooperating Agency status, as it relates to the development of the SEIS, is limited to four areas: Historic and Archeological Resources; Socioeconomics; Land Use; and Environmental Justice. The tribe recognizes that the agreement is the first of its kind within the NRC and would not have been developed had the NRC not taken its Trust responsibility to the Prairie Island Indian Community seriously. 15-b-LR

Although most of the comments and suggestions in this letter are outside our four areas of the MOU, they are just as important to the Prairie Island Indian Community. We believe that all things are related, "Mitakuye Oyasin,"[2] and that one cannot separate one

[2] Mitakuye Oyasin, literally translated, means "to all my relations" or "we are all related." Mitakuye Oyasin is a prayer, an acknowledgement, that honors the sacredness of all people and of all life.

4

aspect of the environment from another. In other words, our Community's health and well-being are dependent upon the health of the natural environment—the water, the fish, the birds, the air, the plants, are all interrelated as part of an ecosystem that is Prairie Island. 15-b-LR (continued)

We believe that the NRC's SEIS should clearly set forth the scope and role of the NRC's Trust responsibilities to the Community in the license renewal process, including, among other things, and whether and to what extent the NRC believes that the Trust responsibility applies to both Category One and Category Two issues. 15-c-LR

Category One Issues

While Category 1 issues are generally excluded from disclosure by NRC regulations, the Community continues to be concerned about the future impacts of these issues. The Community has provided some "new and significant" information relative to the storage of spent fuel and health impacts.

Human Health and Radiological Exposure

The Community recognizes that radiological exposure is a GEIS Category 1 issue. Nevertheless, community members remain concerned about their chronic exposure to low-level radiation. Many of our community members have been living on Prairie Island since the plant went on-line in 1973. Community members typically do not move in and out of the community. We are concerned about the human health effects from 60 years of low-level exposure (the original licensing period and the extended licensing period).

In addition, community members may have exposure pathways (water, food, air) that may be different from typical or "average" population in the area surrounding the plant, thereby placing the tribal population at greater risk. For example, many tribal members consume native plants for traditional purposes (direct consumption, medicines, teas, ceremonies) that are not typically part of Xcel's or the State of Minnesota's monitoring programs. 15-d-HH/EJ

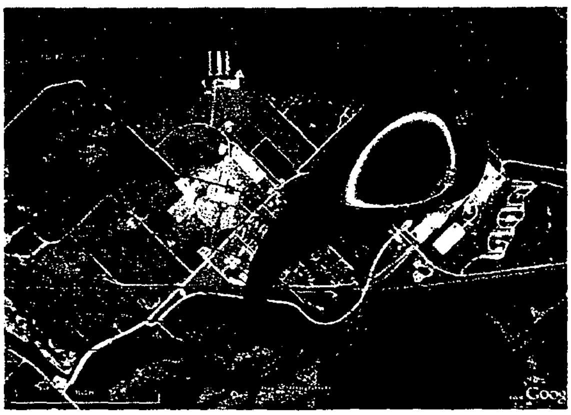
The ER does not address the issue of tritium contamination of the Community's wells. According to the 2007 Annual Radiological Monitoring Program (REMP) report (for PINGP) submitted to the NRC (May 13, 2008), wells PIIC-02 (1773 Buffalo Slough Rd.) and PIIC-26 (1771 Buffalo Slough Rd.) had Tritium concentrations of 65 pCi/L and 62 pCi/L, respectively (sampled July 2007). Well P-24D (Sueter residence) has tritium concentrations less than 23 pCi/L and all other off-site wells have tritium concentration less than 19 pCi/L.

According to the report, in July 2007, many onsite wells have Tritium concentration greater than 65 pCi/L. We understand that the levels of tritium found in our groundwater are below the US Environmental Protection Agency (EPA) standard of 20,000 pCi/L. Nevertheless, the tritium is there and we did not ask for it to be there. 15-e-GW

5

Figure 2, below, represents a simulated groundwater modeling showing the movement of tritium from the PINGP towards the Prairie Island Indian Community. The Community respectfully demands a full and complete disclosure of the monitoring data for all tritium and other radiological contaminants for each well or other monitoring location, and not simply monthly, quarterly or annual averages for individual wells. This data is critical to identify and baseline accidental and planned releases of tritium and other radiological contaminants, and to facilitate the Community's preparation of exposure scenarios, scenario analysis, and computer modeling of all environmental pathways for tritium contamination.

Scenario 3:
Simulated Geology-Driven Groundwater Contamination



Mississippi; PI-NGP *Sept. 2008*

Figure 2.

Other concerns related to site-specific observations and review of past annual REMP reports for the PINGP include the following:

- There was no REMP made available to PIIC for 2006. This was also stated by a participant at the July 30, 2008 evening EIS scoping meeting (see meeting transcript, ADAMS ML0824900514);
- No information on tritium concentrations in the onsite and off-site wells was provided in the years prior to 2007;
- No follow-up sampling of PIIC wells was performed;

15-e-GW (continued)

6

- Proximity of PIIC wells to the plant merits their regular sampling for tritium concentration amongst others;

- Closeness of wells PIIC-02 and PIIC-26 appears to confirm the consistency of the tritium concentration at the order of 100 pCi/L, which is slightly less than the level of tritium concentration found in onsite wells reported in the range of 100 pCi/L to 2200 pCi/L for P-2, P-109, P-7, P-11, PZ-2, SW-4, and especially P-10 reported for every month of 2007 in the range of 390 pCi/L to 2258 pCi/L;

- The lower limit of detection (LLD) for analysis seems to vary from year-to-year (What is the reason for the fluctuation and increase of the LLD? How can it be that as technology improves the LLD would increase?);

- The higher tritium concentration in onsite wells indicate that PINGP is the tritium source of PIIC wells (see Figure 2);

- No explanation was provided for off-site residence well contamination of tritium since 1989;

- Even though the REMP report states that the tritium results are far below the EPA drinking water standard of 20,000 pCi/L, BEIR VII 2006 on radiation health effects state that Linear No Threshold standard should apply to chronic low dose exposure for potential cause of cancer and other radiation-induced diseases;

- Even though the REMP report states that the tritium results are far below the EPA drinking water standard of 20,000 pCi/L, new and significant studies and analysis (discussed more fully below) raise significant concerns about the safety of even low dose exposure, raising the question of what NMC and the NRC are doing to "continuously evaluat[e] the latest radiation protection recommendations from international and scientific bodies to ensure the adequacy of the standards the agency uses," in accordance with the US NRC Fact Sheet of July 2006;

- The problems of tritium contamination of nearby water reported in the PINGP REMP 2007 may be similar to tritium contamination observed at other aging US nuclear power plants, raising the concern that these tritium leaks will increase in frequency and severity (see "Leaks at nuclear plants a growing trend? Regulators to hear concerns about water tainted by low-lever radiation," Miguel Llanos, April 5, 2006, available at http://www.msnbc.msn.com/id/11996239/); and

- Whether and to what extent NMC and the NRC have modified or improved their respective programs and procedures to inspect and assess the equipment and structures at PINGP that have the potential to leak tritium in response to the US NRC Fact Sheet of July 2006;

15-e-GW (continued)

7

- Whether and to what extent NMC and the NRC have modified or improved their ability to evaluate NMC's abilities to analyze for additional discharge pathways, such as groundwater, as a result of a spill or leak in response to the US NRC Fact Sheet of July 2006. 15-e-GW (continued)

Given the above information, the EIS scope must be expanded to disclose the possible impacts of PINGP to the Community, especially as it relates to health effects, particularly the exposed critical subpopulations such as children and pregnant women. 15-f-HH/EJ

Section 4.2.5 of Appendix E – ER for the PINGP license renewal application must be regarded at best as incomplete at this time pending additional information and further investigation. 15-g-ER

The SEIS must include an accurate quantification of radiological impacts to the members of the Prairie Island Indian Community—from all sources. At a minimum, the SEIS should include all data associated with all tritium and other radiological releases (accidental and planned), and all of the data for each well or other monitoring location (and not simply monthly, quarterly or annual averages for individual wells). This data is critical to identify and baseline accidental and planned releases of tritium and other radiological contaminants, and to facilitate the Community's preparation of exposure scenarios, scenario analysis, and computer modeling of all environmental pathways for tritium contamination.

New and Significant Information – Increased Risk of Cancer

The current and continued operation of the PINGP is one the most, if not the most important environmental and health concerns for the Prairie Island Indian Community. Past and current Tribal Council members have voiced their concerns about health impacts stemming from planned and unplanned radioactive releases. As set forth below, the Community is already conducting its own examination of current peer reviewed studies pertaining to nuclear power plants and health impacts. 15-h-HH

A number of studies have reported elevated rates and/or risks for cancer experienced by populations residing proximal to nuclear facilities. Many of these studies were completed subsequent to the release of the GEIS (NUREG 1437) and can be considered as new and significant information.

In particular, elevated rates of leukemia have been observed among populations in England (Gardner et al, 1987), Spain (Silva-Mato et al, 2003) and Germany (Hoffmann et al, 2007; Spix et al, 2008; Kaatsch P, Spix C, Schulze-Rath R, et al, 2008).

The most recent of the above studies involving populations residing in the vicinity of 16 German nuclear power plants (the Kikk study) are among the methodologically strongest studies that have to date been completed (BFS 2007).

8

The KiKK study included all 16 large reactor locations where 20 nuclear power plants in Germany were in operation during the 24-year period of study (1980 - 2003).

The distance between the children's homes and the power plants was precisely determined to within 25 meters (or approximately 82 feet). The main questions posed by the study were: "Do children under five years of age more frequently develop cancer when living near a nuclear power plant?" and "is there a negative distance trend?" (In other words: is the risk greater the nearer the child lives to the plant?) The results showed not only a 60% increase in the cancer rate and a 117% increase in leukemia in infants within the 5 km radius (or approximately 3 miles), but also a significant increase in the risk of cancer and leukemia the closer one lived to the nuclear power plant.

In the second part of the study, which covered a shorter period of time and a selection of diagnoses (leukemia, lymphomas and tumors of the central nervous system), it was tested whether other risk factors (confounders) could have had any appreciable effect on the main result of the study - the negative distance trend. This proved not to be the case for any of the studied risk factors. The proximity of residence to the nuclear power plant remains the only plausible explanation at this time.

Recently, results were also reported for a comprehensive meta-analysis (Baker and Hoel, 2007) concerning leukemia in children living near nuclear power plants contained in 17 international studies carried out in Germany, Spain, France, Japan and North America during the period between 1984 and 1999. Distance dependent increased risks of 14%-21% for leukemia in children under nine years of age were observed. When age was expanded to include the population up to 25 years of age, an increased probability of morbidity of 7-10% and increased mortality of 2-18% were observed.

15-h-HH (continued)

Taken together, these studies are consistent with the hypothesis that children who live near nuclear power plants develop cancer and leukemia more frequently that those living further away. If emissions have been correctly measured by monitoring the areas surrounding nuclear installations, as has been claimed by both the plant operators and the regulatory authorities, then either the currently accepted calculation models for determining radiation exposure of local residents are incorrect, or the biological effects of incorporated radionuclides have been badly underestimated, at least for young children and embryos (human fetuses).

The indications over many years that there are increased levels of morbidity near to nuclear power plants are given added support by results of the KiKK study. The possibility of an increased risk for older children and adults living near nuclear power plants cannot be ruled out. It is important to point out that the radiation health standards established by BEIR VII are consistent with the above research findings regarding both cancer and non-cancer health outcomes given any level of low dose exposures. Furthermore, the BEIR VII committee also concludes "that the current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose-response relationship between exposure to ionizing radiation and the development of cancer in humans." In other words, there exists general consensus on the radiation health risks by

9

exposure and living near nuclear power plants. Consequently, the most effective mitigation of such risks will rely on either 1) avoiding the area surrounding the plant, or 2) reducing the nuclear energy operational level, or 3) implementing risk management options based on the mechanistic understanding of cancer or non-cancer epidemiology.

A number of studies have observed that risk of leukemia for children under the age of 5 increases with decreasing distance of residence from nuclear power plants in Germany, the United Kingdom and in the United States (Hoffman, et al, 2007 and Kaatsch, et al, 2007).

The KiKK & USC studies are among the strongest methodologically speaking and utilize state-of-the-art epidemiological methods.

The methodology of modeling the continuous distance variables is adequate. Models applied in the studies show good adaptation to the collected data. The models permit an assessment of the incidence risks associated with distance of the home to the nearest nuclear power plant site.

15-h-HH (continued)

The risk to contract childhood cancer and leukemia significantly and continuously increases with increasing vicinity of the home to a nuclear power plant. The studies are the methodically most elaborate and comprehensive investigation of this interrelation worldwide. The association between vicinity of the home and increased risk of leukemia has been observed repeatedly in well-designed studies in Germany, the USA and UK.

The causal role of ionizing radiation in these studies remains to be investigated using state-of-the-art genomic, molecular and cellular diagnostics and testing technologies that have only recently become available for medical and healthcare research. The estimated exposures are far below those levels that are known to be leukemogenic or carcinogenic. Some of the associations are ecologic in nature, individual dosimetry is lacking and potentially important confounders such as competing risks (exposure and disease), length of residence, etc., are not measured. These factors can be further examined for site-specific information and data to improve on recent research findings concerning the PINGP operations and on-site waste management practice.

Waste and Waste Confidence

The Prairie Island Indian Community remains concerned about the on-going operation of the PINGP and Independent Spent Fuel Storage Installation (ISFSI). We recognize that the NRC licenses these two facilities separately and that spent fuel storage is beyond the scope of the license extension application. We believe that the two issues are, however, linked.

15-i-RW

The Commission's GEIS on the License Renewal of Nuclear Plants, NUREG-1437, states that "...the original target date for opening the repository will not be met ...DOE now expects that a geologic repository will be ready no sooner than 2010." (NUREG-1437). This target has, unfortunately, been pushed back considerably. The Commission

10

has only recently docketed the Department of Energy (DOE) application for a license for the repository. The NRC has three years from the date of docketing, and an additional year if necessary, to evaluate the DOE license application. It is almost certainly going to take this long, given the complexity and controversial nature of the repository licensing decision. If the Commission reaches a favorable decision on the license application, it will be several more years before the repository is constructed and ready to receive shipments of spent fuel for disposal. This assumes that there will not be the substantial delays that often occur in large-scale construction projects. In addition, the upcoming Presidential election could have a significant impact on the project. As DOE noted in its recent Congressional testimony "...significant reductions in appropriated funding for FY2007 and FY2008 had negated DOE's ability to meet the March 2017 best achievable opening date [for the Yucca Mountain repository]." (emphasis added). Testimony of Edward F. Sproat III, Director of DOE's Office of Civilian Radioactive Waste Management (OCRWM), House and Senate Appropriations Hearing, April 9 – 10, 2008.

The end result of all of this uncertainty is that the Community may have to live with the onsite storage of spent fuel at PINGP for decades, especially if the license for PINGP is renewed. It is time for the Commission to revisit its Waste Confidence Decision and to seriously explore whether there other alternatives to Yucca Mountain for removing the spent fuel from PINGP. This falls into the category of "new and significant" information, although it is certainly not "new" anymore. Concerned citizens and governments have been raising this issue for a number of years in regard to many reactor license renewal applications. Both the Waste Confidence Decision and the GEIS conclusions are seriously in question and should be revisited before any Commission decision on whether to renew the license for PINGP.

15-i-RW (continued)

As the GEIS noted, the total accumulated amount of spent fuel after an additional 20 years of operation at an individual reactor would amount to 50% more fuel than at the end of 40 years of operation. (NUREG-1437) Even with this large increase, the NRC has determined in its Waste Confidence Decision that spent fuel can be stored on-site for at least 30 years beyond the licensed (and license renewal) operating life of nuclear power plants safely and with minimal environmental impact. However, the GEIS also notes that a second repository will be necessary because of the statutory limitation of 70,000 metric tons uranium (MTU) for the first repository. The GEIS concluded that "...[a]ssuming that the first repository is available by 2025, additional disposal capacity would probably not be needed before about the year 2040 to avoid storing spent fuel at a reactor for more than 30 years after the expiration of operating licenses." NUREG-1437). The 2025 date matches the Commission's second finding in the Waste Confidence Decision, i.e., that the Commission finds reasonable assurance that at least one mined geologic repository will be available within the first quarter of the 21st century and that sufficient repository capacity will be available within 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of any reactor to dispose of the commercial high-level radioactive waste or spent fuel originating in that reactor and generated up to that time. Given the difficulties associated with docketing the application for the first repository, this finding no longer appears to be reasonable and should be re-examined, either in the EIS for the PINGP license renewal,

11

or in a re-opening of the Waste Confidence Decision. It is conceivable, if the Yucca Mountain repository does not survive the Commission's license evaluation, that a repository may not be available until 2060. This would approach or exceed the "thirty years after the expiration of the operating license" for many plants. 15-i-RW (continued)

If the Commission does not see fit to re-open the Waste Confidence Decision, the Community will take the lead, in coordination with other governmental entities concerned about this issue, in submitting a petition for rulemaking to re-open the Waste Confidence Decision. If the Commission does re-open the Waste Confidence Decision, either on its own, or in response to a Petition for Rulemaking or some similar stimulus, the Community requests that the PINGP license renewal be proceeding be suspended until the Commission issues a new Waste Confidence Decision. It would not be prudent to renew any operating license during the pendency of an evaluation of the Waste Confidence decision that might reach a conclusion apposite to the present findings. If the present findings are re-affirmed, the license renewal proceeding could be re-opened with little impact on the license applicant. 15-j-RW

In addition, the NRC SEIS on the license renewal application must develop alternatives, including a no action alternative, as contingencies, in case NMC either does not receive approval from the Minnesota Public Utilities Commission (PUC) for the expansion of the Independent Fuel Storage Installation (ISFSI), or does not receive approval for an amendment of its license from the NRC for the same purpose. (Note: the needed state-level approvals are discussed later in this letter). 15-k-AS

Avian Mortality and Transmission Lines

Section 3.1.6.3 of the ER discusses avian mortalities that have resulted from the collisions from transmission lines. The ER noted that over a five-year period (1973–1978) 453 bird carcasses, representing 53 species, were found along portions of the transmission lines from the PINGP. Sixty-four percent of those carcasses were found along the 2,500 foot east-west portions of the transmission lines. About one-half of these transmission lines are on the boundary between the Community's land (east-west boundary separating Sections 5 and 32, T113North, R15 West) from Xcel's property. Since there is no information regarding species composition for this time period, nor any data to definitively indicate that avian mortality has not been reduced since the conclusion of the five-year study, it is difficult to ascertain whether the continued operation of the PINGP will not have a negative impact on avian populations. 15-l-TR

No explanation was offered in the ER as to why avian mortality was so high at the PINGP, other than to quote the NRC statement that "no relatively high collision mortality is known to occur along transmission lines associated with nuclear power plants in the United States other than the Prairie Island Plant in Minnesota." (NRC GEIS, 1996). Similarly, there is no information as to whether operations at the PINGP have changed any way, since 1978, to reduce mortalities over the license renewal term. Moreover, there is a disturbing statement on page 3-13 of the ER that "very few bird carcasses have been observed at PINGP or along associated transmission lines since 1978, but

12

systematic searches or formal avian collision studies have not been conducted." This statement leads the reader of the ER to believe that PINGP personnel just stopped looked for dead birds.

Because there is no information regarding any past operational changes that have been made (or will be made during the relicensing period) that have resulted in the reduction of avian mortalities, no information to suggest that formal searches or studies of avian mortality are being conducted, and that nowhere else in the country is avian mortality so high (according to NUREG 1437), the Community believes that, for the reasons outlined below, avian mortality should be a Category 2 issue for the PINGP SEIS. The Community is especially concerned about avian mortality as it relates to potential impacts to threatened or endangered avian species, as the PINGP sits in the Mississippi River flyway.

The Mississippi River is recognized as a Globally Important Bird Area and Migratory "Flyway" for birds. The Mississippi flyway is heavily utilized because it is uninterrupted by mountains or hills that would interfere with the movements of migrating birds (Couleeaudubon.org). The Upper Mississippi River and associated ecosystem is very important to birds that are year-round residents and those who are migratory. About 40% of all North American waterfowl use the river as a migratory flyway, and 326 species of birds (about 1/3 of all species in North America) use the river corridor as a flyway in their spring and fall migrations (couleeaudubon.org). The Mississippi River is a well-known migration corridor for millions of waterfowl, including dabbling ducks, canvasbacks, and scaup that pass through this flyway annually. The bottomland forests also provide wintering and migration habitat for mallards, black ducks, wood ducks, northern pintails and Canada geese (Ducks Unlimited). Parts of the Mississippi River also provide habitat for breeding and wintering birds such as the bald eagle (USGS 2007).

15-I-TR (continued)

The associated floodplain forests and wetlands of the Upper Mississippi River have become increasingly important because of losses of these habitats throughout the upper Midwest. Higher species abundance is found in the floodplain as opposed to adjacent upland, and many species, such as the prothonotary warbler, brown creeper, yellow-billed cuckoo, yellow-bellied sapsucker and great flycatcher, show a clear preference for floodplain forest. A study done in 1993 found 150 species of birds between Pools 4-8 during spring migration and 20% of these were neotropical migratory birds. A few declining species such as the red-shoulder hawk, cerulean warbler, Louisiana waterthrush, northern waterthrush, and prothonotary warbler are dependent on these forests. Because of the importance of the Mississippi flyway, resource management and other human activities within the flyway should be conducted carefully to protect the health of this important ecosystem and the birds and other wildlife that depend on it (USGS 1993).

There is passing reference in the ER to the Mississippi River as a bird migration route and how these particular lines (east-west corridor) are perpendicular to the river and that "studies have found that transmission lines at right angles to avian flight paths are

13

associated with greater collisions." ER at 3-13. The ER also states, "this section of the (transmission) corridors is perpendicular to the bird migration corridor along the Mississippi River." The mere mention of the "bird migration corridor along the Mississippi River" understates the importance of the Mississippi River as an annual flyway for millions of migratory birds and the possibility that threatened or endangered species may be affected.

It is interesting to note that NMC/Xcel devoted two paragraphs to the importance of the Mississippi River Flyway in its application to the State of Minnesota Public Utility Commission (PUC) for permission to use additional dry casks and to operate the PINGP at a higher rate (PUC application dated May 16, 2008, page 7-21). (Note these state proceedings are also discussed later in this letter).

Prairie Island and PINGP are also right in the middle of the Vermillion River and Lower Cannon River Important Bird Area. This is an area of high biodiversity significance within Minnesota harboring diverse bird communities unique to the Upper Mississippi River. This is one of the top 4 sites in Minnesota for rare forest birds and it contains the highest number of records for two special concern species—the Red-shouldered Hawk and Cerulean Warbler (Dunevitz 2001).

15-I-TR (continued)

The ER mentions that Xcel has entered into a Memorandum of Understanding (MOU) with the US Fish and Wildlife Service (FWS) in 2002 to establish policies and procedures for dealing with migratory birds that may be on Xcel property and for the development of an Avian Protection Plan. The ER further states that the Avian Protection Plan is in development, although reports covering activities related to the MOU are submitted to the FWS. Since the plan is still in development, there appears to no current plan to protect birds.

Because of the PINGP's location within the Mississippi River flyway and the reasons stated above, Avian Mortality impacts should be treated as a Category 2 issue and evaluated in the SEIS. We do not know why the incidence of avian mortality was so high at the PINGP (during the only documented study period), we not know which species had the highest mortality rates, whether these mortalities had an impact on populations, and whether any threatened or endangered species were involved. There simply is not enough information provided.

<u>Category 2 Issues</u>

Archaeological Impacts (National Historic Preservation Act)

One of the most important issues for the Prairie Island Indian Community is the condition of the many archaeological sites within the PINGP.

15-m-CR

We have learned that there have been some impacts to at least two archaeological sites within the plant boundaries. One site, 21GD207, a habitation site, is under a service road. Another site, 21GD59, a human burial mound site, impacted by the construction of the

14

cooling towers, may now be under 12 feet of fill or may have been destroyed. This burial site contains the remains of our ancestors.

We are well aware that the EIS scoping process does not provide a remedy for past damage or disturbance to archaeological sites. The process, however, exists to ensure that the full extent environmental impacts of the proposed action are fully understood and disclosed. It is because of past damage or destruction of archaeological sites that we have concerns about how the steam generator replacement project, and other future construction (such as the expansion of the ISFSI, proposed for 2020) might impact previously unrecorded archaeological resources.

Section 3.2 of the ER (Refurbishment Activities) discusses the replacement of Unit 2 steam generator (proposed for September 2013). The ER states that several temporary buildings will be constructed, as well as office space for construction workers and a decontamination building. In addition, warehouses will be built and will remain after the project. It is mentioned that these buildings will be constructed on previously disturbed land. No location information or maps, however, are provided. No mention is made of water systems, sanitation facilities, or other infrastructure for the office space and how these would be constructed.

In the 1960s Northern States Power (NSP), then the owner and operator of the PINGP, contracted with Dr. Eldon Johnson (State Archaeologist) to conduct an archaeological survey of the project area, which included excavations of existing burial mound sites, two of which were well-outside the project area (Birch Lake Mounds and Bartron Village).

15-m-CR (continued)

A Final Environmental Statement (FES), prepared by the United States Atomic Energy Commission (AEC), for the original operating licenses for the PINGP, was released in May of 1973. In the FES there is some discussion about impacts to archaeological sites. A table lists some of the sites within the PINGP, but not all of the sites within the PINGP. Most notably, there is no discussion regarding the archaeological site near the cooling towers (21GD59). Correspondence from the Advisory Council on Historic Preservation (ACHP) (March 1973) indicated that the AEC's draft environmental statement did not contain sufficient information in order to allow the Council to comment substantively. In response to the ACHP's letter, the FES stated concluded "that only the Barton site is sufficiently close to the plant that an impact is possible." The FES goes on to state that the Barton site is beyond the limits of plant construction and was not disturbed. There is no mention whatsoever of whether a burial mound site much closer to the plant (21GD59) that was impacted in any way. This site was actually outlined on a map provided in the FES. (FES page II-30)

We bring these issues up because that original survey work (late 1960s) appears to be the basis for all other work within the plant boundaries, including the steam generator replacement project. The circa 1990 EA for the ISFSI states that "an archaeological survey was conducted in 1967, and nothing significant in the immediate area of the power plant or ISFSI was found." Past archaeological work (i.e., 1960s investigations by Dr. Johnson) is no guarantee that the area is clear of archaeological sites. In fact, two

15

previously unrecorded sites were discovered subsequent to the early site work, thus demonstrating that it is still possible to identify previously unrecorded sites with the PINGP boundaries. There is no evidence to suggest that Dr. Johnson's original site survey work went beyond previously recorded sites.

Xcel/NMC provided the Community with a copy of the report developed by its contractor, the 106 Group (Boden 2008). The report is concluded with the statement that the study area (the PINGP site) has a high potential to contain intact archaeological remains." This strongly suggests the need to do a field assessment before any "construction" (i.e., steam generator replacement project buildings, etc.) activities occur.

As previously mentioned, the assessment conducted by the 106 Group did not involve any field work, but involved an extensive review of the collected site files, reports, and other literature, aerial photographs, historical plat maps, General Land Survey maps, USGS topographic maps. The study area was the entire area within the boundaries of the PINGP plant and grounds.

Further on the report states "Despite the construction of the PINGP and associated features, there remains undisturbed land within the study area. Because the remaining portions of the study area are in proximity to significant bodies of water and appear to be undisturbed, they are considered to have inherently very high potential to contain intact precontact archaeological sites. Further there is also the potential for finding intact burial because four precontact mound sites, some of which have yielded human remains, have been recorded in the study area." The report is concluded with the statement that "no construction activities are planned under the new 20-year operating license." This leads one to conclude that the 106 Group was not aware that Xcel/NMC planned to construct several temporary buildings, as well as office space for construction workers, warehouses and a decontamination building as part of the steam generator replacement project.

It is the responsibility of the NRC to assure compliance with the National Historic Preservation Act, which states that all Federal agencies are required to give appropriate consideration to the environmental effects of their proposed actions in their decision-making and to prepare detailed environmental statements on recommendations or reports on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment (36CFR805.1).

It was the responsibility of the AEC (predecessor to the NRC) to ensure that the environment (which includes cultural and archaeological resources) would not be adversely impacted by the construction and operation of the PINGP. In fact, in the forward of the FES, it is stated that, according to the National Environmental Policy Act of 1969, it is the responsibility of the Federal government to, among other things:

> *Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and a variety of individual choice.*

15-m-CR (continued)

16

Part of our heritage (and culture) was lost when NSP destroyed burial mounds in the 1970s because no one was protecting these important cultural, historic, and religious monuments.

The scope of the EIS must include a Phase I archaeological site survey to locate any previously unrecorded sites within the steam generator project area and ascertain the current status of all known sites within the boundaries of the PINGP to ensure that all of culturally-significant sites can be protected and respectfully managed. NMC/Xcel should develop a Cultural Resource Management Plan (CRMP) to ensure that all of the archaeological sites within the PINGP will be protected and respectfully managed.

We understand that the Midwest Region of the Bureau of Indian Affairs requested in writing that they be allowed to participate in the EIS process as a Consulting Party, pursuant to 36CFR800.2(c)(5) (letter to Rani Franovich, Branch Chief, from Kevin Bearquiver, Acting Regional Director, BIA, August 18, 2008). We support this request.

15-m-CR (continued)

Threatened and Endangered Species

Under provisions of section 7(a)(2) of the Endangered Species Act (ESA), a Federal agency that carries out, that permits, licenses, funds, or otherwise authorizes activities must consult with the US Fish and Wildlife Service (USFWS) as appropriate, to ensure that its actions are not likely to jeopardize the continued existence of any listed species. Section 7 of the ESA requires the NRC to ensure that, if it grants a license, its action will not jeopardize the existence of a regulated species.

Section 2.3.3 of the ER (Threatened and Endangered Species) notes the presence of the Higgins eye pearlymussel (*Lampsilis higginsii*), an endangered species listed by both the USFWS and the MN Department of Natural Resources (MN DNR). The ER also notes the efforts of the USFWS and the MN DNR to re-introduce into Pool 3 of the Mississippi River. Because Sturgeon Lake is historic habitat for the Higgins eye pearly mussel, the Community has also been involved in this effort. The re-location area is located just 0.5 miles upstream of PINGP's intake screenhouse (this area is located in tribal waters). In fact over, 5,000 sub-adults have been placed in Sturgeon Lake since 2003.

Section 4.4 of the ER (Entrainment of Fish and Shellfish in Early Life Stages) discusses entrainment of fish species from the condenser cooling system. No mention is made of shellfish, other than to note that entrainment of fish and shellfish in early life stages is "a potential adverse environmental impact that can be minimized by the best available technology." ER at 4-12.

The ER concludes "impacts of entrainment of fish and shellfish at PINGP are SMALL and warrant no mitigation beyond that already in place and required by the current NPDES permit." The NPDES permit is attached, information related to NMC's Clean water Act Section 316 (b) determination is discussed, but the report is not attached. Most importantly, impacts to the Higgins eye pearlymussel is not discussed in this section. The NPDES permit states that NMC must submit the results of a required Impingement

15-n-TE

17

Mortality and Entrainment Study, which shall provide information to support the development of a calculation baseline for evaluating impingement mortality and entrainment consistent with the 316(b) rule. This report was to have been submitted to the Minnesota Pollution Control Agency by October 26, 2006, as required by 10 C.F.R. § 51.53(c)(3)(ii)(B). The required report was not attached to the ER.

Section 4.7 of the ER (Threatened and Endangered Species) discusses the fact that impacts to threatened and endangered species is a Category 2 issue and that site-specific assessment would be required to determine whether continued plant operations of refurbishment would be affected.

As noted in Section 2.3.3, efforts are underway to re-introduce the Higgins eye pearlymussel to Pool 3 (Sturgeon Lake). According to the USFWS:

> the current range for the Higgins eye mussel is about 50 percent of its historic distribution, which extended as far south as St. Louis, Missouri, and in several additional tributaries of the Mississippi River. The Higgins eye pearlymussels depend on deep, free-flowing rivers with clean water. Much of their historic habitat was changed from free-flowing river systems to impounded river systems. This resulted in different water flow patterns, substrate characteristics, and host fish habitat and movement that affects how the Higgins eye feed, live, and reproduce. To reproduce, male Higgins eye release sperm into the river current and downstream females siphon in the sperm to fertilize their eggs. After fertilization, the females store the developing larvae (glochidia) in their gills until they're expelled into the river current. Some of the glochidia are able to attach themselves to the gills of host fish, where they develop further. After a few weeks, the juvenile mussels detach from the gills of the fish and settle on the river bottom, where they can mature into adult mussels and possibly live up to 50 years. The sauger, walleye, yellow perch, largemouth and smallmouth bass, and freshwater drum are considered suitable hosts for Higgins eye glochidia. (USFWS 2008)

There is mention of these fish species in the ER, but there is no specific discussion connecting the entrainment of larval Higgins eye or impingement of fish species (the host for the mussel's early life stage, the glochidia) with impacts to the survival of the Higgins eye pearlymussel in Section 4.7, Threatened and Endangered Species. The discussion of impacts to the Higgins eye is simply summed up by stating, "it is conceivable that some larval *higginsii* will be carried downstream into the power plants intake screenhouse." No quantification of losses or further assessment, is provided, as required by 10 C.F.R. § 51.53(c)(3)(ii)(E). These impacts seem to be negated or minimized by the later statement in the paragraph, that even under the best of circumstances, the mortality rate of the early life stages (of the Higgins eye) is very high and the glochidia (early larval stage) that do not attach themselves to a host quickly have a low probability of survival. This does not seem to meet the requirement that "the applicant shall assess the impact of the proposed action on threatened or endangered

15-n-TE (continued)

18

species in accordance with the Endangered Species Act (10 C.F.R. § 51.53(c)(3)(ii)(E).

NMC contacted the USFWS by letter dated January 25, 2008, requesting information relative to concerns about possible impacts to threatened and endangered species arising from license renewal. No reply was included in the April 15, 2008 ER. The NRC also corresponded with the US FWS on July 22, 2008 regarding the presence of Threatened or Endangered Species in the project. On August 13, 2008 the USFWS responded to the NRC inquiry, stating that the only known endangered species in the project area was the Higgins eye mussel and to also provide information relative to efforts to establish a viable population.

The Community is concerned about how the cooling system in use at PINGP affects survival of the Higgins eye larval stage. According to the ER, the PINGP can operate in one of three modes: 1) open cycle, once through without the cooling towers; 2) helper cycle, once-through with cooling towers; and 3) closed cycle. There is no discussion of the cooling system and its three cycles and how any of them relate to species survival. The matter is summed up by stating that "because current operational practices will be affected by license renewal, NMC concludes that impacts to threatened or endangered species from license renewal would be SMALL and do not warrant mitigation. " ER at 4-27.

15-n-TE (continued)

There was no discussion about how current operational practices are currently impacting the survival of Higgins eye mussel beyond stating, "it is conceivable that some larval *higginsii* will be carried downstream into the power plants intake screenhouse." The EIS must include a disclosure of how a the extended operating period will affect the survival of this endangered species.

Socioeconomic Impacts

Taxes

Section 2.7 of the ER (Taxes) discusses the annual property taxes for the PINGP by Goodhue County, the City of Red Wing, and School District 256. According to Table 2.7-1 of the ER, Goodhue County has received $26,223,326, Red Wing has received $27,034,951 and School District 256 has received $17,041,750 for the time period of 2001 to 2006 (for a total sum of $70,300,027).

In contrast, Xcel has only paid the Tribe a sum of $2.3 million annually as a result of a Settlement Agreement between the Community and Xcel/NMC entered into in 2003.

15-o-SE

Over the last several years, the tribe was spent several million dollars in legal and consultant fees in order to participate in various Xcel/NMC proceedings, either at the state or federal levels. The money we have spent, in order to participate in these proceedings, is money that we could have used for other community purposes. In addition, the Tribe has also established the Prairie Island Police Department. And although the Tribe receives no funding from Xcel/NMC for its Police Department, PIPD

19

is and will most likely always be the first responder for any incident at PINGP. The settlement monies paid to the Tribe by Xcel/NMC are far less than the costs and expenses the Community has incurred as a result of the PINGP.

The negative socioeconomic impacts to the Prairie Island Indian Community cannot be overlooked and must be disclosed in the SEIS. As the tax information shows the egregious disparity between the tribe and Red Wing, the school district, and the county. The Community bears the greatest risk and receives the least amount of benefit.

15-o-SE (continued)

Electricity Supply and Transmission

Electricity produced at PINGP is sent out on the highest capacity 345 kV lines right along the PINGP-PIIC property line, directly across the road from several Community residences, and away from the Community. Remarkably, the Community receives its electricity from power generation facilities hundreds of miles away, with the associated problems of delivery and quality.

15-p-OS

Traffic Concerns

Section 2.8.2 of the ER (Transportation) discusses the number of employees traveling to the PINGP and the various routes they might take. The ER states that all employees travel east on Sturgeon Lake Road and then take a right onto the plant access road, just west of the reservation boundary. It is further stated that employees leave the plant via the same roadways. This is not accurate. Many employees exit the plant at 3PM via Wakonade to Sturgeon Lake Road, though the reservation, because they do not want to stop at the intersection of the service road and Sturgeon Lake Road (a 4-lane road) and make a left-hand turn across two lanes of traffic. Again, this serves to underestimate the traffic impacts to the Prairie Island Indian Community from plant activities.

During the steam generator replacement project, 750 workers (in addition to the 700 or so outage workers and the 685 PINGP permanent and long-term contract staff) will be coming to Prairie Island, using the one primary access road, Sturgeon Lake Road. The SEIS scope should be expanded to disclose how this additional traffic to the PINGP, related to the steam generator project, would impact the Prairie Island Indian Community.

15-q-SE

Environmental Justice

Section 2.5.3.1 of the ER (Minority Populations) discusses minority or low-income populations within a 50-mile radius. Section 2.5.3.1 describes how the ER identified minority populations using NRC guidance. The section concludes with the statement that "Except for the Prairie Island Indian Community, the census block groups containing minority populations are[] predominately in the Minneapolis area and more than thirty miles from PINGP." (ER at 2-23)

Chapter 2, Site and Environmental Interfaces, is concluded with the statement that "Having evaluated environmental conditions in the vicinity of the PINGP site in this

15-r-EJ

20

section and assessed potential impacts of license renewal in Chapter 4, NMC has not identified any obvious cumulative impacts and has not extended the discussion of potential cumulative impacts into Chapter 4, Environmental Consequences of the Proposed Action and Mitigating Actions." ER at 2-41.

In Section 4.1.3 of the ER ("NA" License Renewal Issues), states, "the NRC does not require information from applicants, but noted that it will be addressed in individual reviews (10CFR51). Environmental justice demographic information is provided in Section 2.5.3. ER at 4-3

No analysis of impacts to minority populations from license renewal was disclosed in the ER, other than to identify the Prairie Island Indian Community as a minority community. The ER's very limited discussion of environmental justice does not contain any valuation of impacts on the minority or disadvantaged communities identified in the ER.

Regulatory Guide 4.2S1, Section 4.22 (Environmental Justice) states that the need for and the content of an analysis of environmental justice will be addressed in plant-specific reviews (Table B-1). It is clear from NRC Regulatory Guide 4.2S1 that the NRC expects the ER to analyze environmental justice issues. Therefore, the Community believes that the ER is deficient with regard to environmental justice.

15-r-EJ (continued)

Even though radiation protection in general may be a Category 1 issue, the Category 2 issue of environmental justice is an overarching site specific issue, and if there is a disproportionate impact on a minority group from license renewal activities, including radiation protection, it must be evaluated. In summary, the Community is raising two issues about the adequacy of the ER's environmental justice analysis. One is the absolute lack of any evaluation of impact in the ER on minority groups. The ER has not disclosed the information the Community believes it is expected to disclose, so that Commission may properly consider, and publicly disclose, environmental factors that may cause harm to minority and low-income populations that would be disproportionate to that suffered by the general population.

The second issue is the absence of any analysis in the ER on the potential impacts of radiation on a potentially predisposed cancer minority group, the Prairie Island Indian Community. In this regard, the Community believes that the proposed action may have significant adverse impacts on the minority group identified in the ER, that is the Prairie Island Indian Community, because the impacts to the Community were not adequately evaluated.

15-s-EJ

The EIS scope must consider non-radiological health effects. In 2005, we commissioned a public health study (conducted by the University of Minnesota), which documented that many of our youth experience increased levels of stress and anxiety because of health and safety fears related to the power plant. These are the same youth who will be our leaders in the future, the people with whom future Xcel and NRC representatives will be working over the re-licensing period (McGovern, et al. 2006).

15-t-HH

21

Severe Accidents

If a severe accident were to occur, the Prairie Island Indian Community would be financially devastated. The Tribe's primary source of revenue could not be easily replaced and would have a severely detrimental economic impact to the Tribe. The impacts to the Tribe's culture would be immeasurable and irreparable. Because of these concerns, the Community is particularly interested in the sufficiency of the severe accident mitigation alternatives (SAMA) analysis.

According to the NRC GEIS, "the generic analysis of severe accidents applies to all plants and that the probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts of severe accidents are of small significance for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives."

The ER explains how the SAMA analysis includes modeling to determine which SAMA would be the most cost beneficial. The ER however, does not describe the modeling in sufficient detail for the Community to understand how the benefits of the SAMA were calculated. The Prairie Island Indian Community is very unique and will not readily fit into a conventional model of averted risks. In particular, the lost revenue from the Treasure Island Resort represents a unique "cost" for an averted severe accident that will not fit well in a conventional model of radiological impacts.

We request that the NRC to evaluate site-specific economic data in the SAMA discussion of the SEIS. Prairie Island is our <u>only</u> home; our business (which can <u>only</u> be located on our reservation) is our primary means of providing benefits and services to our Community. If there was a severe accident, the Tribe would lose its primary revenue source, many members would lose their primary income source (that does not include future members), over 1,600 people would lose their jobs, several hundred vendors would lose lucrative contracts, and the Tribe could no longer provide benefits and services to our Community. Our largest business, the Treasure Island, is not easily re-located. Federal laws and regulations govern not only how a Tribal gaming facility operates, but also where a Tribal gaming facility can be located. *See* 25 U.S.C. § 2719 (provisions governing tribal gaming on lands acquired after 1988). 15-u-PA

Economic data must also include the value of our Community's buildings, facilities and infrastructure, as well as the value of our tribal members' home sites (1 acre), the value of their homes, and the costs of re-establishing an Indian Tribe (which includes land acquisition, legal costs, and infrastructure development). Since tribal land cannot be sold (or bought) it may be difficult to place a monetary value on tribal members' homes and property. One cannot simply re-establish an Indian Tribe elsewhere; Federal law also governs the transfer of land into Trust for non-gaming purposes. *See* 25 U.S.C. § 465 and 25 C.F.R. § 151.

This issue is of paramount importance to our community.

22

Connected Actions and Cumulative Impacts

The Community believes that there are "connected" actions that must be included in the scope of the SEIS, which were not included in the ER. The SEIS must go beyond the narrow scope of the continued operation of the two reactors at the PINGP and the steam generator replacement project to include the extended power uprate and dry cask storage expansion proposed by Xcel/NMC. In addition, the cumulative effects of the actions (proposed action and connected actions) must be included in the SEIS scope. Connected, similar, or cumulative actions generate direct, indirect, and cumulative impacts. 15-v-CI/OS/RW

Dry Cask Storage Expansion and Extended Power Uprate

On May 16, 2008, Xcel/NMC filed a Certificate of Need (CON) application with the Minnesota Public Utilities Commission (PUC) requesting the use of 35 additional dry casks, so the PINGP can operate another twenty years beyond its currently licensed life. In its CON application to the PUC, Xcel/NMC states that the current Independent Spent Fuel Storage Installation (ISFSI), currently licensed by the NRC under a Part 72 site-specific license to use/store up to 48 casks until 2013, would have to be expanded to accommodate the additional casks. It is expected that Xcel will request a license amendment from the NRC to increase the allowed storage beyond 48 casks sometime in 2018. To accommodate the increased number of casks, the storage pad will have to be expanded. Xcel/NMC anticipates constructing two new concrete storage pads, designed for a single row of casks, adjacent to the south side of the existing storage pads. When completed (sometime in 2020), the new storage pad will hold up to 98 casks (license renewal term plus decommissioning). 15-w-OS/RW

In the above-mentioned CON application, NMC/Xcel also requested that the PINGP be allowed to operate at a higher rate (i.e., extended power uprate). The PINGP is licensed by the NRC for an output of 1044 MW (522 MW each unit); the uprate will add 164 MW for a total of 1208 MW.

The ER for the license renewal application contains no information about the environmental impacts of the uprate. The Safety Analysis Report (SAR) for the license renewal application contains some information about the uprate. 15-x-ER

State EIS Scoping

On August 25, 2008 the MN Department of Commerce (DOC) issued a draft environmental scoping document, which describes impacts (i.e., health, safety, and environmental) from both the extended power uprate and dry cask storage expansion that will be evaluated in the state EIS. In addition, the DOC held a public meeting on September 10, 2008 to solicit comments and suggestions regarding the scope of the environmental review that the DOC will conduct. 15-y-ER/LR

23

According to the CON application, Xcel/NMC, expects that the dry cask storage expansion will increase radiation levels (expected to be 0.36 mrem) and the extended power uprate will increase water use (both surface and ground water) by up to 10 percent, increase the temperature of the circulating water outfall, and also increase radioactive releases by 10 percent. Individually these impacts are expected to be within their respective permitted limits, but there is no information regarding the cumulative impacts.

Cumulative impacts are generally limited to what is foreseeable. The NRC's Regulatory Guide 4.2S1, Preparation of Supplemental Environmental Reports for Applications to Renew Nuclear Power Plant Operating Licenses (Regulatory Guide 4.2S1), requires that Chapter 2 of the ER (Site and Environmental Interfaces) identify and describe "known and reasonably foreseeable Federal and non-Federal projects and other actions in the vicinity of the site that may contribute to the cumulative environmental impacts of license renewal and extended plant operation."

Section 2.11 of the ER (Known or Reasonably Foreseeable Projects in Site Vicinity) discusses the status of industrial facilities in the three counties, such as projects related to Lock and Dam No. 3, Treasure Island Resort and Casino and a couple of hydro-electric plants nearby. There is no disclosure, however, of the Certificate of Need for the extended power uprate, the increase in casks, or the planned expansion of the ISFSI, even though these applications were submitted one month after the PINGP license renewal application was submitted to the NRC. It seems that one month into the future (from the submission of the license renewal application) is both reasonable and foreseeable. Without expanded dry cask storage, the PINGP cannot continue to operate. Although the PINGP does not need to operate at a higher power, it does not seem likely that Xcel/NMC would invest resources in the uprate project unless the company was sure of a favorable decision from the NRC relative to relicensing for an additional 20 years.

There is mention in Chapter 9 (Status of Compliance) of the need to get approval from the MN Public Utilities Commission (PUC) for additional dry cask storage, but there is no disclosure of the extended power uprate proposal or how either relates to cumulative impacts at the PINGP.

According to 40 CFR 1508.25, connected actions are "actions that are closely related and therefore should be discussed in the same impact statement." Furthermore, actions are connected if they "i) automatically trigger other actions which may require environmental impact statements; ii) cannot or will not proceed unless other actions are taken previously or simultaneously; and iii) are interdependent parts of a larger action and depend on the larger action for their justification.

The NRC's EIS scope must include all of these projects—the relicensing of the PINGP, the extended power uprate of the PINGP, the expansion of dray cask storage at the PINGP, and the steam generator replacement activities—and a disclosure of all the related impacts. These projects are all currently proposed by NMC/Xcel and are expected to occur in the very near future.

15-y-ER/LR (continued)

24

Cumulative Impacts

As mentioned above, connected, similar, or cumulative actions generate direct, indirect, and cumulative impacts. Cumulative effects or impacts are neither discussed nor considered in the ER. According to Regulatory Guide 4.2S1, Chapter 2 of the ER must identify and describe "known and reasonably foreseeable Federal and non-Federal projects and other actions in the vicinity of the site that may contribute to the cumulative environmental impacts of license renewal and extended plant operation." Also as discussed above, there are pending NMC/Xcel projects that the Community believes contributes to the cumulative impact (i.e., dry cask storage expansion and extended power uprate).

Chapter 2 of the ER is concluded with the statement "NMC has not identified any obvious cumulative impacts and has not extended the discussion of potential cumulative impacts into Chapter 4, Environmental Consequences of Proposed Actions and Mitigating Actions." ER at 2-41. To the Community, this seems like a faulty conclusion, given that connected actions are not discussed and that the Prairie Island Indian Community, its land, resources, and people are barely mentioned. 15-z-CI/ER

The Prairie Island Indian Community is subjected to a number of impacts that have a potential cumulative effect:

- Health effects (stress, increased cancer vulnerability)
- Operational radiological releases
- Operation of the ISFSI and increased levels of radiation
- High-voltage power lines immediately adjacent to homes
- Disregard of cultural impacts (i.e., burial mounds)
- Emergency preparedness concerns (one entrance/exit road)
- Socio-economic impacts (impacts on the tribe's culture, traffic, possible water impacts)
- Cost to the tribe of being involved in (or opposing) proceedings
- Cost to tribe to educate members of Congress on PINGP issues, and waste issues

Mitigations measures to eliminate or reduce the level of adverse impacts should be considered for each Category 2 issue. No mitigation was offered or discussed. 15-aa-EJ

As mentioned previously, members of the Prairie Island Indian Community may have exposure pathways (water, food, air) that may be different from typical or "average" consumer, thereby placing the tribal consumer at a greater risk. For example, many 15-bb-EJ

25

tribal members consume native plants for traditional purposes (direct consumption, medicines, teas, ceremonies) that are not typically part of any monitoring program. Many of our community members have been living on Prairie Island since the plant went on-line. Tribal members typically do not move in and out of the community. We are concerned about the human health effects from 60 years of low-level exposure, as many of our community members already have compromised health.

The scope of the SEIS Environmental Justice disclosure must include all of these factors.

15-bb-EJ (continued)

Alternatives to Relicensing the PINGP

It must be noted that if the "No Action" alternative (i.e., the NRC does not renew the license for the PINGP, PINGP ceases operation and is decommissioned) would have a LARGE POSITIVE impact on the Prairie Island Indian Community. As mentioned previously, our community derives no financial (or other) benefit from the presence of the PINGP, other than provisions outlined in the limited 2003 Settlement Agreement, and yet we bear the greatest risks. This aspect was not evaluated in Chapter 7 of the ER. Therefore the scope of the EIS must also include an evaluation of all the positive impacts that might arise from the No Action alternative.

15-cc-AS

Other Issues

Water Issues

It is noted that the gaging station at Prescott, WI (13 miles away) just south of Hastings, MN, where the St. Croix River enters the Mississippi, is cited and used by the PINGP to show annual mean flow values for the Mississippi River (Section 2.2.1.1). The Prairie Island Indian Community, in coordination with the US Geological Survey (USGS), operates a gaging station just .5 miles north of the plant (at the marina). The tribe's gaging station may be useful in depicting more accurate mean flow values. The scope of the SEIS and future modeling efforts should utilize data from this closer gaging station, as it more accurately reflects the Mississippi River conditions.

15-dd-SW

Army Corps of Engineers Projects

There is no information about the Army Corps of Engineers (ACE) planned drawdown of Pool 3 in an effort to restore native vegetation in Sturgeon Lake. This must be included in the scope of the EIS, especially with regard to the possibility of low flow or drought conditions, and the proposed uprate (which is expected to draw an additional 10 percent from the Mississippi River).

15-ee-OS/SW

26

Temperature Increases

As noted above, the proposed extended power uprate will increase the temperature of the PINGP's cooling water discharge water. This temperature increase must be evaluated as it relates to the proposed action (i.e., 20 year extended operation period). 15-ff-OS

Electromagnetic Fields

We understand that there is no consensus among scientists whether the electromagnetic energy emanating from the power lines would have a measurable human health impact. Some studies suggest exposure to EMF's increases the risk for certain diseases.

Since there is no scientific consensus on whether human health is compromised, there is NO assurance that there are NO adverse health effects (i.e., chronic health effects, increased risks to cancer). In fact, the United States EPA's Office of Radiation and Indoor Air offers only two recommendations for people who want to protect themselves from possible risks from power lines to reduce their exposure: "[i]ncreasing the distance between you and the source" and "[l]imiting the time spent around the source." (*See* "Electric and Magnetic Field (EMF) Radiation from Power Lines," available at www.epa.gov/radtown/power-lines.html). Needless to say, these are severe options for a people whose ancestors have lived on Prairie Island for generations. We recommend that the scope of the EIS include health impacts to members of the Prairie Island Indian Community resulting from exposure to electromagnetic energy and radiation emanating from the PINGP's transmission lines. Members of our community live extremely close to the power lines. 15-gg-HH

Terrorism

Though not mentioned (and certainly not imagined), the 1996 GEIS does not discuss potential environmental and health impacts resulting from a terrorist attack on a nuclear power plant must be part of the EIS scope. This is now a very real and very credible threat to the health and safety of our people, since the PINGP is right next door to us. The Community believes that the scope of the EIS must include an analysis of the environmental impacts from a terrorist attacks to the PINGP. 15-hh-OS

27

Conclusion

The Prairie Island Indian Community is the largest, most diverse and culturally significant population adjacent to the Prairie Island Nuclear Generating Plant. Since we bear the greatest risks from PINGP operation, with less benefit than other populations in the vicinity, it is our responsibility to ensure that the adverse impacts of continued operation of PINGP on our Community and the surrounding environmental resources are adequately disclosed and mitigated.

We appreciate this opportunity to provide these comments on the scope of the EIS that will be prepared by the NRC to disclose and evaluate impacts from the relicensing of the PINGP. This issue, the PINGP and its associated waste storage facility is the most important environmental issue for our community.

Respectfully,

Ronald Johnson
Tribal Council President

Johnny Johnson
Tribal Council Vice-President

Lucy Taylor
Tribal Council Secretary

Victoria Winfrey
Tribal Council Treasurer

Shelley Buck-Yeager
Tribal Council Assistant Secretary/Treasurer

Cc: Terry Virden, BIA

28

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The following pages contain the comments
made by Michael Schultz during the
NRC public scoping meetings held on July 30, 2008

Wing.

MICHAEL SCHULTZ: My name is Michael Schultz. I'm a member of the Red Wing City Council.

This past week we passed a resolution supporting Prairie Island Nuclear Generating Plant license renewal, and we would like to read into the record our resolution.

"Whereas, the Prairie Island Nuclear Generating Plant became operational with the start-up of Unit 1 reactor in December 1973 and Unit 2 reactor in December 1974; and

"Whereas, Prairie Island has operated safely and efficiently for more than 30 years, generated a record 8.89 million megawatt hours of electricity in 2007, and its 100 megawatts of electrical generating capacity remain vital to Minnesota's economy; and

"Whereas Xcel Energy has continually reinvested in the Prairie Island facility to assure the continued safe, clean, reliable and affordable production of electricity for Minnesota's homes, businesses, and factories; and

"Whereas, the 700 permanent jobs at Prairie Island and the extensive use of contractors

16-a-SR

for ongoing maintenance and special projects are recognized as vitally important to the economies of the City of Red Wing and Goodhue County; and

"Whereas, Xcel Energy announced in the fall of 2004 that it intended to renew the license of both units at Prairie Island for an additional 20 years; and

"Whereas, Xcel Energy submitted an application to renew Prairie Island's operating licenses for its two units to the United States Nuclear Regulatory Commission on April 15, 2008; and

"Whereas, Nuclear Regulatory Commission is the Federal agency charged with oversight of our nation's nuclear facilities and encourages public input and comment on license renewal proceedings; and

"Whereas, the Prairie Island Nuclear Generating Plant has been a good neighbor to the communities located in Goodhue County and Pierce County for more than three decades;

"Now, therefore, be it resolved that the City of Red Wing City Council supports the renewal of the licenses for the nuclear generating facilities at Prairie Island to assure their continued operation of safe, affordable and integrally important component

16-a-SR (continued)

of Minnesota's electric power supply system for another 20 years; and

"Be it further resolved that the City of Red Wing will present a copy of this resolution to the Nuclear Regulatory Commission."

16-a-SR (continued)

Thank you.

MR. RAKOVAN: Thank you, sir.

Next we'll go to Ron Johnson, followed by Katie Himanga and Scott Arneson.

RON JOHNSON: Good afternoon. My name is Ron Johnson. I'm president of the Prairie Island Tribal Council and the Prairie Island Indian Community.

I've represented my community for several years, and as president I have the obligation to ensure the health and welfare of the community, which includes also the environment down there.

I'm here today as the continuing operation of the Prairie Island Nuclear Generating Plant is one of our most important issues for our community. In fact, most community members have had concerns about the plant since it went online in 1973.

The Prairie Island Indian Community is a

The following pages contain the comments
made by Andrija Vukmir during the
NRC public scoping meetings held on July 30, 2008

we're certainly not going to say you can't just because you didn't fill out a yellow card, but we're going to start with the yellow cards that we have.

The first card that I have is Andi Vukmir. From there we'll be going to Michael Schultz, and then, third, Ron Johnson.

So Andy?

ANDRIJA VUKMIR: Good afternoon, the NRC, Xcel, and also public concerned.

I've lived here in Red Wing for the past 25 years. I'm a strong advocate in support of the nuclear energy. 17-a-SN

At this time I urge you, the NRC, and support from the public to support both a license renewal process for existing nuclear plants as well as to work putting policies in place to support building of new power plants in the future. 17-b-SR

Nuclear energy keeps American business competitive, and the plants themselves are incredible job resources for the Red Wing and the neighboring communities.

As a nation, the U.S. Department of Energy projects that the U.S. electrical demand will rise about 25 percent by the year 2030. This means 17-c-SN that our nation will need hundreds of new power plants to provide electricity for homes and continued economic growth here in Red Wing and the neighboring communities, and of course Goodhue County is included there, in all.

Nuclear power plants are the lowest-cost producers of electricity by providing a reliable and affordable source of electricity, and nuclear energy helps to keep American businesses competitive.

Nuclear plants are sources of local job growth here in Red Wing.

And nuclear power plants, which do not emit any carbon dioxide, account for the majority of voluntary reduction in greenhouse gas emissions in the electrical power sector, according to a 2007 report from Power Partners, a partnership between the electric power industry and the U.S. Department of Energy.

The nation's nuclear power plants are among the safest, secure individual facilities in the United States. Multiple layers of physical security together with high levels of operating performance protect plant workers, the public, and the environment.

17-c-SN (continued)

The recent Bird Island Nuclear Plant emergency drill conducted last week was a successful exercise and part of the support team.

The primary concern of Xcel is the health and safety of the public. The spent fuel is not a threat to the public. Under an integrated management approach, spent fuel remains safely stored in the nuclear power plants until being moved to consolidate in long-term storage facilities.

Eventually the United States will follow France, Japan, England, and other places and will recycle the spent fuel to extract the energy there and place the remaining usable end product at a repository at Yucca Mountain, Nevada.

17-d-RW

And in closing, I am thankful for the opportunity of having clean nuclear power to produce electricity. I urge the NRC and the public, working together as a team with Xcel, to support the license renewal process for Prairie Island's Units 1 and 2 and to put policies in place to promote building new power plants in order to meet the projected electrical demands.

17-e-SR

MR. RAKOVAN: Thank you, sir.

Michael Schultz from the city of Red

The following pages contain the comments
made by Mike Wadley during the
NRC public scoping meetings held on July 30, 2008

collaboration up to this point, and we believe that the necessity of energy to our community has certainly been recognized by the plants that we've had here up to this time.

And I believe the County Board will be considering the full impact of the relationship and offering their opinions on the future and also their opinions on any concerns that may be identified, and we will be reporting back to them on the comments that we're hearing here today as well.

Thank you.

MR. RAKOVAN: Thank you, gentlemen.

The last person that I have in terms of filling out the yellow cards is Mike Wadley from Xcel Energy.

MIKE WADLEY: Thank you.

Good afternoon. My name's Mike Wadley. I'm the site vice president for the Prairie Island Nuclear Generating Plant, and I'm here today to provide Xcel Energy's support and perspective of our request for renewal of the operating license for Prairie Island Units 1 and 2.

The mission of everyone that works at Prairie Island is clear: It's safe, clean, reliable,

18-a-SR

and affordable operation with the health and safety of the public and our employees being number one priority.

Two of our key values include being a good neighbor and a steward of the environment in which we operate.

Our 700 employees are highly experienced, well-trained, committed to the safe and continuing operation of Prairie Island. All of our employees go through a rigorous training to continuously hone their skills and learn new procedures and information.

We continuously improve our training based on advances in technology, best practices learned through benchmarking of the industry and feedback from our employees as they identify better ways to gain the skills and knowledge that are needed to operate the plant safely.

An example of this high-quality training is our control room simulator that is used to train and update our operators and staff members.

The NRC, Nuclear Regulatory Commission, requires that employees undergo extensive qualification programs utilizing this simulator to

18-a-SR (continued)

receive a Nuclear Regulatory Commission operator license, which qualifies an employee to work in the plant's control room.

Once an operator receives their initial license, they are required to spend five to six weeks each year maintaining that qualification.

18-a-SR (continued)

We also have extensive processes and detailed procedures that are continuously reviewed and modified to cover every aspect of our operation. We have an exhaustive set of procedures that cover operation, maintenance, engineering, training, security, and emergency response.

Our emergency response procedures and drills, for example, examine just how well our employees react to an event of an emergency. The emergency plan focuses on health and safety, health and safety of the public, health and safety of our employees, and safety of the plant.

Emergency response drills are conducted several times a year to test our abilities and to carefully analyze areas in which we can improve.

The rigorous standards we abide by are set and reviewed through both the Nuclear Regulatory Commission and the Federal Emergency Management

18-b-NS

Agency.

We have a collaborative approach to emergency planning at Prairie Island which results in a team effort between employees, Goodhue and Dakota Counties of Minnesota, Pierce County in Wisconsin, and the states of Minnesota and Wisconsin, the Nuclear Regulatory Commission, and other federal agencies.

All told, more than 2,000 people are part of the emergency response teams throughout these organizations.

We have consistently demonstrated our ability to protect the health and safety of the public and our employees. We will continue to do so as we partner with the NRC to maintain the highest standards of safety excellence.

The Prairie Island plant has been well maintained over its lifetime. Approximately every 18 months we perform refueling outages on each unit. During these outages, the plant staff, with the help of hundreds of contractors, complete more than 1300 maintenance activities and replace one-third of the plant's reactor core fuel, this in addition to ongoing maintenance, inspection, and regular testing

18-b-NS (continued)

activities that are performed during the period in which the plant is operating at full power.

Over the years we've continued to make capital improvements to a wide range of equipment to take advantage of technology and improve materials to ensure safe and reliable operation.

For example, Unit 1's steam generators were replaced in the fall of 2004, and both reactor vessel heads were replaced as well.

As computer training methods evolve, we're able to broaden the range of training to our work force. As we move forward, we continue to upgrade and improve equipment and technology at the Prairie Island Nuclear Generating Plant.

Since the plant began operating Unit 1 in 1973 and Unit 2 in 1974, there have been many changes showing the nuclear industry's dedication and commitment to an improved record of safety and security.

I would add that the regulations set forth by the Nuclear Regulatory Commission that we abide by and which we're held accountable to are the most stringent of any industry, and the inspections are more rigorous to maintain this record of safe and

18-b-NS (continued)

reliable operation.

One example is security at all U.S. nuclear plants. Security at nuclear plants across the nation has received increased emphasis and scrutiny since the tragic events of September 11th, 2001.

Security at Prairie Island is no exception, and we have taken extensive precautions and implemented new policies and procedures to ensure the safety and well being of the community and our employees is maintained. This includes several million dollars in additional resources and new equipment.

We continue to work with the Nuclear Regulatory Commission to review and evaluate our security procedures to make certain that the most effective methods are being utilized.

Prairie Island is a strong supporter of the environment. We take great care in our daily activities to ensure that the environment is well protected.

18-c-NS

Our employees feel fortunate that the location of the Prairie Island plant rests on the banks of the Mississippi River. The site is home to

18-d-SR

numerous wildlife, aquatic species, and plant life. Our efforts have made Prairie Island a safe and sound habitat for many years and will continue in the future.

18-d-SR (continued)

On a different note, Prairie Island is more than a power plant operated by highly-skilled workers; it is part of the community. Not only does the plant rely upon local companies for goods and services, but our employees live in and contribute to the surrounding communities.

We are very proud of our participation and our willingness to give back to the community in a variety of ways, including serving on city and town boards, leaders in civic and community organizations, as sports coaches, on church committees, boards, and councils as well as members of charitable organizations.

Our employees also raise money for local United Way campaigns, American Cancer Society as well as Make-A-Wish of Minnesota, to name a few.

18-e-SR

In conclusion, the Prairie Island plant has been a productive contributor to the energy needs in Minnesota and a valuable asset and good neighbor to the surrounding communities. We remain committed

18-f-SR

to operating safely, reliably, economically and focused on being a good neighbor and a steward to the environment.

I and the employees of Prairie Island look forward to serving you and meeting the needs of the community for many years to come.

18-f-SR (continued)

Thank you.

MR. RAKOVAN: At this point that is all the yellow cards that I had filled out for people who knew that they wanted to make a comment when they first came into the meeting.

At this point I just want to make sure that there's nobody else who wanted to come give comments or if anybody else has a question that they would like to ask in a public forum.

(No response.)

Okay. Just keep in mind pretty much anybody with one of these name tags on is probably an NRC employee. We're all going to be hanging around after the meeting, so if you have a question or a topic that you'd like to address with them, grab one of them; and if they're not the right person to have that conversation, they can hopefully find the person who is the right person.

Prairie Island Nuclear Generating Plant,
Units 1 and 2
Public Scoping Process
Comments and Responses

A.1. Alternative Energy Sources

The following comment pertains to the no-action alternative outlined by NEPA:

15-cc-AS

The NRC staff will address alternatives to the continued operation of PINGP 1 and 2, including the no-action alternative (not renewing the licenses) in Chapter 8 of the SEIS.

The following comments pertain to the scope of alternatives to be discussed in the DSEIS:

13-i-AS;15-k-AS

The NRC staff will evaluate environmental impacts associated with various reasonable alternatives to the continued operation of PINGP 1 and 2 in Chapter 8 of the SEIS.

The following comments pertain to using either natural gas or a combination of wind and natural gas to power an alternative to PINGP 1 and 2:

4-a-AS; 5-s-AS; 14-b-AS

The NRC staff will evaluate environmental impacts associated with various reasonable alternatives to the continued operation of PINGP 1 and 2 in Chapter 8 of the SEIS.

The following comment pertains to using the PINGP site for an alternate industrial purpose:

5-t-AS

The comment describes the potential conversion of the PINGP 1 and 2 site to an energy and research facility that would produce hydrogen in addition to providing electricity. The NRC staff's examination of alternatives in Chapter 8 of the SEIS will be limited to energy alternatives that can replace or offset the capacity currently provided by PINGP 1 and 2. As PINGP 1 and 2 do not currently produce hydrogen or provide a site for energy research and development efforts, alternatives to continued operation of PINGP 1 and 2 will not need to fulfill these roles.

The following comment pertains to the greenhouse gas emissions and efficiency of energy generation technologies:

4-a-AS

The NRC staff will provide a comparison of greenhouse gas emissions from a variety of energy generation technologies in Chapter 6 of the SEIS. The NRC staff analysis of alternatives in Chapter 8 will also address relative levels of greenhouse gas emissions for alternatives.

The following comment pertains to policy or planning considerations in meeting future energy needs:

4-a-AS

The NRC does not play a role in energy planning or energy policy development, though the NRC staff does take into account existing policies and regulations when evaluating energy alternatives.

A.2. Aquatic Resources

The following comment pertains to the impacts to aquatic resources from the impingement and entrainment of fish and shellfish:

11-a-AR

The comment is related to aquatic ecology, specifically impingement, entrainment, and heat shock analysis. As part of its environmental review process and SEIS, NRC will review and assess pertinent information regarding impingement, entrainment, and heat shock in Chapters 2 and 4 of the SEIS.

The following comment pertains to fish kills related to the cooling and intake systems of PINGP 1 and 2:

11-c-AR/SW

The comment is related to operation of the plant's cooling system, and its effects in terms of fish kills and other thermal impacts. Potential impacts associated with the plant's cooling system will be discussed in Chapter 4 of the SEIS. Additionally, NRC will identify potential mitigation measures to limit fish kill impacts in Chapter 4 of the SEIS. The State, not the NRC, manages thermal impacts through the National Pollutant Discharge Elimination System (NPDES) permitting process.

The following comments pertain to impacts from thermal discharges of the PINGP 1 and 2 cooling systems:

4-b-AR/SW; 7-a-AR/RW/SW; 7-b-AR/CR/SW; 7-d-AR/CR/SW

These comments are related to operation of the plants cooling system, specifically the effects of the thermal discharge on aquatic and other resources. NRC will discuss the potential impacts associated with the plant's thermal discharge will be presented in Chapter 4 of the SEIS. The State, not the NRC, regulates thermal discharges through the NPDES permitting process.

The following comment pertains to impacts to aquatic resources from exotic species:

11-e-AR

The comment is related to aquatic ecology. Invasive and exotic species as well as other impacts will be discussed in Chapters 2 and 4 of the SEIS. The State, not the NRC, regulates discharge contaminants through the NPDES permitting process. Additionally, Chapter 2 will provide a description of measures undertaken to control biofouling at PINGP 1 and 2.

The following comments pertain to the area of consideration for the aquatic ecology review and analysis provided in the SEIS:

5-e-AR; 8-a-AR/PA/SW

Issues pertaining to the area of consideration for review of aquatic ecology impacts are site specific, or Category 2 issues, and will be discussed in Chapters 2 and 4 of the SEIS.

The following comment pertains to potential releases of radioactive materials into the water:

4-d-AR/HH

All nuclear plants were licensed with the expectation that they would release small quantities of radioactive material to both the air and water during normal operation. Airborne and liquid releases of radionuclides from nuclear power plants must meet radiation dose-based limits specified in 40 CFR Part 190, 10 CFR Part 20, and the as low as is reasonably achievable (ALARA) criteria in 10 CFR Part 50, Appendix I. Regulatory limits are placed on the radiation dose that members of the public might receive from all of the radioactive material released by the nuclear plant combined. Licensees are required to report liquid, gaseous, and solid effluent releases as well as the results of their radiological environmental monitoring program annually to the NRC. The annual effluent release and radiological environmental monitoring reports submitted to the NRC are available to the public through the ADAMS electronic reading room through the NRC website. The NRC routinely inspects all licensees to ensure their compliance with these regulatory limits.

Additionally, in the spring of 2006, the National Research Council of the National Academies published, "Health Risks from Exposure to Low Levels of Ionizing Radiation, BEIR VII Phase 2." The major conclusion of the report is that current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. The NRC evaluated the BEIR VII report and discussed its findings in a report to the Commission (SECY 05-0202; Accession Number ML052640532). The NRC concluded that the BEIR VII report does not support the need for fundamental revision to the International Commission on Radiological Protection recommendations. Therefore, it is the NRC's position that the NRC's regulations continue to be adequately protective of public health and safety and the environment and that none of the findings in the BEIR VII report warrant changes to the NRC regulations. The BEIR VII report does not say there is no safe level of exposure to radiation; it does not address "safe versus not safe." It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and that risk increases with exposure and exposure rate. It does conclude that risk of cancer induction at the dose levels in NRC's and EPA's radiation standards is very small. Similar conclusions have been made in all of the associated BEIR reports since 1972 (BEIR I, III, and V). The comment does not provide any new and significant information and will not be evaluated further.

A.3. Cultural Resources

The following comments pertain to issues regarding potential impacts to cultural resources surrounding the PINGP 1 and 2 site and compliance with the National Historic Preservation Act:

7-b-AR/CR/SW; 7-d-AR/CR/SW; 10-a-CR; 15-m-CR;

The comments are related to the potential impacts to cultural, archaeological, and historical resources. NRC staff is aware of the Prairie Island Indian Community's concern for the archaeological sites both on and within the vicinity of the PINGP 1 and 2 facilities. The comments are noted, and the impacts of extended operation of the PINGP

1 and 2 on cultural, archaeological, and historical resources will be assessed and discussed in Chapters 2 and 4 of the SEIS. Additionally, the PIIC is a cooperating agency and will assist the NRC staff in its review. Several other tribes, the Bureau of Indian Affairs, and the Minnesota State Historic Preservation Office have been contacted by, and may provide their views to, the NRC under Section 106 of the National Historic Preservation Act.

A.4. Cumulative Impacts

The following comments pertain to the assessment of a cumulative impacts analysis in the SEIS:

5-g-CI/LR; 5-h-CI; 5-r-CI/LR; 5-q-CI/LR; 5-w-CI; 5-x-CI; 11-f-CI; 15-z-CI/ER

As part of the environmental review process, the NRC evaluates the potential for cumulative impacts of operations (as defined in 40 CFR 1508.7) during the renewal term. Chapter 4 of the SEIS will analyze the impacts of the proposed action in conjunction with other past, present, and reasonably foreseeable future actions at PINGP 1 and 2 and the activities of other industrial facilities and/or Federal agency actions in the area. As part of NRC's environmental review and SEIS, all pertinent information pertaining to cumulative impacts will be reviewed and assessed.

The following comments pertain to the cumulative impacts of spent fuel storage and spent fuel waste:

5-m-CI/RW; 5-o-CI/RW; 15-v-CI/OS/RW

Onsite storage of spent nuclear fuel is a Category 1 issue. Additionally, waste management issues were evaluated in the GEIS and determined to be a Category 1 issue. Issues classified as Category 1 in Table B-1 of 10 CFR Part 51 have been determined in the GEIS to have similar impacts across all sites and are, therefore, not reevaluated in the SEIS unless new and significant information is identified that would lead the NRC staff to reevaluate the GEIS's conclusions. During the environmental review, the NRC staff makes a concerted effort to determine whether any new and significant information exists for the specific site being evaluated that would change the generic conclusion for a Category 1 issue into a Category 2 issue. Category 2 issues are site specific issues which must be thoroughly analyzed by the applicant as part of its submittal and included in detail in its environmental report. The NRC staff then independently evaluates the issue as part of its SEIS.

While cumulative impacts are site specific issues for some resources, these comments pertaining to cumulative impacts of spent fuel storage and spent fuel waste are not within the scope of the environmental review and will not be evaluated further.

The following comments pertain to establishing a baseline for cumulative impacts in the areas of groundwater and hydrologic resources, human health, and aquatic resources:

5-r-CI/LR

Cumulative impacts on each of these resource areas are a Category 2 issue and will be addressed in Chapter 4 of the SEIS under cumulative impacts.

A.5. Environmental Justice

The following comments pertain to the analysis of environmental justice within the SEIS:

6-b-EJ/UR; 6-f-EJ/RW/UR; 11-d-EJ/SW

The comments are noted. Environmental justice is an issue specific to the plant and will be addressed in Chapter 4 of the SEIS. To perform a review of environmental justice in the vicinity of the nuclear power plant, the NRC staff examines the geographic distribution of minority and low-income populations within 50 miles (80 km) of the site being evaluated. The staff uses the most recent census data available. Once the locations of minority and low-income populations are identified, the staff determines the extent to which these populations may be disproportionately affected.

The environmental impacts of various individual operating uranium fuel cycle facilities are outside the scope of license renewal but are addressed in separate EISs prepared by NRC. These documents include analyses that address human health and environmental impacts to minority and low-income populations. Electronic copies of these EISs are available through the NRC's public Web site under Publications Prepared by NRC Staff document collection of the NRC's Electronic Reading Room at http://www.nrc.gov/reading-rm/doc-collections/; and the NRC's Agency wide Documents Access and Management System (ADAMS) at http://www.nrc.gov/reading-rm/adams.html.

The following comments pertain specifically to the Prairie Island Indian Community (PIIC), and the inclusion of the PIIC in the analysis of environmental justice within the SEIS:

5-f-EJ/RW; 15-d-HH/EJ; 15-f-HH/EJ; 15-r-EJ; 15-s-EJ; 15-aa-EJ; 15-bb-EJ;

The PIIC is a minority population living within the 50 mile (80 km) radius of PINGP 1 and 2. PIIC will be included in the environmental justice analysis in Chapter 4 of the SEIS. Additionally, the PIIC is a cooperating agency and will assist the NRC staff in its review of environmental justice issues.

A.6. Environmental Report

The following comments raise concerns pertaining to the information included within the Environmental Report submitted by the applicant:

3-c-ER/HH; 5-a-ER; 6-i-ER/HH;13-c-ER/LR; 15-a-ER;15-g-ER; 15-x-ER; 15-y-ER/LR; 15-z-CI/ER

The comments assert that the Environmental Report failed to include information regarding the impacts of routine releases of radioactive effluents, the effects of continued operations on the health and on the Prairie Island Indian Community, the effects of the plant's requested power uprate, the expansion of dry cask storage, and the replacement of the steam generator. The comments will be considered, as appropriate, during the environmental review for the license renewal of PINGP 1 and 2.

A.7. Groundwater

The following comments pertain indirectly and cumulatively to impacts to the groundwater resources, mostly from tritium, surrounding PINGP 1 and 2:

5-b-GW/SW; 15-e-GW

Groundwater is a Category 2 issue and discussed in Chapters 2 and 4 of the SEIS. The comments, in general, are related to the public concerns regarding potential leaks at PINGP 1 and 2 and the PIIC's as well as the public's request for additional information and monitoring data on the level and extent of potential environmental impacts. The requirement to obtain additional data and information on known leaks is part of the ongoing operating license and is currently being addressed by NRC and the applicant. The comments, as they pertain to requiring additional environmental data, are not within the scope of the environmental review. However, the environmental impacts of identified leaks are within the scope of the environmental review and will be addressed in Chapters 2 and 4 of the SEIS.

In addition, NRC regulations require licensees to make surveys, as necessary, to evaluate the potential hazard of radioactive material released in order to assess doses to members of the public and workers, recent discoveries of releases at other plants indicate that undetected leakage to groundwater from facility structures, systems, or components can occur resulting in unmonitored and unassessed exposure pathways to members of the public. The NRC has identified several instances of unintended tritium releases, and all available information shows no threat to the public. Nonetheless, the NRC is inspecting each of these events to identify the cause, verify the impact on public health and safety, and review licensee plans to remediate the event. The NRC also established a lessons learned task force to address inadvertent, unmonitored liquid radioactive releases from U.S. commercial nuclear power plants. This task force reviewed previous incidents to identify lessons learned from these events and determine what, if any, changes are needed to the regulatory program. Detailed information and updates on these liquid releases can be found on the NRC public website at http://www.nrc.gov/reactors/operating/ops-experience/grndwtr-contam-tritium.htm.

A.8. Human Health

The following comments pertain to the assessment of human health impacts in the SEIS:

3-c-ER/HH; 4-d-AR/HH; 6-a-HH; 6-c-HH; 6-d-HH; 6-e-HH; 6-h-HH/LR; 13-a-HH; 13-j-HH; 15-d-HH/EJ; 15-f-HH/EJ; 15-h-HH

The NRC staff will address the radiological impacts to human health during its evaluation of the PINGP 1 and 2 license renewal application. However, this issue is a Category 1 issue. Issues classified as Category 1 in Table B-1 of 10 CFR Part 51 have been determined in the GEIS to have similar impacts across all sites and are, therefore, not reevaluated in the SEIS unless new and significant information is identified that would lead the NRC staff to reevaluate the GEIS's conclusions. During the environmental review, the NRC staff makes a concerted effort to determine whether any new and significant information exists for the specific site being evaluated that would change the generic conclusion for a Category 1 issue into a Category 2 issue. Category 2 issues are site specific issues which must be thoroughly analyzed by the applicant as part of its submittal and included in detail in its Environmental Report. The NRC staff then independently evaluates these issues as part of its SEIS.

The following comments pertain to the monitoring of radioactive effluents:

3-b-HH; 3-c-ER/HH 4-e-HH; 6-a-HH; 6-c-HH; 6-d-HH; 6-e-HH; 6-h-HH/LR; 6-i-ER/HH; 13-j-HH; 15-h-HH

The applicant's current operating license requires it to conduct environmental monitoring programs. Upon identification of a new pathway of potential radiological release, the applicant is required by 10 CFR Part 20 to perform radiological surveys to evaluate the radiological hazard from the release. While current operating issues are outside of the scope of the environmental review of this license renewal application, the NRC staff will consider the radioactive effluents monitoring and release points as part of its evaluation of the PINGP license renewal application. The staff will perform a historical review of the radioactive effluents released from the plant and of the data from the applicant's radiological environmental monitoring program to determine if there are any significant or unusual trends that warrant additional evaluation. NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Radiological data relevant to the environmental review will be discussed as appropriate in Chapters 2 and 4 of the SEIS.

This issue is a Category 1 issue. Issues classified as Category 1 in Table B-1 of 10 CFR Part 51 have been determined in the GEIS to have similar impacts across all sites and are, therefore, not reevaluated in the SEIS unless new and significant information is identified that would lead the NRC staff to reevaluate the GEIS's conclusions. During the environmental review, the NRC staff makes a concerted effort to determine whether any new and significant information exists for the specific site being evaluated that would change the generic conclusion for a Category 1 issue into a Category 2 issue. Category 2 issues are site specific issues which must be thoroughly analyzed by the applicant as part of its submittal and included in detail in its Environmental Report. The NRC staff then independently evaluates these issues as part of its SEIS.

NRC regulations require licensees to control and limit releases to the environment (the air and water) to very small amounts. As part of the NRC requirements for operating a nuclear power facility, licensees must keep releases of radioactive material to unrestricted areas during normal operation as low as is reasonably achievable (as described in the NRC's regulations in 10 CFR Part 50.34a) and comply with radiation dose limits for the public as given in the regulations in 10 CFR Part 20.

In addition, NRC regulations require licensees to have various effluent and environmental monitoring programs so that the impacts from plant operations are minimized and the extent of releases are accurately recorded and reported. The NRC requires licensees to report plant discharges and results of environmental monitoring around their plants to ensure that potential impacts are detected and reviewed. Licensees must also participate in an interlaboratory comparison program, which provides an independent check of the accuracy and precision of environmental measurements. Licensees are required to keep accurate records on releases to the air and water. In annual reports, licensees identify the amount of liquid and airborne radioactive effluents discharged from plants and calculate associated doses. Licensees also must report environmental radioactivity levels around their plants annually. These reports, which are available to the public, include sampling from thermoluminescent dosimeters (which measure radiation dose levels); airborne radioiodine and particulate samplers; samples of surface, groundwater, and drinking water and downstream shoreline sediment from existing or potential recreational facilities; and samples of ingestion sources such as milk, fish, invertebrates, and broad-leaf vegetation. The NRC conducts periodic onsite inspections of each licensee's effluent and environmental monitoring programs to ensure compliance with NRC requirements. The NRC documents licensee effluent releases and the results of their environmental monitoring and assessment effort in inspection reports that are available to the public.

The following comments pertain to exposure from electromagnetic fields (EMF):

15-gg-HH

The NRC staff will evaluate the actions taken by PINGP to ensure that the impacts from acute electromagnetic fields from their power lines adhere to safety standards issued by the National Electrical Safety Code. These safety standards are designed to ensure that any impacts remain within acceptable limits. This is a Category 2 issue that every plant seeking license renewal must address in its Environmental Report. The NRC staff will *include a discussion of* PINGP *1 and 2's program to manage acute electromagnetic* fields in Chapters 2 and 4 of the SEIS.

For impacts related to the chronic exposure to electromagnetic fields, biological and physical studies of 60-Hz electromagnetic fields have not found consistent evidence linking harmful effects with field exposures. There is currently no scientific consensus on this issue. Therefore, the NRC staff will not perform a specific health assessment for chronic exposure to EMF in the SEIS.

The following comments pertain to human health issues generically associated with nuclear power generating facilities:

3-b-HH; 3-c-ER/HH; 15-h-HH

The GEIS evaluated human health issues and determined them to be a Category 1 issue. The amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small. The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low that resulting cancers have not been observed and would not be expected. A number of studies of cancer incidence in the vicinity of nuclear power facilities have been conducted and there are no studies to date that are accepted by the scientific community that show a correlation between radiation dose from nuclear power facilities and cancer incidence in the general public. The comments are noted but provide no new and significant information and will not be evaluated further.

The following comments pertain to added risk due to proximity to PINGP 1 and 2:

4-e-HH; 15-d-HH/EJ

Human health issues were evaluated in the GEIS and were determined to be Category 1 issues. The GEIS evaluated radiation exposures to the public for all plants including PINGP 1 and 2, and concluded that the impact was small. The information regarding increases in the population around PINGP 1 and 2, possible changes in the age distribution of that population, and increased radio-sensitivity of older people and other sensitive populations does not change this evaluation. The maximum dose to any member of the public living or working near PINGP 1 and 2 is well below one millirem per year, which is well below the radiation standards set by EPA and NRC. These *comments provide no new and significant information regarding human health issues* and therefore will not be evaluated further.

The following comment pertains to the BEIR VII Phase 2 report:

3-c-ER/HH

In the spring of 2006, the National Research Council of the National Academies published, "Health Risks from Exposure to Low Levels of Ionizing Radiation, BEIR VII Phase 2." The major conclusion of the report is that current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose response relationship between exposure to ionizing radiation and the development of cancer in humans. This conclusion is consistent with the system of radiological protection that the NRC uses to develop its regulations. The NRC evaluated the BEIR VII report and discussed its findings in a report to the Commission (SECY 05-0202; ADAMS No. ML052640532). The NRC concluded the BEIR VII report does not support the need for fundamental revision to International Commission on Radiological Protection recommendations. Therefore, the NRC's regulations continue to be adequately protective of public health and safety and the environment. None of the findings in the BEIR VII report warrant changes to the NRC regulations. The BEIR VII report does not say there is no safe level of exposure to radiation; it does not address "safe versus not safe." It does continue to support the conclusion that there is some amount of cancer risk associated with any amount of radiation exposure and that risk increases with exposure and exposure rate. It does conclude that risk of cancer induction at the dose levels in NRC's and EPA's radiation standards is very small. Similar conclusions have been made in all of the associated BEIR reports since 1972 (BEIR I, III, and V). The comment does not provide any new and significant information and will not be evaluated further.

The following comment pertains to non-radiological human health concerns:

15-t-HH

The GEIS evaluated human health issues related to plant operations during the period of extended operations and determined that the issues are generic Category 1 issues. These issues include both radiological and non-radiological health effects. The comment is noted but because it provides no new and significant information, it will not be evaluated further.

A.9. License Renewal and its Processes

The following comments pertain to the MOU between the NRC and the PIIC:

9-a-LR; 15-b-LR; 15-c-LR

The NRC and the PIIC signed an MOU pursuant to which the PIIC is a cooperating agency and the NRC is the lead agency in four specific resource areas: environmental justice, land use, cultural resources, and historic and archeological resources. The MOU can be accessed through the NRC's Electronic Reading Room via ADAMS at accession number ML081710160. These scoping comments are general in nature and do not provide new information. Therefore, the comments will not be evaluated further.

The following comments pertain to the public's ability to provide public comments and the time allotted for the public to do so:

3-a-LR; 5-g-CI/LR; 6-g-LR; 9-a-LR; 14-c-LR

The NRC has established an open process to permit all members of the public to participate in the environmental scoping process. The NRC published a Federal Register Notice (FRN) of its intent to conduct environmental scoping pertaining to the PINGP 1 and 2 license renewal application on July 22, 2008. The environmental scoping period lasted for two months and closed on September 22, 2008. In this time, the NRC staff held two public meetings on July 30, 2008, to receive comments on the scope of the environmental review. These meetings were advertised on the NRC public website, in local newspapers, on notices posted throughout Red Wing, and by letter to individuals and groups on the NRC's most current distribution list.

The NRC makes every effort to inform interested persons or parties of their opportunity to be involved in the NEPA process. After the draft SEIS is published, the NRC staff will issue a FRN of the availability of the document, and this FRN will also open a 75-day period to comment on the draft SEIS. Additionally, the NRC staff will hold a public meeting to receive comments on the draft SEIS. Comments can be provided to the NRC in person, by mail, and by e-mail. These scoping comments identified above are general in nature and do not provide new information. Therefore, the comments will not be evaluated further.

The following comments pertain to the regulations and procedures regarding NRC staff's review of information, assessment, and analysis during the environmental review process, as well as the availability of information to the public:

5-q-CI/LR; 6-h-HH/LR; 13-b-LR

Pertaining to the staff's regulations on the environmental review process under NEPA, 10 CFR 51 contains the NRC regulations that implement NEPA. These regulations define the NRC staff's scope of review and its analysis of information in the SEIS. Regarding the availability of information to the public, the NRC is required to protect information deemed sensitive. Before any NRC- or licensee-generated materials can be released for public inspection, the NRC must complete a sensitivity review to ensure the documents do not contain information that should be designated sensitive.

The following comments pertain to the environmental review process, how it determines impacts on the environment, and how NRC staff should prepare its SEIS:

5-c-LR; 5-r-CI/LR; 5-u-LR; 5-v-LR; 15-y-ER/LR

As part of the environmental review process, the NRC evaluates site-specific data provided by the applicant, other Federal agencies, State agencies, tribal and local governments, as well as information from members of the public. In addition, the NRC performs independent reviews of the plant-specific environmental impacts of license renewal in accordance with NEPA and the NRC's requirements in 10 CFR Part 51. The following technical areas are commonly included in the review: land use, ground and surface water use, ground and surface water quality, air quality, aquatic resources, terrestrial resources, threatened and endangered species, radiological impacts, socioeconomic factors, environmental justice issues, historical and archaeological resources, related federal project activities, postulated accidents, uranium fuel cycle and solid waste management, decommissioning, alternatives to license renewal, and irreversible or irretrievable resource commitments. Site specific Category 2 impacts will be discussed in Chapter 4 of the SEIS. Other areas may be included as a result of information obtained during the NRC staff's review or from public comments during or following meetings that are held in the vicinity of the nuclear power reactor.

The following comments pertain to the availability of the applicant's license renewal application:

13-c-ER/LR; 13-d-LR; 14-a-LR

10 CFR 51.66 specifies the requirements for availability and distribution of the applicant's environmental reports required by the applicant. In addition to providing

copies to the NRC, applicants must maintain the capability to generate additional copies of the environmental report for distribution to Federal, State, and local officials, and any affected Indian tribes. Applicants are not required to provide copies of the application to other interested persons or parties. However, once a license renewal application is accepted for review by the NRC, the publicly available portions of the application are included on the NRC's website on the license renewal webpage at http://www.nrc.gov/reactors/operating/licensing/renewal.html under the link entitled, "Status of Current Applications and Industry Initiatives." Applications are also available for public inspection in the NRC Public Document Room (PDR), located at One White Flint North, 11555 Rockville Pike, Rockville, Maryland, 20852, or from the NRC's

ADAMS. The ADAMS Public Electronic Reading Room is accessible at http://www.nrc.gov/reading-rm/adams/web-based.html. Copies of the application are also available at the Red Wing public library.

A.10. Nuclear Safety

The following comments pertain to nuclear safety, the safety of operations at PINGP 1 and 2, and the safety of fuel storage:

5-z-NS; 11-b-NS; 18-b-NS; 18-c-NS

The NRC's environmental review is confined to environmental matters relevant to the 20-year period of extended period of operation requested by the applicant. Operational safety issues and issues related to the safety of fuel storage are outside the scope of 10 CFR Part 51 and Part 54 and will not be evaluated further in the SEIS. The comments provide no new information and, therefore, will not be evaluated further in the context of the environmental review.

A.11. Outside of Scope

The following comment pertains to general background information about the NEPA process:

5-l-OS

The comment provides general background information and is outside of the scope of the environmental review process and, therefore, will not be evaluated further.

The following comments pertain to a proposed license amendment request regarding transition to a new fuel type at PINGP 1 and 2:

5-y-OS/RW; 13-f-OS

License amendment requests completed during the original 40 year term or during the term of extended operation if the license renewal is granted are reviewed by the NRC for any environmental or safety concerns at the time of the amendment. These comments are outside of the scope of the environmental review process and, therefore, will not be evaluated further.

The following comments pertain to the extended power uprate proposal by NSP and issues of electricity supply:

5-i-OS; 5-k-OS/RW; 5-y-OS/RW; 15-p-OS; 15-v-CI/OS/RW; 15-w-OS/RW; 15-ee-OS/SW; 15-ff-OS

The purpose and need for the proposed action (renewal of an operating license) is to provide an option that allows for power generation capability beyond the term of the current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and where authorized, Federal (other than NRC) decisionmakers. The NRC does not assess the need for power as part of its license renewal environmental review, and 10 CFR 51.95(c)(2) provides that the SEIS is not required to discuss such need.

With respect to power uprates or any modifications made to increase power, these actions are not within the scope of license renewal and they require a separate licensing action. The NRC staff would prepare an Environmental Assessment (EA), or an EIS, if needed, for the power uprate application. These comments provide no new and significant information and will not be evaluated further.

The following comment pertains to issues surrounding security and terrorism:

15-hh-OS

Security issues such as safeguards planning are not tied to license renewal, but are considered to be issues that need to be dealt with constantly as a part of the current operating license. Security issues are periodically reviewed and updated (and extended) at every operating plant. These reviews will continue throughout the period of any extended license. If issues related to security are discovered at a nuclear plant, they would be addressed immediately, and any necessary changes reviewed and incorporated under the operating license, rather than waiting for the period of extended operation. The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Appropriate safeguards and security measures have been incorporated into the site security and emergency preparedness plans. Any required changes to emergency and safeguard contingency plans related to terrorist events will be incorporated and reviewed under the operating license. The comments provide no new information and do not pertain to the scope of license renewal as defined under 10 CFR Part 51 and 54. Therefore, the comment will not be evaluated further.

A.12. Postulated Accidents

The following comments pertain to the severe accident mitigation alternatives (SAMA) analysis:

8-a-AR/PA/SW; 15-u-PA

The comments are related to the impacts of design basis accidents and severe accidents. The impacts of design basis accidents and severe accidents were evaluated in the GEIS and determined to be small for all plants; therefore, they are Category 1 issues. Technical issues classified as Category 1 in Table B-1 of 10 CFR Part 51 have been generically evaluated in the GEIS and are not reevaluated in the SEIS unless new and significant information is identified that would lead the NRC staff to reevaluate the GEIS's conclusions. During the environmental review, the NRC staff makes a concerted effort to determine whether any new and significant information exists for the specific site being evaluated that would change the generic conclusion for a Category 1 issue into a Category 2 issue. Category 2 issues are site specific issues which must be thoroughly analyzed by the applicant as part of its submittal and included in detail in its environmental report. The NRC staff then independently evaluates the issue as part of its SEIS.

However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. During the plant-specific environmental review of PINGP 1 and 2, the NRC will determine whether there is any new and significant information bearing on the previous analysis in the GEIS. The applicant provided a severe accident mitigation alternatives (SAMA) analysis as part of the license renewal application for PINGP 1 and 2. The NRC staff's review of the SAMA analysis will be discussed in Chapter 5 and Appendix F of the SEIS for PINGP 1 and 2.

Concerning the potential for accidental drawdown at Lock and Dam 3, this scenario is outside the scope of the environmental review and will not be considered further. Concerning the effects of a severe accident on the Prairie Island Indian Community specifically, socioeconomic issues, including disproportionate effects to minority or low-income communities, will be dicussed in Chapters 2 and 4 of the SEIS.

A.13. Radioactive Waste

The following comments pertain to long term storage of spent fuel:

5-j-RW; 5-k-OS/RW; 5-m-CI/RW; 5-n-RW; 5-o-CI/RW; 5-p-RW; 5-y-OS/RW; 5-aa-RW; 6-f-EJ/RW/UR; 7-a-AR/RW/SW; 7-c-RW; 12-a-RW; 13-h-RW; 15-i-RW; 15-j-RW; 15-v-CI/OS/RW; 17-d-RW

Onsite storage of spent nuclear fuel is a Category 1 issue and the safety and environmental effects of long-term storage of spent fuel onsite has been evaluated by the NRC in the Waste Confidence Rule. The Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and sufficient repository capacity will be available within 30 years beyond the licensed life for operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in such reactor and generated up to that time. In its Statement of Considerations for the 1990 update of the Waste Confidence Rule (55 FR 38472), the Commission addressed the impacts of the disposal of spent fuel discharged from the current fleet of reactors operating under existing and renewed licenses and from a new generation of operating reactors. The rule was last reviewed by the Commission in 1999 when it reaffirmed the findings in the rule (64 FR 68005). The rule is currently the subject of a notice of proposed rulemaking (73 FR 59547) that proposes to simplify the rule to state that spent fuel can be "stored safely and without significant environmental impacts beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite ISFSIs until a disposal facility can reasonably be expected to be available." Because the issue of spent fuel storage is a Category 1, generic issue, comments regarding spent fuel storage are not within the scope of the environmental review and will not be evaluated further.

The following comments pertain to the Independent Spent Fuel Storage Installation (ISFSI) system in place at PINGP 1 and 2:

5-f-EJ/RW; 5-k-OS/RW; 5-y-OS/RW; 15-i-RW; 15-v-CI/RW; 15-w-OS/RW

The comments relate to spent fuel management and storage issues specifically those regarding the PINGP 1 and 2 independent spent fuel storage installation (ISFSI). Waste management issues and onsite storage of spent nuclear fuel were evaluated in the GEIS and determined to be a Category 1 issue. In addition, the safety and environmental effects of long-term, onsite, storage of spent fuel onsite was addressed by the NRC, in the Waste Confidence Rule (10 CFR 51.23). In the Waste Confidence Rule, Finding 4, the Commission determined that spent fuel can be stored onsite for at least 30 years beyond the licensed operating life, which may include the term of a renewed license. At or before the end of that period, the rule asserts that spent fuel will be moved to a permanent repository. In October 2008, the NRC proposed to revise Finding 4 in the Waste Confidence Decision so that it reads as follows: "The Commission finds reasonable assurance that, if necessary, spent fuel generated in any reactor can be stored safely without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent fuel storage basin and either onsite or offsite independent spent fuel storage installations."

The GEIS is based on the assumption that storage of the spent fuel onsite is not permanent. The SEIS for PINGP 1 and 2, is based on the same assumption.

With respect to the PINGP 1 and 2 ISFSI, specifically, any modifications to the ISFSI pad or containers themselves may require separate licensing actions. NRC regards these actions as part of the current operating licenses and thus they fall outside of the scope of license renewal. These comments provide no new and significant information and will not be evaluated further.

A.14. Shutdown and Decommissioning

The following comment pertains to how much time is budgeted for relicensing, and whether or not PINGP 1 and 2 should be decommissioned:

13-e-SD

The NRC makes its decision whether or not to renew the license based on safety and environmental considerations. The final decision on whether or not to decommission the nuclear plant will be made by the utility, state, and federal (non-NRC) decision makers. This final decision may be based on economics, energy reliability goals, environmental considerations and potential impacts, and other objectives over which the other entities may have jurisdiction.

The environmental review generally takes 22 months to complete if no hearing is granted and 30 months if a hearing is granted.

Environmental impacts from the activities associated with the decommissioning of any reactor before or at the end of an initial or renewed license are evaluated in the GEIS and in NUREG-0586, Generic Environmental Impact Statement for Decommissioning Nuclear Facilities, Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors, published in 2002. The findings from these two documents are used to support the findings in the SEIS by the use of tiering. Tiering is a process by which agencies eliminate repetitive discussions and focus on the more pertinent issues. The effect of license renewal on the impacts of decommissioning will be discussed in Chapter 7 of the SEIS.

A.15. Socioeconomics

The following comments pertain to NRC staff's assessment of socioeconomics:

4-c-SE; 5-d-SE; 15-o-SE; 15-q-SE

The comments are related to the socioeconomic impacts associated with the continued operation or closure of PINGP 1 and 2. Socioeconomic impacts such as housing, transportation, taxes, employment, and land use are Category 2 issues. These issues will be addressed in Chapters 2 and 4 of the SEIS.

A.16. Support for License Renewal

The following comments pertain to the support of PINGP 1 and 2 license renewal:

16-a-SR; 17-b-SR; 17-e-SR

The comments are in support of license renewal of PINGP 1 and 2, and are general in nature. In addition, 10 CFR 51.95(c)(2) discussed the need for power, which is outside of the scope of license renewal. These comments provide no new and significant information and will not be evaluated further.

The following comments pertain to the support of Xcel Energy and NMC:

1-a-SR; 2-a-SR; 16-a-SR; 18-a-SR; 18-d-SR; 18-e-SR; 18-f-SR

The comments are in support of Xcel/NSP (formerly NMC/Xcel) and/or their philanthropic activities. The comments are outside of the scope of the staff's environmental review and will not be evaluated further.

A.17. Support for Nuclear Power

The following comments are in support of nuclear power, generally:

17-a-SN; 17-c-SN

The need for power is outside of the scope of license renewal and pursuant to 10 CFR 51.95(c)(2), need not be addressed in this SEIS. The purpose and need for the proposed action (renewal of the PINGP 1 and 2 operating license) is to provide an option that allows for power generation capability beyond the term of the current operating licenses and thereby meet future system generating needs, as such needs may be determined by State, utility, and where authorized, Federal (other than NRC) decisionmakers. These comments are outside the scope of the staff's environmental review and will not be evaluated further.

A.18. Surface Water

The following comments pertain to the effects of thermal discharge on the Mississippi River and other surface waterbodies:

4-b-AR/SW; 4-f-SW; 7-a-AR/RW/SW; 7-b-AR/CR/SW; 7-d-AR/CR/SW; 11-c-AR/SW; 11-d-EJ/SW

The comments are related to operation of the plants' cooling system, specifically the effects of thermal discharge on surface water, and aquatic and other resources. A discussion of the potential impacts associated with the plants thermal discharge will be presented in Chapter 4 of the SEIS.

The following comments pertain to protecting the surface water resources as well as assessing impacts to surface water resources near PINGP 1 and 2:

4-b-AR/SW; 5-b-GW/SW; 15-dd-SW

Water use and water quality issues are Category 2 issues and will be addressed in Chapters 2 and 4 of the SEIS.

The following comments pertain to Lock and Dam 3, a U.S. Army Corps of Engineers owned and operated facility and associated erosion impacts:

8-a-AR/PA/SW; 15-ee-OS/SW

Issues pertaining to the construction and safety of Lock and Dam 3 are not within the scope of review for license renewal. However, concerns relating to the Mississippi River and other surface waterbodies near PINGP 1 and 2 will be addressed in Chapter 4 of the SEIS. Issues pertaining to water use and quality, including erosion, are Category 2 issues and will be addressed in Chapters 2 and 4 of the SEIS.

A.19. Terrestrial Resources

The following comment pertains to impacts to avian mortality within the transmission line corridors surrounding PINGP 1 and 2:

15-l-TR

Impacts from bird collisions with transmission lines was determined to be a Category 1 in the GEIS. Technical issues classified as Category 1 in Table B-1 of 10 CFR Part 51 have been generically evaluated in the GEIS and are not reevaluated in the SEIS because the conclusions reached would be the same as in the GEIS, unless new and significant information is identified that would lead the NRC staff to reevaluate the GEIS's conclusions. During the environmental review, the NRC staff makes a concerted effort to determine whether any new and significant information exists for the specific site being evaluated that would change the generic conclusion for a Category 1 issue into a Category 2 issue. This study, as well as other pertinent information concerning this issue, will be discussed in Chapter 4 of the SEIS. However, this issue will remain Category 1 unless the NRC staff finds new and significant information during the environmental review.

Impacts to terrestrial ecology and non-threatened and endangered species are a Category 1 issue. Impacts to threatened and endangered species, including any protected avian species, is a Category 2 issue and will be addressed in Chapters 2 and 4 of the SEIS.

A.20. Threatened and Endangered Species and Essential Fish Habitat

The following comment pertains to the threatened and endangered Higgins eye pearlymussel:

15-n-TE

The potential impacts of the continued operation of PINGP 1 and 2 on threatened and endangered species is a site specific, or Category 2 issue and will be addressed in Chapters 2 and 4 of the SEIS under aquatic resources. Further, NRC staff will issue a Biological Assessment on the Higgins eye pearlymussel, which can be found in Appendix D of the draft SEIS.

A.21. Uranium Fuel Cycle

The following comments pertain to the uranium fuel cycle and waste management:

6-b-EJ/UR; 6-f-EJ/RW/UR; 13-g-UR

The NRC evaluated the impacts of the uranium fuel cycle which comprises uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low level wastes and high level wastes related to uranium fuel cycle activities. The wide range of activities associated with the uranium fuel cycle are geographically located throughout the United States and affect a diverse population. The impacts on the environment of the uranium fuel cycle is a Category 1 issue. Technical issues classified as Category 1 in Table B-1 of 10 CFR Part 51 have been generically evaluated in the GEIS and are not reevaluated in the SEIS because the conclusions reached would be the same as in the GEIS, unless new and significant information is identified that would lead the NRC staff to reevaluate the GEIS's conclusions. During the environmental review, the NRC staff makes a concerted effort to determine whether any new and significant information exists for the specific site being evaluated that would change the generic conclusion for a Category 1 issue into a Category 2 issue. Category 2 issues are site-specific issues which must be thoroughly analyzed by the applicant as part of its submittal and included in detail in its Environmental Report. The NRC staff then independently evaluates the issue as part of its SEIS.

The NRC has conducted several transportation studies to evaluate the risk of transportation of radioactive material. NUREG-0170 (NRC 1977b), supported NRC's 10 CFR Part 71, "Packaging and Transportation of Radioactive Material" rulemaking. Based on this study, the Commission concluded that the transportation regulations are adequate to protect the public against unreasonable risks from the transportation of radioactive materials, including spent fuel. The NRC sponsored another study in the 1980s entitled, "Shipping Container Response to Severe Highway and Railway Accident Conditions," NUREG/CR-4829 (Fischer et al. 1987), or the "Modal Study." Based on the results of this study, the NRC staff concluded that NUREG-0170 overestimated spent fuel accident risks by about a factor of three. In March 2000, the NRC initiated another spent fuel study, "Reexamination of Spent Fuel Shipment Risk Estimates," NUREG/CR-6672 (Sprung et al. 2000). This study focused on risks of a modern spent fuel transport campaign from reactor sites to possible interim storage sites and/or permanent geologic repositories. This study concluded that accident risks were much less than those estimated in NUREG-0170 and that more than 99 percent of transportation accidents are not severe enough to damage NRC-certified spent fuel casks. While very severe accidents could cause cask damage, the studies show that releases of material would be small and pose little risk to the local population/public. The most severe accidents might cause greater releases, but their likelihood is so remote that the NRC considers the risk to public health to be low. The comments are noted. However, they do not provide any new and significant information and will not be evaluated further

APPENDIX B

NEPA Issues for License Renewal of Nuclear Power Plants

NEPA Issues for License Renewal of Nuclear Power Plants

Table B-1. Summary of Issues and Findings. *This table is taken from Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51. Data supporting this table are contained in NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants. Throughout this report, "Generic" issues are also referred to as Category 1 issues, and "Site-specific" issues are also referred to as Category 2 issues.*

Issue	Type of Issue	Finding
	Surface Water Quality, Hydrology, and Use	
Impacts of refurbishment on surface water quality	Generic	SMALL. Impacts are expected to be negligible during refurbishment because best management practices are expected to be employed to control soil erosion and spills.
Impacts of refurbishment on surface water use	Generic	SMALL. Water use during refurbishment will not increase appreciably or will be reduced during plant outage.
Altered current patterns at intake and discharge structures	Generic	SMALL. Altered current patterns have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered salinity gradients	Generic	SMALL. Salinity gradients have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered thermal stratification of lakes	Generic	SMALL. Generally, lake stratification has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Temperature effects on sediment transport capacity	Generic	SMALL. These effects have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Scouring caused by discharged cooling water	Generic	SMALL. Scouring has not been found to be a problem at most operating nuclear power plants and has caused only localized effects at a few plants. It is not expected to be a problem during the license renewal term.
Eutrophication	Generic	SMALL. Eutrophication has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Discharge of chlorine or other biocides	Generic	SMALL. Effects are not a concern among regulatory and resource agencies, and are not expected to be a problem during the license renewal term.

Issue	Type of Issue	Finding
Discharge of sanitary wastes and minor chemical spills	Generic	SMALL. Effects are readily controlled through NPDES permit and periodic modifications, if needed, and are not expected to be a problem during the license renewal term.
Discharge of other metals in wastewater	Generic	SMALL. These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants. They are not expected to be a problem during the license renewal term.
Water use conflicts (plants with once-through cooling systems)	Generic	SMALL. These conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems.
Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	Site-specific	SMALL OR MODERATE. The issue has been a concern at nuclear power plants with cooling ponds and at plants with cooling towers. Impacts on instream and riparian communities near these plants could be of moderate significance in some situations. See § 51.53(c)(3)(ii)(A).
		Aquatic Ecology
Refurbishment	Generic	SMALL. During plant shutdown and refurbishment there will be negligible effects on aquatic biota because of a reduction of entrainment and impingement of organisms or a reduced release of chemicals.
Accumulation of contaminants in sediments or biota	Generic	SMALL. Accumulation of contaminants has been a concern at a few nuclear power plants but has been satisfactorily mitigated by replacing copper alloy condenser tubes with those of another metal. It is not expected to be a problem during the license renewal term.
Entrainment of phytoplankton and zooplankton	Generic	SMALL. Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Cold shock	Generic	SMALL. Cold shock has been satisfactorily mitigated at operating nuclear plants with once-through cooling systems, has not endangered fish populations or been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds, and is not expected to be a problem during the license renewal term.
Thermal plume barrier to migrating fish	Generic	SMALL. Thermal plumes have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

Issue	Type of Issue	Finding
Distribution of aquatic organisms	Generic	SMALL. Thermal discharge may have localized effects but is not expected to affect the larger geographical distribution of aquatic organisms.
Premature emergence of aquatic insects	Generic	SMALL. Premature emergence has been found to be a localized effect at some operating nuclear power plants but has not been a problem and is not expected to be a problem during the license renewal term.
Gas supersaturation (gas bubble disease)	Generic	SMALL. Gas supersaturation was a concern at a small number of operating nuclear power plants with once-through cooling systems but has been satisfactorily mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Low dissolved oxygen in the discharge	Generic	SMALL. Low dissolved oxygen has been a concern at one nuclear power plant with a once-through cooling system but has been effectively mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	Generic	SMALL. These types of losses have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Stimulation of nuisance organisms (e.g., shipworms)	Generic	SMALL. Stimulation of nuisance organisms has been satisfactorily mitigated at the single nuclear power plant with a once-through cooling system where previously it was a problem. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	*Site-specific*	*SMALL, MODERATE, OR LARGE*. The impacts of entrainment are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. Further, ongoing efforts in the vicinity of these plants to restore fish populations may increase the numbers of fish susceptible to intake effects during the license renewal period, such that entrainment studies conducted in support of the original license may no longer be valid. See § 51.53(c)(3)(ii)(B).

Issue	Type of Issue	Finding
Impingement of fish and shellfish	Site-specific	SMALL, MODERATE, OR LARGE. The impacts of impingement are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. See § 51.53(c)(3)(ii)(B).
Heat shock	Site-specific	SMALL, MODERATE, OR LARGE. Because of continuing concerns about heat shock and the possible need to modify thermal discharges in response to changing environmental conditions, the impacts may be of moderate or large significance at some plants. See § 51.53(c)(3)(ii)(B).
Aquatic Ecology (for plants with cooling-tower-based heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	Generic	SMALL. Entrainment of fish has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Impingement of fish and shellfish	Generic	SMALL. The impingement has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Heat shock	Generic	SMALL. Heat shock has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Ground Water Use and Quality		
Impacts of refurbishment on ground water use and quality	Generic	SMALL. Extensive dewatering during the original construction on some sites will not be repeated during refurbishment on any sites. Any plant wastes produced during refurbishment will be handled in the same manner as in current operating practices and are not expected to be a problem during the license renewal term.
Ground water use conflicts (potable and service water; plants that use <100 gpm)	Generic	SMALL. Plants using less than 100 gpm are not expected to cause any ground water use conflicts.
Ground water use conflicts (potable and service water, and dewatering plants that use >100 gpm)	Site-specific	SMALL, MODERATE, OR LARGE. Plants that use more than 100 gpm may cause ground water use conflicts with nearby ground water users. See § 51.53(c)(3)(ii)(C).
Ground water use conflicts (plants using cooling towers withdrawing make-up water from a small river)	Site-specific	SMALL, MODERATE, OR LARGE. Water use conflicts may result from surface water withdrawals from small water bodies during low flow conditions which may affect aquifer recharge, especially if other ground water or upstream surface water users come on line before the time of license renewal. See § 51.53(c)(3)(ii)(A).

Issue	Type of Issue	Finding
Ground water use conflicts (Ranney wells)	Site-specific	SMALL, MODERATE, OR LARGE. Ranney wells can result in potential ground water depression beyond the site boundary. Impacts of large ground water withdrawal for cooling tower makeup at nuclear power plants using Ranney wells must be evaluated at the time of application for license renewal. See § 51.53(c)(3)(ii)(C).
Ground water quality degradation (Ranney wells)	Generic	SMALL. Ground water quality at river sites may be degraded by induced infiltration of poor-quality river water into an aquifer that supplies large quantities of reactor cooling water. However, the lower quality infiltrating water would not preclude the current uses of ground water and is not expected to be a problem during the license renewal term.
Ground water quality degradation (saltwater intrusion)	Generic	SMALL. Nuclear power plants do not contribute significantly to saltwater intrusion.
Ground water quality degradation (cooling ponds in salt marshes)	Generic	SMALL. Sites with closed-cycle cooling ponds may degrade ground water quality. Because water in salt marshes is brackish, this is not a concern for plants located in salt marshes.
Ground water quality degradation (cooling ponds at inland sites)	Site-specific	SMALL, MODERATE, OR LARGE. Sites with closed-cycle cooling ponds may degrade ground water quality. For plants located inland, the quality of the ground water in the vicinity of the ponds must be shown to be adequate to allow continuation of current uses. See § 51.53(c)(3)(ii)(D).
		Terrestrial Ecology
Refurbishment impacts	Site-specific	SMALL, MODERATE, OR LARGE. Refurbishment impacts are insignificant if no loss of important plant and animal habitat occurs. However, it cannot be known whether important plant and animal communities may be affected until the specific proposal is presented with the license renewal application. See § 51.53(c)(3)(ii)(E).
Cooling tower impacts on crops and ornamental vegetation	Generic	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling tower impacts on native plants	Generic	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Bird collisions with cooling towers	Generic	SMALL. These collisions have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

Issue	Type of Issue	Finding
Cooling pond impacts on terrestrial resources	Generic	SMALL. Impacts of cooling ponds on terrestrial ecological resources are considered to be of small significance at all sites.
Power line right of way management (cutting and herbicide application)	Generic	SMALL. The impacts of right-of-way maintenance on wildlife are expected to be of small significance at all sites.
Bird collisions with power lines	Generic	SMALL. Impacts are expected to be of small significance at all sites.
Impacts of electromagnetic fields on flora and fauna	Generic	SMALL. No significant impacts of electromagnetic fields on terrestrial flora and fauna have been identified. Such effects are not expected to be a problem during the license renewal term.
Floodplains and wetland on power line right of way	Generic	SMALL. Periodic vegetation control is necessary in forested wetlands underneath power lines and can be achieved with minimal damage to the wetland. No significant impact is expected at any nuclear power plant during the license renewal term.
	Threatened and Endangered Species	
Threatened or endangered species	Site-specific	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are not expected to adversely affect threatened or endangered species. However, consultation with appropriate agencies would be needed at the time of license renewal to determine whether threatened or endangered species are present and whether they would be adversely affected. See § 51.53(c)(3)(ii)(E).
	Air Quality	
Air quality during refurbishment (non-attainment and maintenance areas)	Site-specific	SMALL, MODERATE, OR LARGE. Air quality impacts from plant refurbishment associated with license renewal are expected to be small. However, vehicle exhaust emissions could be cause for concern at locations in or near nonattainment or maintenance areas. The significance of the potential impact cannot be determined without considering the compliance status of each site and the numbers of workers expected to be employed during the outage. See § 51.53(c)(3)(ii)(F).
Air quality effects of transmission lines	Generic	SMALL. Production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.
	Land Use	
Onsite land use	Generic	SMALL. Projected onsite land use changes required during refurbishment and the renewal period would be a small fraction of any nuclear power plant site and would involve land that is controlled by the applicant.

Issue	Type of Issue	Finding
Power line right of way	Generic	SMALL. Ongoing use of power line right of ways would continue with no change in restrictions. The effects of these restrictions are of small significance.
		Human Health
Radiation exposures to the public during refurbishment	Generic	SMALL. During refurbishment, the gaseous effluents would result in doses that are similar to those from current operation. Applicable regulatory dose limits to the public are not expected to be exceeded.
Occupational radiation exposures during refurbishment	Generic	SMALL. Occupational doses from refurbishment are expected to be within the range of annual average collective doses experienced for pressurized-water reactors and boiling-water reactors. Occupational mortality risk from all causes including radiation is in the mid-range for industrial settings.
Microbiological organisms (occupational health)	Generic	SMALL. Occupational health impacts are expected to be controlled by continued application of accepted industrial hygiene practices to minimize worker exposures.
Microbiological organisms (public health)(plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	Site-specific	SMALL, MODERATE, OR LARGE. These organisms are not expected to be a problem at most operating plants except possibly at plants using cooling ponds, lakes, or canals that discharge to small rivers. Without site-specific data, it is not possible to predict the effects generically. See § 51.53(c)(3)(ii)(G).
Noise	Generic	SMALL. Noise has not been found to be a problem at operating plants and is not expected to be a problem at any plant during the license renewal term.
Electromagnetic fields – acute effects (electric shock)	Site-specific	SMALL, MODERATE, OR LARGE. Electrical shock resulting from direct access to energized conductors or from induced charges in metallic structures have not been found to be a problem at most operating plants and generally are not expected to be a problem during the license renewal term. However, site-specific review is required to determine the significance of the electric shock potential at the site. See § 51.53(c)(3)(ii)(H).
Electromagnetic fields – chronic effects	Uncategorized	UNCERTAIN. Biological and physical studies of 60-Hz electromagnetic fields have not found consistent evidence linking harmful effects with field exposures. However, research is continuing in this area and a consensus scientific view has not been reached.
Radiation exposures to public (license renewal term)	Generic	SMALL. Radiation doses to the public will continue at current levels associated with normal operations.

Issue	Type of Issue	Finding
Occupational radiation exposures (license renewal term)	Generic	SMALL. Projected maximum occupational doses during the license renewal term are within the range of doses experienced during normal operations and normal maintenance outages, and would be well below regulatory limits.
	Socioeconomic Impacts	
Housing impacts	Site-specific	SMALL, MODERATE, OR LARGE. Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures that limit housing development are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development. See § 51.53(c)(3)(ii)(I).
Public services: public safety, social services, and tourism, and recreation	Generic	SMALL. Impacts to public safety, social services, and tourism and recreation are expected to be of small significance at all sites.
Public services: public utilities	Site-specific	SMALL OR MODERATE. An increased problem with water shortages at some sites may lead to impacts of moderate significance on public water supply availability. See § 51.53(c)(3)(ii)(I).
Public services: education (refurbishment)	Site-specific	SMALL, MODERATE, OR LARGE. Most sites would experience impacts of small significance but larger impacts are possible depending on site- and project-specific factors. See § 51.53(c)(3)(ii)(I).
Public services: education (license renewal term)	Generic	SMALL. Only impacts of small significance are expected
Offsite land use (refurbishment)	Site-specific	SMALL OR MODERATE. Impacts may be of moderate significance at plants in low population areas. See § 51.53(c)(3)(ii)(I).
Offsite land use (license renewal term)	Site-specific	SMALL, MODERATE, OR LARGE. Significant changes in land use may be associated with population and tax revenue changes resulting from license renewal. See § 51.53(c)(3)(ii)(I).
Public services: transportation	Site-specific	SMALL, MODERATE, OR LARGE. Transportation impacts (level of service) of highway traffic generated during plant refurbishment and during the term of the renewed license are generally expected to be of small significance. However, the increase in traffic associated with the additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites. See § 51.53(c)(3)(ii)(J).

Issue	Type of Issue	Finding
Historic and archaeological resources	Site-specific	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are expected to have no more than small adverse impacts on historic and archaeological resources. However, the National Historic Preservation Act requires the Federal agency to consult with the State Historic Preservation Officer to determine whether there are properties present that require protection. See § 51.53(c)(3)(ii)(K).
Aesthetic impacts (refurbishment)	Generic	SMALL. No significant impacts are expected during refurbishment.
Aesthetic impacts (license renewal term)	Generic	SMALL. No significant impacts are expected during the license renewal term.
Aesthetic impacts of transmission lines (license renewal term)	Generic	SMALL. No significant impacts are expected during the license renewal term.
	Postulated Accidents	
Design basis accidents	Generic	SMALL. The NRC staff has concluded that the environmental impacts of design basis accidents are of small significance for all plants.
Severe accidents	Site-specific	SMALL. The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. See § 51.53(c)(3)(ii)(L).
	Uranium Fuel Cycle and Waste Management	
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high level waste)	Generic	SMALL. Offsite impacts of the uranium fuel cycle have been considered by the Commission in Table S-3 of this part. Based on information in the GEIS, impacts on individuals from radioactive gaseous and liquid releases including radon-222 and technetium-99 are small.

Issue	Type of Issue	Finding
Offsite radiological impacts (collective effects)	Generic	The 100 year environmental dose commitment to the U.S. population from the fuel cycle, high level waste and spent fuel disposal excepted, is calculated to be about 14,800 person rem, or 12 cancer fatalities, for each additional 20-year power reactor operating term. Much of this, especially the contribution of radon releases from mines and tailing piles, consists of tiny doses summed over large populations. This same dose calculation can theoretically be extended to include many tiny doses over additional thousands of years as well as doses outside the U. S. The result of such a calculation would be thousands of cancer fatalities from the fuel cycle, but this result assumes that even tiny doses have some statistical adverse health effect which will not ever be mitigated (for example no cancer cure in the next thousand years), and that these doses projected over thousands of years are meaningful. However, these assumptions are questionable. In particular, science cannot rule out the possibility that there will be no cancer fatalities from these tiny doses. For perspective, the doses are very small fractions of regulatory limits, and even smaller fractions of natural background exposure to the same populations. Nevertheless, despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgment in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the commission has not assigned a single level of significance for the collective effects of the fuel cycle, this issue is considered Category 1 [Generic].

Issue	Type of Issue	Finding
Offsite radiological impacts (spent fuel and high level waste disposal)	Generic	For the high level waste and spent fuel disposal component of the fuel cycle, there are no current regulatory limits for offsite releases of radionuclides for the current candidate repository site. However, if we assume that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence Decision, 10 CFR 51.23, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 millirem per year or less. However, while the Commission has reasonable confidence that these assumptions will prove correct, there is considerable uncertainty since the limits are yet to be developed, no repository application has been completed or reviewed, and uncertainty is inherent in the models used to evaluate possible pathways to the human environment. The NAS report indicated that 100 millirem per year should be considered as a starting point for limits for individual doses, but notes that some measure of consensus exists among national and international bodies that the limits should be a fraction of the 100 millirem per year. The lifetime individual risk from 100 millirem annual dose limit is about 3 x 10-3. Estimating cumulative doses to populations over thousands of years is more problematic. The likelihood and consequences of events that could seriously compromise the integrity of a deep geologic repository were evaluated by the Department of Energy in the "Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste," October 1980. The evaluation estimated the 70-year whole-body dose commitment to the maximum individual and to the regional population resulting from several modes of breaching a reference repository in the year of closure, after 1,000 years, after 100,000 years and after 100,000,000 years.

Issue	Type of Issue	Finding
		Subsequently, the NRC and other federal agencies have expended considerable effort to develop models for the design and for the licensing of a high level waste repository, especially for the candidate repository at Yucca Mountain. More meaningful estimates of doses to population may be possible in the future as more is understood about the performance of the proposed Yucca Mountain repository. Such estimates would involve very great uncertainty, especially with respect to cumulative population doses over thousands of years. The standard proposed by the NAS is a limit on maximum individual dose. The relationship of potential new regulatory requirements, based on the NAS report, and cumulative population impacts has not been determined, although the report articulates the view that protection of individuals will adequately protect the population for a repository at Yucca Mountain. However, EPA's generic repository standards in 40 CFR Part 191 generally provide an indication of the order of magnitude of cumulative risk to population that could result from the licensing of a Yucca Mountain repository, assuming the ultimate standards will be within the range of standards now under consideration. The standards in 40 CFR Part 191 protect the population by imposing amount of radioactive material released over 10,000 years. The cumulative release limits are based on EPA's population impact goal of 1,000 premature cancer deaths worldwide for a 100,000 metric ton (MTHM) repository. Nevertheless, despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgment in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel and high level waste disposal, this issue is considered in Category 1 [Generic].
Nonradiological impacts of the uranium fuel cycle	Generic	SMALL. The nonradiological impacts of the uranium fuel cycle resulting from the renewal of an operating license for any plant are found to be small.
		Decommissioning
Radiation doses	Generic	SMALL. Doses to the public will be well below applicable regulatory standards regardless of which decommissioning method is used. Occupational doses would increase no more than 1 man-rem caused by buildup of long-lived radionuclides during the license renewal term.

Issue	Type of Issue	Finding
Waste management	Generic	SMALL. Decommissioning at the end of a 20-year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected.
Air quality	Generic	SMALL. Air quality impacts of decommissioning are expected to be negligible either at the end of the current operating term or at the end of the license renewal term.
Water quality	Generic	SMALL. The potential for significant water quality impacts from erosion or spills is no greater whether decommissioning occurs after a 20-year license renewal period or after the original 40-year operation period, and measures are readily available to avoid such impacts.
Ecological resources	Generic	SMALL. Decommissioning after either the initial operating period or after a 20-year license renewal period is not expected to have any direct ecological impacts.
Socioeconomic impacts	Generic	SMALL. Decommissioning would have some short-term socioeconomic impacts. The impacts would not be increased by delaying decommissioning until the end of a 20-year relicense period, but they might be decreased by population and economic growth.
	Environmental Justice	
Environmental Justice	Uncategorized	NONE. The need for and the content of an analysis of environmental justice will be addressed in plant-specific reviews.

Appendix C

Applicable Regulations, Laws, and Agreement

C. Applicable Regulations, Laws, and Agreements

The Atomic Energy Act of 1954 (AEA) authorizes States to establish programs to assume NRC regulatory authority for certain activities. For example, through section 274b of the AEA, as amended, beginning on January 13, 2006, Minnesota assumed regulatory authority for: (1) byproduct materials as defined in 11e.(1) of the Act; (2) source materials; and (3) special nuclear materials in quantities not sufficient to form a critical mass. The Minnesota Radiation Control Unit (RCU) is responsible for implementing State nuclear regulations. Minnesota did not seek authority to: (a) conduct safety evaluations of sealed sources and devices manufactured in Minnesota and distributed in interstate commerce; (b) regulate the disposal of low-level radioactive waste at a land disposal site as described in 10 CFR Part 61; or (c) regulate 11e.(2) byproduct material resulting from the extraction or concentration of source material from ore processed primarily for its source material content, and its management and disposal.

In addition to implementing some Federal programs, State legislatures develop their own laws. State statutes supplement as well as implement Federal laws for protection of air, water quality, and ground water. State legislation may address solid waste management programs, locally rare or endangered species, and historic and cultural resources.

The Clean Water Act (CWA) allows for primary enforcement and administration through State agencies, provided the State program is at least as stringent as the Federal program. The State program must conform to the CWA and to the delegation of authority for the Federal National Pollutant Discharge and Elimination System (NPDES) program from the U.S. Environmental Protection Agency (EPA) to the State. The primary mechanism to control water pollution is the requirement for direct dischargers to obtain an NPDES permit. In Minnesota, the Minnesota Pollution Control Agency (MPCA) issues and enforces NPDES permits.

One important difference between Federal regulations and certain State regulations is the definition of waters regulated by the State. Certain state regulations may include underground waters, while the CWA only regulates surface waters.

C.1. State Environmental Requirements

Certain environmental requirements, including some discussed earlier, may have been delegated to State authorities for implementation, enforcement, or oversight. Table C-1 provides a list of representative State environmental requirements that may affect license renewal applications for nuclear power plants.

Table C-1. State Environmental Requirements. *PINGP 1 and 2 is subject to numerous State requirements regarding their environmental program. Those requirements are briefly described below. See Section 1.9 for PINGP 1 and 2's compliance status with these requirements.*

Law/Regulation	Requirements
Air Quality Protection	
Air Pollution Control Act, Minnesota Administrative Rules and Laws, Chapter 7007, Air Emission Permits, Section 1450	All emission sources at PINGP 1 and 2, must obtain a Synthetic Minor Operating Permit prior to operation; the MPCA issues and enforces permits.
Water Resources Protection	
Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.); Minnesota Stat. § 115.03, subd. 1(e)(10) "Requiring that applicants for wastewater discharge permits evaluate in their applications the potential reuses of the discharged wastewater."	The NPDES permit is required for plant industrial, sanitary, and stormwater discharges to the Mississippi River. The NPDES permit requires the compliance of each point source with authorized discharge levels, monitoring requirements, and other appropriate requirements. The MPCA is the responsible State agency for NPDES permitting.
CWA (33 U.S.C. Section 401)	The CWA Section 401 Water Quality Certification requires a Section 401 water quality certification and payment of applicable fees before the issuance of a Federal permit or license to conduct any activity that may result in any discharge to waters of the State. In Minnesota, State issuance of an NPDES permit constitutes 401 Certification.
2008 Minnesota State Statutes 103G.265, Laws regarding Water Supply Management	Subd. 3. requires a permit to cover consumptive water use over 2,000,000 gallons per day (gpd) (over a 30-day average) of surface and ground water; the Minnesota Department of Natural Resources (MNDNR) is the regulatory agency that issues and enforces consumptive water use permits.
2008 Minnesota State Statutes 103G.265, Laws regarding Water Supply Management	Subd. 3. requires a permit to cover ground water withdrawals over 100,000 gpd or more (over a 30-day average) of surface water, ground water, or a combination of the two; the MNDNR is the regulatory agency that issues and enforces ground water withdrawal permits.
Minnesota State Statutes 103G.127 Permit Program	The U.S. Army Corps of Engineers in cooperation with MNDNR issues maintenance dredging permits for maintenance dredging of the area around PINGP 1 and 2.
Minnesota State Statutes 103G.127 Permit Program	Maintenance dredging of the PIINGP, Units 1 and 2 intake canal in the Mississippi River also requires a maintenance dredging permit issued by the MNDNR.
Minnesota Safe Drinking Water Act (40 CFR 141 and 142); 2008 Minnesota Statutes 103G.291 Public Water Supply Plans; Appropriation During Deficiency.	The MNDNR issues and enforces public water supply permits for operation of the PINGP 1 and 2, plant site drinking water systems.

Law/Regulation	Requirements
Minnesota 2008 State Statutes 282.0195 Subd. 2. Storage tank sites for state laws and regulations; Chapter 7150 Minnesota Pollution Control Agency Underground Storage Tanks Program for state permitting and registration requirements.	The State of Minnesota issues storage tank registration and permit certificates, which establish annual registration requirements for underground storage tanks containing petroleum or other regulated substances. The MPCA, Industrial Division is the State contact for obtaining permits, as well as issuing any fines and/or performance measures.
Minnesota 2008 State Statute 7150.0100 Performance standards for underground storage tank systems; Minnesota 2008 State Statute 7150.0215 Operation and Maintenance of Cathodic Protection.	These laws regulate flammable and combustible liquid storage tanks as well as the approval to construct or operate an underground storage tank containing flammable or combustible liquids.
Minnesota 2008 State Statute 458D.07 Sewage Collection and Disposal; 2008 State Statute 458D.07 Subd. 6. deals specifically with discharge of treated sewage.	The State of Minnesota and the MPCA issues sewage sludge disposal agreements, which are required for the disposal of sewage sludge. The MPCA also issues on-lot sewage disposal system permits, and permit modifications for approvals of additional flows to on-lot sewage treatment systems.

C.2. Operating Permits and Other Requirements

Several operating permit applications may be prepared and submitted, and regulator approval and permits would be received prior to license renewal approval by the NRC. Table C-2 lists representative Federal, State, and local permits.

Table C-2. Federal, State, and Local Permits and Other Requirements. *PINGP 1 and 2, is subject to other requirements regarding various aspects of their environmental program. Those requirements are briefly described below.*

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Air Quality Protection			
Approval (operating permit) for construction or modification of an air pollutant source.	MPCA	Clean Air Act, Title V, Sections 501-507 (42 U.S.C. 7661-7661f); Minn. Stat. § 116.07	NSP may need to modify its existing operation of air emissions system for an electric utility power generation system permit, or apply for a new permit for temporary emissions associated with refurbishment.
Water Resources Protection			
NPDES permit for construction site storm water and other project-specific discharges.	MPCA	CWA (33 U.S.C. 1251 et seq.); 40 CFR Part 122; Minn Stat. § 7090	NSP may need to modify the existing PINGP 1 and 2 NPDES permit, or otherwise obtain authorization for temporary discharges associated with refurbishment.
Review and approval of any project that will result in consumptive use of water from the Mississippi River within the State of Minnesota.	MNDNR	2008 Minnesota Statutes 103G.265 Water Supply Management.	Modifications to the existing PINGP 1 and 2 consumptive water use permit may be necessary to supply water for refurbishment activities.
Appropriations permit required for any user withdrawing more than 10,000 gpd or 1 million gallons of per year.	MNDNR	Minn Stat. § 103G.271	Refurbishment activities at PINGP 1 and 2 may require additional water withdrawal or an increased pumping rate; the existing PINGP 1 and 2 surface and/or groundwater appropriation permit(s) may require modification.
Permit required before construction, modification, removal, destruction, or abandonment of an obstruction in a floodplain.	MNDNR	"The Flood Plain Management Law;" Minnesota Statute 103F.101 – 103F.	NSP is reviewing flood plain elevations associated with refurbishment activities; if avoidance is not possible, NSP may be required to apply for appropriate permits.

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
A Spill Prevention Control and Countermeasures (SPCC) Plan is required for any facility that could discharge diesel fuel in harmful quantities into navigable waters or onto adjoining shorelines.	MNDNR and EPA Region 5	CWA (33 U.S.C. 1251 et seq.); 40 CFR Part 112;	A SPCC Plan is required at nuclear power plants storing large volumes of diesel fuel or other petroleum products. NSP may need to modify its existing SPCC Plan, or develop a new plan to cover activities associated with refurbishment.
New Underground Storage Tanks System Registration is required within 30 days of bringing a new underground storage tank system into service.	MPCA	Resource Conservation and Recovery Act (RCRA), as amended, Subtitle I (42 U.S.C. 6991a-6991i); 40 CFR §280.22; Storage Tank and Spill Prevention (35 P.S. 6021.101-6021.2104); Minnesota 2008 State Statutes 7150.0100 – 7150.0210	Required if new underground storage tank systems would be installed during refurbishment.
Waste Management and Pollution Prevention			
Registration and Hazardous Waste Generator Identification Number are required before a facility that generates over 100 kg (220 lb) per calendar month of hazardous waste ships the hazardous waste offsite.	MPCA and EPA Region 5	RCRA, as amended (42 U.S.C. 6901 et seq.), Subtitle C; Minnesota State Statute 7045.0125 Hazardous Waste Generator's License	Generators of hazardous waste must notify EPA that the wastes exist and require management in compliance with RCRA. NSP is required to characterize wastes generated by refurbishment to determine proper disposal procedures and permit requirements.
Emergency Planning and Response			
Submission of a list of Material Safety Data Sheets is required for hazardous chemicals (as defined in 29 CFR Part 1910) that are stored onsite in excess of their threshold quantities.	State and local emergency planning agencies	Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), Section 311 (42 U.S.C. 11021); 40 CFR §370.20	Nuclear power plant operators are required to submit a List of Material Safety Data Sheets to State and local emergency planning agencies.
Transportation of Radioactive Wastes and Conversion Products Packaging, Labeling, and Routing Requirements for Radioactive Materials is required for packages containing radioactive materials that will be shipped by truck or rail.	U.S. Department of Transportation	HMTA (49 U.S.C. 1501 et seq.); Atomic Energy Act (AEA), as amended (42 U.S.C. 2011 et seq.); 49 CFR Parts 172, 173, 174, 177, and 397	When shipments of radioactive materials are made, nuclear power plant operators are required to comply with U.S. Department of Transportation packaging, labeling, and routing requirements.
Biotic Resource Protection			

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance and Status
Threatened and Endangered Species Consultation is required between the responsible Federal agencies and affected States to ensure that the project is not likely to: (1) jeopardize the continued existence of any species listed at the Federal or State level as *endangered or threatened*; or (2) result in destruction of critical habitat of such species.	U.S. Fish and Wildlife Service (FWS) and State agencies	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)	NRC will consult with FWS and State agencies regarding the impact of license renewal on threatened or endangered species or their critical habitats.
CWA Section 404 (Dredge and Fill) Permit is required to place dredged or fill material into waters of the U.S., including areas designated as wetlands, unless such *placement* is exempt or authorized by a nationwide permit or a regional permit; a notice must be filed if a nationwide or regional permit applies.	U.S. Army Corps of Engineers	CWA (33 U.S.C. 1251 et seq.); 33 CFR Parts 323 and 330	Any dredging or placement of fill material at a nuclear power plant into wetlands within the jurisdiction of the U.S. Army Corps of Engineers would require a Section 404 permit.
Cultural Resources Protection			
Archaeological and Historical Resources Consultation is required before a Federal agency approves a project in an area where archaeological or historic resources might be located.	Minnesota Office of the State Archeologist	National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.); Archaeological and Historical Preservation Act of 1974 (16 U.S.C. 469-469c-2); Antiquities Act of 1906 (16 U.S.C. 431 et seq.); Archaeological Resources Protection Act of 1979, as amended (16 U.S.C. 470aa-mm)	NRC will consult with the State and Tribal Historic Preservation Officers and representative Indian tribes regarding the impacts of license renewal and the results of archaeological and architectural surveys of nuclear power plant sites.

APPENDIX D

CONSULTATION CORRESPONDENCE

D. Consultation Correspondence

The Endangered Species Act of 1973, as amended, the Magnuson-Stevens Fisheries Management Act of 1996, as amended; and the National Historic Preservation Act of 1966 require that Federal agencies consult with applicable State and Federal agencies and groups prior to taking action that may affect threatened and endangered species, essential fish habitat, or historic and archaeological resources, respectively. This appendix contains consultation documentation.

The Prairie Island Indian Community (PIIC) submitted a petition to intervene on August 18, 2008. Any correspondence related to this petition and not specifically to the PINGP 1 and 2 license renewal application review are not listed in the following table or included in this appendix. The documents related to this petition that have been submitted to a hearing file, which can be found in ADAMS under the adjudicatory process for Prairie Island Nuclear Generating Plant, Docket Nos. 050-282 and 050-306.

Table D-1. Consultation Correspondences. *This is a list of the consultation documents sent between the NRC and other agencies we are required to consult with based on NEPA requirements.*

Author	Recipient	Date of Letter
Prairie Island Indian Community (Tribal Council)	U.S. Nuclear Regulatory Commission (L. Reyes)	January 29, 2008
U.S. Nuclear Regulatory Commission (J. Dyer)	Prairie Island Indian Community (R. Johnson)	February 23, 2008
U.S. Nuclear Regulatory Commission (P.T. Kuo)	Prairie Island Indian Community (Tribal Council)	March 21, 2008
Prairie Island Indian Community (R. Johnson)	U.S. Nuclear Regulatory Commission (S. Lee)	April 14, 2008
Prairie Island Indian Community (Tribal Council)	Bureau of Indian Affairs (T. Verdin)	May 1, 2008
U.S. Nuclear Regulatory Commission (J. Dyer)	Prairie Island Indian Community (R. Johnson)	May 2, 2008
Prairie Island Indian Community (H. Westra)	U.S. Nuclear Regulatory Commission (N. Le)	May 15, 2008
U.S. Nuclear Regulatory Commission (E. Leeds)	Prairie Island Indian Community (R. Johnson)	June 14, 2008
U.S. Nuclear Regulatory Commission (Staff)	Prairie Island Indian Community (Tribal Council)	June 14, 2008
Prairie Island Indian Community (P. Mahowald)	U.S. Nuclear Regulatory Commission (R. Plasse)	June 17, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Advisory Council on Historic Preservation (D. Kilma)	July 10, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Prairie Island Indian Community (P. Mahowald)	July 21, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Bureau of Indian Affairs (T. Verdin)	July 22, 2008

Author	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (R. Franovich)	Prairie Island Indian Community (H. Westra)	July 22, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Minnesota Department of Natural Resources (L. Joyal)	July 22, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	U.S. Fish and Wildlife Service (T. Sullins)	July 22, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Wisconsin Department of Natural Resources (E. Rusch)	July 22, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	State Historic Preservation Office (D. Gimmestad)	July 22, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Prairie Island Indian Community (R. Johnson) [a]	July 24, 2008
U.S. Fish and Wildlife Service (T. Sullins)	U.S. Nuclear Regulatory Commission (R. Franovich)	August 13, 2008
Bureau of Indian Affairs (T. Verdin)	U.S. Nuclear Regulatory Commission (R. Franovich)	August 18, 2008
Minnesota Department of Natural Resources (H. Cyr)	U.S. Nuclear Regulatory Commission (R. Franovich)	August 26, 2008
Wisconsin Department of Natural Resources (T. Lovejoy)	U.S. Nuclear Regulatory Commission (N. Goodman)	September 8, 2008
U.S. Nuclear Regulatory Commission (R. Franovich)	Bureau of Indian Affairs (K. Bearquiver)	October 23, 2008
U.S Nuclear Regulatory Commission	U.S. Fish and Wildlife Service	September 2009

[a] Similar letters went to twenty eight other Native American Tribes listed in Section 1.8.

D.1. Consultation Correspondence

The following pages contain copies of the letters listed in Table D-1. Figures contained in the July, 21, 2008, letter (D-26 and D-27) were included with all letters following this date sent by the NRC.

Ronald Johnson
President

Lucy Taylor
Secretary

Johnny Johnson
Vice President

Victoria Winfrey
Treasurer

Shelley Buck-Yeager
Assistant Secretary/Treasurer

January 29, 2008

Mr. Luis Reyes
Executive Director for Operations
United States Nuclear Regulatory Commission
Washington D.C. 20555

Dear Mr. Reyes:

As a follow-up to our October 24, 2007, meetings with Chairman Klein and other representatives of the NRC, the Prairie Island Indian Community respectfully requests several further actions from the NRC that will enable the Community to adequately prepare for a potential application by Xcel to renew the license for the Prairie Island Nuclear Generating Plant. We are appreciative of the long history of cooperative relations between the NRC and the Community. We believe that this cooperation is a continuing affirmation of the December 2, 1996, Commission letter to the Community stating that it would direct the NRC staff to continue to implement the spirit and letter of the presidential executive memorandum of April 29, 1994 to ensure that the rights of sovereign Tribal governments are fully respected and to operate within a government-to-government relationship with Federally-recognized Native American Tribes. Accordingly, the Community would request the following:

1. Members of the Tribal Council and staff will be in the Washington area during the week of February 24, 2008. We would like to meet with the license renewal staff in the Office of Nuclear Reactor Regulation to discuss the details of the safety and environmental issues that the NRC will evaluate when reviewing any license renewal application from Xcel for the Prairie Island Plant. The NRC staff has already given us an overview of the license renewal evaluation process and we would now like to learn more in order to properly prepare for our role in the NRC process. We could make ourselves available any time on February 27 and 28, 2009, for this purpose.

2. We would request that the NRC consider designating the Community as a "cooperating agency" in the preparation of the Environmental Impact Statement (EIS) for the license renewal application in accordance with 10 CFR 51.4 and 51.29(a)(7) of the Commission's regulations. We believe that this is not only consistent with the Commission's policy of cooperation and consultation with Native American Tribes, but also will be of assistance to the NRC in its evaluation of the environmental impacts from the facility.

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Mr. Luis Reyes
January 29, 2008
Page 2

3. Finally, we would request that our environmental specialist be able to accompany the NRC staff team when it conducts its initial environmental audit of the Prairie Island Plant in preparation for the evaluation of environmental impacts from a proposed renewal of the Plant license. This will not only be helpful to the Community to enable us to adequately comment on the scope and substance of the environmental review, but also, we believe, helpful to the NRC, particularly in regard to the historic and religious cultural impacts of the review.

Thank you for your consideration of these requests. I will look forward to hearing from you.

Sincerely,

Ronald Johnson
Tribal Council President

Johnny Johnson
Tribal Council Vice President

Lu Taylor
Tribal Council Secretary

Victoria Winfrey
Tribal Council Treasurer

Shelley Buck-Yeager
Tribal Council Assistant Secretary/Treasurer

cc: Bruce Mallett
Martin Virgilio
James Dyer
P.T. Kuo
Dennis Rathbun

February 23, 2008

Mr. Ronald Johnson
Tribal Council President
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

Dear Mr. Johnson:

The U.S. Nuclear Regulatory Commission (NRC) received the letter from you and the Prairie Island Indian Community dated January 29, 2008. We appreciate your interest in the anticipated license renewal review for Prairie Island Nuclear Generating Plant (PINGP).

I understand that the Tribal Council and the Council's staff will be in the Washington area during the week of February 24, 2008, and that the Council would like to meet with the NRC license renewal staff to discuss the details of the safety and environmental reviews for license renewal (LR). The staff will be available that week to meet with you.

The NRC staff appreciates your interest in participating in the LR environmental review as a cooperating agency and looks forward to exploring that option with you. We also are very receptive to your request to have the Council's environmental specialist accompany the NRC staff team when the team conducts its initial environmental site audit of the PINGP. We will inform you of the NRC staff's schedule in a timely manner so that the Council's staff can prepare to participate.

Again, we appreciate your interest in the PINGP LR review and look forward to further dialogue on the opportunity for cooperative assessment of the environmental impacts.

Sincerely,

/RA/

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

March 21, 2008

Mr. Ronald Johnson
Tribal Council President
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

Dear President Johnson:

This is in follow-up to the February 27, 2008, meeting with you and Ms. Heather Westra at U.S. Nuclear Regulatory Commission (NRC) headquarters in Rockville, Maryland. The staff very much appreciates the opportunity to discuss the Prairie Island Indian Community's (the Community) interest in the Prairie Island Nuclear Generating Plant (PINGP) license renewal application, which the staff expects to receive in April 2008.

The staff works with Native American Tribal governments on a government-to-government basis to ensure that the rights of sovereign Tribal governments are fully respected. In keeping with this relationship, the NRC staff appreciates the offer of assistance in the environmental review of the proposed action (license renewal) in accordance with the National Environmental Policy Act of 1969. The staff understands that the Community is evaluating its options for participating in the staff's review and will notify NRC if it wishes to pursue status as a cooperating agency. The staff requests that, as you explore the option of cooperating agency status, you consider the "Factors for Determining Whether to Invite, Decline or End Cooperative Agency Status," enclosed for your convenience. These factors can be accessed at http://www.nepa.gov/nepa/regs/cooperating/cooperatingagenciesmemorandum.html. Should the Community decide to pursue cooperating agency status, the NRC staff requests that the Community notify the NRC by letter and address each of the "Factors" therein for staff consideration.

As stated in the February 23, 2008, letter from J. E. Dyer to you, the staff is receptive to your request to have the Community's environmental specialist accompany the NRC staff during its environmental site audit of the PINGP. Should the NRC staff accept the PINGP license renewal application for review, we will contact you with the dates of the environmental site audit so your environmental specialist can make necessary arrangements.

Please direct all correspondence related the PINGP license renewal review to Mr. Ngoc (Tommy) Le, Senior Project Manager. He can be reached by phone at (301) 415-1458 and by email at nbl@nrc.gov. Similarly, the NRC staff requests the name and contact information of a point of interface from the Community.

The staff remains committed to continue working with the Community on a government-to-government basis and will be available to meet with representatives of the Community at meeting facilities located on the reservation, if such a meeting would be beneficial.

R. Johnson - 2 -

Thank you again for your interest in PINGP license renewal and your offer to assist the staff in conducting the associated environmental review. We look forward to hearing from the Community regarding the options it wishes to pursue for participation in the staff's environmental review.

Sincerely,

\RA\ Sam Lee for

Pao-Tsin Kuo, Director
Division of License Renewal
Office of Nuclear Reactor Regulation

cc: Heather J. Westra, Interim Director
Land and Environment Department
5636 Sturgeon Lake Road
Welch, MN 55089

Enclosure:
As stated

7. Can the cooperating agency provide resources to support scheduling and critical milestones such as:

    - Personnel? Consider all forms of assistance (e.g., data gathering; surveying; compilation; research.
    - Expertise? This includes technical or subject matter expertise.
    - Funding? Examples include funding for personnel, travel and studies. Normally, the cooperating agency will provide the funding; to the extent available funds permit, the lead agency shall fund or include in budget requests funding for an analyses the lead agency requests from cooperating agencies. Alternatives to travel, such as telephonic or video conferencing, should be considered especially when funding constrains participation.
    - Models and databases? Consider consistency and compatibility with lead and other cooperating agencies' methodologies.
    - Facilities, equipment and other services? This type of support is especially relevant for smaller governmental entities with limited budgets.

8. Does the agency provide adequate lead-time for review and do the other agencies provide adequate time for review of documents, issues and analyses? For example, are either the lead or cooperating agencies unable or unwilling to consistently participate in meetings in a timely fashion after adequate time for review of documents, issues and analyses?

9. Can the cooperating agency(s) accept the lead agency's final decision-making authority regarding the scope of the analysis, including authority to define the purpose and need for the proposed action? For example, is an agency unable or unwilling to develop information/analysis of alternatives they favor and disfavor?

10. Are the agency(s) able and willing to provide data and rationale underlying the analyses or assessment of alternatives?

11. Does the agency release predecisional information (including working drafts) in a manner that undermines or circumvents the agreement to work cooperatively before publishing draft or final analyses and documents? Disagreeing with the published draft or final analysis should not be a ground for ending cooperating status. Agencies must be alert to situations where state law requires release of information.

12. Does the agency consistently misrepresent the process or the findings presented in the analysis and documentation?

Ronald Johnson
President

Lucy Taylor
Secretary

Johnny Johnson
Vice President

Victoria Winfrey
Treasurer

Shelley Buck-Yeager
Assistant Secretary/Treasurer

April 14, 2008

Mr. Sam Lee
Acting Director
Division of License Renewal
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

VIA FACSIMILE
(301) 415-2002 &
FEDERAL EXPRESS

RE: Request for Cooperating Agency Status

Dear Mr. Lee:

On behalf of the Prairie Island Indian Community, we wanted to thank the NRC staff for devoting the time to meet with Community representatives on February 27, 2008, to discuss the anticipated application from the Xcel Corporation to renew the license for the Prairie Island Nuclear Generating Plant (PINGP). We particularly appreciate the efforts of Ms. Rosetta Virgilio in arranging these meetings. As noted in Mr. P.T. Kuo's letter of March 21, 2008, we also appreciate the willingness of the NRC to have the Community's environmental specialist accompany the NRC staff during its environmental site audit of the PINGP. By this letter, we are also formally requesting that the Community be invited to participate as a "cooperating agency" in the preparation of the environmental impact statement on the anticipated license renewal application for the PINGP. As requested in the letter of March 21, 2008, we are providing information on the factors the NRC should consider in determining whether to invite a governmental entity to be a cooperating agency (see attached).

The Prairie Island Indian Community in the State of Minnesota (also known as the Prairie Island Mdewakanton Dakota Community) is a federally recognized Tribe organized under 25 U.S.C. § 476, and is governed under the terms of the Constitution and Bylaws adopted by the Tribal Members on May 23, 1936, and approved by the Secretary of the Interior on June 20, 1936, as amended. Article IV, Section 1 of the Constitution provides that the Community Council (sometimes referred to as the Tribal Council) shall be the

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A133

Mr. Sam Lee
April 14, 2008
Page 2

governing body for the Prairie Island Indian Community. Pursuant to Article V of the Constitution, the Tribal Council has the authority to, among other things: consider various legal matters that fall within the authority of a federally recognized Indian tribe; safeguard and promote the peace, safety, morals, and general welfare of the Community; and protect and preserve the property, wildlife and natural resources of the Community.

By way of background, the Council on Environmental Quality (CEQ) regulations in 40 CFR 1501.6 provide for early and significant involvement by cooperating agencies in the preparation of an EIS. The CEQ regulations permit a federal agency to invite other agencies and governments to assume a cooperating agency role. The NRC regulations in 10 CFR Part 51 recognize the role of cooperating agencies. In a January 20, 2002, memorandum to federal agency heads, including the NRC, CEQ Chairman James Connaughton cited the many benefits of using cooperating agencies and encouraged agencies to make greater use of cooperating agency arrangements.

We are hopeful that the NRC will invite the Community to participate as a cooperating agency. We believe that our environmental staff could contribute significantly to your review, both on issues unique to the Community, and also on broader environmental issues. Our environmental staff has a longstanding knowledge of local environmental conditions which could greatly enhance the collection and analysis of information required for your environmental review. In addition, we believe that cooperating agency status would be an expeditious and convenient way for the NRC to implement the agency's obligations for government-to-government consultation, as reflected in Executive Order 13175. As the only federally recognized tribal entity in close proximity to an NRC-licensed reactor, cooperating agency status for the Community would be entirely appropriate. We have reason to believe that Xcel will submit its application for the renewal of the PINGP license within the next few weeks. We believe that involvement of the Community as early as possible in the NRC review of the Xcel application will make the most productive use of the cooperating agency designation. Consequently, we would appreciate your expedited consideration of our request.

Respectfully submitted,

Ronald Johnson
Tribal Council President

Johnny Johnson
Tribal Council Vice President

Lu Taylor
Tribal Council Secretary

Victoria Winfrey
Tribal Council Treasurer

Shelley Buck-Yeager
Tribal Council Assistant Secretary/Treasurer

Attachment: Cooperating Agency Factors – Prairie Island Indian Community

Mr. Sam Lee
April 14, 2008
Page 3

cc: Luis Reyes, EDO, NRC
Bruce Mallett, DEDO, NRC
MartinVirgilio,DEDO,NRC
James Wiggins, NRR, NRC
Charles Miller, FSME, NRC
Bill Borchardt, NRO, NRC
Chairman Klein, NRC
Commissioner Lyons, NRC
Commissioner Jacksco, NRC
Commissioner Svinicki, NRC
Chairman Connaughton, CEQ

Attachment to Prairie Island
Indian Community letter of
April 14, 2008

PRAIRIE ISLAND INDIAN COMMUNITY ("COMMUNITY") DISCUSSION OF FACTORS TO BE CONSIDERED IN THE UNITED STATES NUCLEAR REGULATORY COMMISSION ("NRC") DETERMINATION ON WHETHER TO INVITE COOPERATING AGENCY STATUS IN REGARD TO THE PREPARATION OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS) ON THE APPLICATION TO RENEW THE LICENSE FOR THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT

1. Jurisdiction by Law

   Not Applicable.

2. Special Expertise

"Special expertise" provides a broad opportunity for cooperating agency status, recognizing the relevant capabilities or knowledge that a tribal government can contribute to the preparation of an EIS. The CEQ regulations in 40 CFR 1508.5 specifically addresses tribal eligibility, specifying that tribes are eligible "when the effects [of a proposed action] are on a reservation." This criterion has been broadly applied to include effects on tribal "interests." The Community has the expertise on the issues that the NRC will have to consider to meet its obligations under the National Environmental Policy Act. These issues include the effects of the proposed action on unique tribal cultural interests, the relationship of Tribal planning objectives to State, regional, and local government land use and energy plans, as well the effects of the proposed action on tribal economic interests. Our environmental expert has been with the Community for many years and is cognizant of Community resources and information, and also experienced in the preparation of environmental review documents relevant to the Community. The Community's environmental expert has full access to any of the Community's information that may be relevant to the preparation of the NRC EIS.

The Community has had environmental monitoring programs in place for many years. With support from the US Environmental Protection Agency (EPA), the Community has developed a Land and Environment Department, responsible for all aspects of environmental quality. The Community has also retained the services of environmental consulting firms to conduct special investigations, such as a plant and bird inventory on Prairie Island. The Community has an Engineer, Emergency Manager, legal staff, and community members (cultural experts) who are ready to assist the tribe in the development of the environmental documents for the relicensing proceeding.

3. Understanding of Cooperating Agency Status

The Community is fully aware of the roles and responsibilities of a cooperating agency and the Tribal Council possesses the requisite authority to enter into an agreement with the NRC as a cooperating agency.

4. Participation during scoping

The Community is fully prepared to participate effectively throughout the entire process of preparing the EIS, including scoping. The Tribal Council has authorized the participation of Community staff in the EIS process fully recognizing the resources that may be required to meet its responsibilities as a cooperating agency.

5. Timely action

The Community believes that it can identify significant environmental issues, identify minor issues to eliminate from further study, alert the NRC to previous studies that are relevant to the EIS, and identify the proposed action's relationship to the Community's long range plans, as well as the relationship to the plans of other governmental entities. In fact, without the Community's participation as a cooperating agency, it would be difficult for the NRC to develop this type of comprehensive information in a timely manner.

6. Assistance in preparation

The Community is fully prepared to assist in preparing portions of the review. In fact, if the cooperating agency status is provided, the Community would suggest for NRC consideration, that the Community staff prepare the portion of the analysis on the impacts of the proposed action on Community cultural interests. The Community fully anticipates providing any assistance necessary fully consistent with the NRC schedule.

7. Provision of resources to support scheduling and critical milestones

The Community will provide all of the necessary resources to support the NRC schedule and milestones. The Community's environmental expert will coordinate all necessary analysis and data gathering in support of the Community's portion of the EIS. The Community will provide all funds for travel assistance for Community personnel participating in the preparation of the EIS under the cooperating agency agreement.

8. Adequate lead time

The Community is fully able to consistently participate in meetings and document review in a timely fashion given reasonable notice.

9. NRC final decision-making authority

The Community accepts the fact that the NRC is the final decision-making authority on the scope of the analysis, including the authority to define the purpose and need for the proposed action.

10. Provision of data

Any conclusions offered by the Community will be based on a rationale and analysis provided in support of those conclusions.

11. Pre-decisional information

The Community is not required under state or Tribal law to release any pre-decisional data. Any release of information shall not be done in a manner that undermines or circumvents the agreement to work cooperatively before publishing draft or final analyses or documents.

12. Misrepresentation

The Community will act with the highest degree of integrity in implementing cooperating agency status. Nothing will be misrepresented.

Ronald Johnson
President

Lucy Taylor
Secretary

Johnny Johnson
Vice President

Victoria Winfrey
Treasurer

Shelley Buck-Yeager
Assistant Secretary/Treasurer

May 1, 2008

Terry Virden
Regional Director
Midwest Regional Office
Bureau of Indian Affairs
United States Department of Interior
Bishop Henry Whipple Federal Building
One Federal Drive, Room 550
Ft. Snelling, Minnesota 55111

Re: Prairie Island Nuclear Generating Plant

Dear Mr. Virden:

On behalf of the Prairie Island Indian Community in the State of Minnesota, we are writing to express our ongoing concerns about the Prairie Island Nuclear Generating Plant (PINGP), which is located adjacent to our Community here on Prairie Island, and to request the Bureau of Indian Affairs' assistance in connection with Xcel Energy's application to relicense the PINGP for an additional 20 years of operation. As you are aware, the PINGP's continued operation and the storage of nuclear waste storage just 600 yards from our Community are matters of critical concern to our Community. Although we will continue to monitor and participate in the relicensing process to the fullest extent possible to protect our Community's interests, we respectfully request the BIA's assistance and involvement in the process.

Xcel Energy's Application to Relicense the PINGP

On April 15, 2008, Xcel Energy filed its application with the Nuclear Regulatory Commission (NRC) to renew the operating licenses for the two reactors at the PINGP for an additional 20 years. The PINGP's current 40-year licenses will expire in 2013 and 2014.

Xcel Energy is also expected to file in the near future a Certificate of Need application with the Minnesota Public Utilities Commission to increase the number of used fuel storage containers at

5636 Sturgeon Lake Road • Welch, MN 55089
(651) 385-2554 • 800-554-5473 • Fax (651) 385-4180 • TTY 800-627-3529 Deaf of Hearing Impaired

Terry Virden
May 1, 2008
Page 2

Prairie Island and a Certificate of Need Application seeking to increase the generating capacity of each Prairie Island reactor by approximately 80 megawatts.

Xcel Energy's Dry Cask Storage Facility

The concrete pad on the storage site was designed to hold 48 casks and was licensed by the NRC to hold 48 casks. The 5.5 acre used storage facility on the plant site currently has 24 containers. Xcel is authorized for enough containers to accommodate the plant operation through expiration of the current licenses, which Xcel estimates to total about 29. According to Xcel, the application will seek to add 35 containers (for a total of 64) within the existing storage site boundaries to support plant operations during the license renewal period.

Each storage cask contains 40 spent fuel assemblies, which represents approximately 25 tons of nuclear waste. Accordingly, there are approximately 600 tons of nuclear waste currently stored on Prairie Island. If Xcel's request to for 64 total casks is approved, then roughly 1600 tons of nuclear waste will be stored indefinitely on Prairie Island within 600 yards of our Community and along the banks of the Mississippi River.

The Prairie Island Indian Community has very serious concerns about Xcel's proposed re-licensing and the potential increase in the amount of nuclear waste to be stored indefinitely near our tribal community. With no concrete solution to the storage problem, we question the wisdom of extending the life of this or any nuclear power plant.

We are extremely concerned about the prospect of re-licensing the PINGP, or any nuclear power plant, at this time. Until the federal government makes good on its promise to solve the nuclear waste storage issue, it is irresponsible to consider expanding the use of nuclear power in Minnesota or any state. According to the Department of Energy, there are 125 temporary nuclear waste storage sites throughout the country with more than 169 million Americans living within 75 miles of one of these temporary facilities. Prairie Island is among the closest.

Twenty-five years after Congress passed the Nuclear Waste Policy Act and mandated the establishment of a national repository, the future of the nation's nuclear waste disposal program remains very much in doubt. The NRC's Waste Confidence Rule (10 CFR 51.52) allows for on-site storage of spent fuel for 30 years beyond licensed life (up until 2063/2064 at PINGP) and states a repository will be available by 2025. Because of numerous delays and setbacks with Yucca Mountain, it is getting less likely that a repository will be available by 2025, if ever. Just because the rule says its so, doesn't make it so. No one in our tribe wants to live next to spent nuclear fuel for the rest of his or her lives.

Terry Virden
May 1, 2008
Page 3

Trust Roles and Responsibilities

The Bureau of Indian Affairs has been a trustee of our Community and its lands since our Tribe was organized in 1936. Planning for the PINGP took place throughout the 1960s. Northern States Power (Xcel Energy's predecessor-in-interest) applied for a construction permit in March 1967, a construction permit was issued for the PINGP in 1968, and construction was commenced shortly thereafter. NSP filed a request for operating licenses for PINGP's two reactors in February 1971. On or about January 22, 1973, the United States Atomic Energy Commission's (AEC) transmitted a Draft Environmental Statement, with a request for comment to various state and federal government entities, including the Minnesota Agency of the U.S. Department of Interior's Bureau of Indian Affairs. According to the AEC's Final Environmental Statement related to the Prairie Island Nuclear Generating Plant dated May 1973, the Minnesota Agency of the U.S. Department of Interior's Bureau of Indian Affairs did not submit any comments. This is extremely troubling given that the Final Environmental Statement makes only passing reference to our Community, and because the statement identifies burial mounds and an Indian village site on the PINGP site that were potentially disturbed during construction.

Benefits and Costs

It is worth noting that although tens of millions of dollars were spent to construct both the PINGP, the transmission infrastructure for the electricity generated at the plant, and the dry cask storage facility for the nuclear waste, apparently no effort was even made to provide our immediately-adjacent Community with access to the electricity generated by the PINGP. At a time when our Community was mired in poverty and a large percentage of our homes were without electricity or running water, the electricity generated by the PINGP was routed along the highest capacity power lines across the road from our homes and away from the Community.

And while we receive no benefit from the electricity generated at the plant, the costs imposed on our Community have been great. The fear, uncertainty and potential adverse health effects related to our close proximity to a nuclear power plant, high-voltage power lines and stored nuclear waste are costs that cannot be quantified. Our Community also bears costs associated with public safety, emergency planning, and the transportation of plant personnel, materials and equipment across our reservation.

In stark contrast, the City of Red Wing promptly annexed the PINGP site. The City of Red Wing and Goodhue County have received the benefit of millions of dollars in property taxes from Xcel during the PINGP's operation. And while our Community receives electricity that has been generated hundreds of miles away in the Dakotas (along with the service and quality problems that result from being so far away from the power source), here at Prairie Island the transmission lines carry the electricity generated by PINGP to homes and businesses in Red Wing and beyond.

Terry Virden
May 1, 2008
Page 4

Understanding the Past to Protect Our Community's Future

Based on this abbreviated history, and in connection with Xcel Energy's recent filing to relicense the PINGP, it is prudent to clarify the scope of the federal government's trust obligations to our Community vis-à-vis the construction and operation of the PINGP. Among other things, we are seeking to understand and chronicle any involvement the Bureau of Indian Affairs has had in the past that relates to the planning, construction and operation of the PINGP. Accordingly, we respectfully request that the Bureau of Indian Affairs provide answers to the following questions:

1. *What involvement, if any, did the Minnesota Agency or the BIA have in the planning, construction, or licensing of the PINGP?*
2. *What efforts, if any, did the Minnesota Agency or the BIA make to advise or assist the Prairie Island Indian Community in connection with the planning, construction or licensing of the PINGP?*
3. *Did the Minnesota Agency or the BIA receive the AEC's transmittal and request for comments on the AEC's Draft Environmental Statement for the PINGP on or about January 22, 1973?*
4. *Did the Minnesota Agency or the BIA respond to the AEC's request for comments on the Draft Environmental Statement for the PINGP in 1973?*
5. *If the Minnesota Agency or the BIA did respond, can you please provide us with a copy of the response?*
6. *If the Minnesota Agency or the BIA did not respond, can you please provide us with an explanation, if any, of the Minnesota Agency's inaction or decision not to comment on the Draft Environmental Statement for the PINGP?*

In addition to responses to these questions, we further request copies of all documents and records regarding the involvement, if any, of the Minnesota Agency or the BIA, during the planning, construction and opening of the PINGP.

Finally, we respectfully request the Bureau of Indian Affairs, as trustee for this Community and its lands, advise us what it intends to do to fulfill its trust obligations in connection with Xcel's application to relicense the PINGP's two reactors for an additional 20 years of operation, Xcel's Certificate of Need application for additional dry cask storage, and Xcel's Certificate of Need Application to increase the generating capacity of each Prairie Island reactor.

Terry Virden
May 1, 2008
Page 5

We appreciate your consideration of this request for information and assistance.

Sincerely,

Ronald Johnson
Tribal Council President

Johnny Johnson
Tribal Council Vice-President

Lucy Taylor
Tribal Council Secretary

Victoria Winfrey
Tribal Council Treasurer

Shelley Buck-Yeager
Tribal Council Assistant Secretary/Treasurer

cc: Carl J. Artman, Assistant Secretary - Indian Affairs
Jerry Gidner, Director of Bureau of Indian Affairs
Dale E. Klein, Chairman, Nuclear Regulatory Commission
Norm Coleman, U.S. Senator
Amy Klobuchar, U.S. Senator
John Kline, U.S. Congressman
Michele Bachmann, U.S. Congresswoman
Keith Ellison, U.S. Congressman
Betty McCollum, U.S. Congresswoman
James Oberstar, U.S. Congressman
Collin Peterson, U.S. Congressman
Jim Ramstad, U.S. Congressman
Timothy Walz, U.S. Congressman
John S. Roberts, Special Assistant to the President for Intergovernmental Affairs

1

May 2, 2008

Mr. Ronald Johnson
Tribal Council President
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

Dear Mr. Johnson:

This is in response to your April 14, 2008, letter to Dr. Samson Lee of the U.S. Nuclear Regulatory Commission (NRC or staff) and your request to participate as a cooperating agency in the environmental review for Prairie Island Nuclear Generating Plant (PINGP) license renewal.

To establish a framework for cooperation and coordination between the NRC and the Prairie Island Indian Community (PIIC), the staff has prepared the enclosed draft Memorandum of Understanding (MOU), which is being provided to you for review and comment. The draft MOU describes the respective roles and responsibilities of the NRC and the PIIC. It also defines the areas of special expertise and information that could be provided by the PIIC to assist the staff in its environmental review.

After mutual agreement to the terms of the PIIC's participation in the staff's environmental review process for the PINGP license renewal application (LRA) as described in the MOU and subsequent signature by both parties, cooperating agency status for the PIIC would become effective. To ensure that the MOU can be finalized before the staff completes its acceptance review of the PINGP application, we request your comments by May 15, 2008.

Thank you again for your interest in participating in the environmental review for PINGP license renewal. We look forward to receiving your comments on the enclosed draft MOU and future dialogue with the PIIC. If you need further assistance in this matter, please contact Mr. Tommy Le of my staff at 301-415-1458.

Sincerely,

\RA Catherine Haney for\

J. E. Dyer, Director
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: Heather J. Westra

From: Heather Westra [hwestra@piic.org]
Sent: Thursday, May 15, 2008 2:58 PM
To: Ngoc Le
Cc: Rani Franovich
Subject: Draft MOU
Attachments: Draft MOU markup 051408.doc

Hi Tommy and Rani

We have been working on the draft MOU and attached you will find our suggestions (we have used red, as you will see). As of Wednesday, we had not received the official letter transmitting the MOU. Perhaps you could fax it to (651) 385-4180

I also wanted to let you know that the Prairie Island Pow Wow will be held July 11, 12, and 13. The hotel at Prairie Island will be full, and many other area hotels will be full, in case you were planning to conduct the Environmental Audit around that time.

Please feel free to call me with any questions regarding our suggestions for the MOU.

Best regards,
Heather

Heather Westra

Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089
(651) 329-5796
hwestra@piic.org

June 14, 2008

Mr. Ronald Johnson
Tribal Council President
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

Dear Mr. Johnson:

By letter dated April 14, 2008, to Dr. Samson Lee of the U.S. Nuclear Regulatory Commission (NRC or staff), you requested to participate as a cooperating agency in the environmental review for Prairie Island Nuclear Generating Plant (PINGP) license renewal. On May 2, 2008, the staff forwarded to you a proposed memorandum of understanding (MOU) to establish a framework for cooperation and coordination between the NRC and the Prairie Island Indian Community (PIIC). Ms. Heather Westra subsequently suggested changes to the staff's proposed MOU, which the staff took into consideration in finalizing the document.

Enclosed for your signature is the final MOU, which has been signed by me. Once you have signed the MOU, you may wish to retain a copy for your records. I request that you return the original to Mr. Richard Plasse of my staff.

Thank you again for your interest in participating as a Cooperating Agency in the environmental review for PINGP license renewal. The NRC recognizes that close cooperation with the PIIC will lead to a more effective and complete environmental review, and we look forward to this collaborative process. If you need further assistance in this matter, please contact Mr. Richard Plasse of my staff at 301-415-1427.

Sincerely,

/RA/

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

Enclosure:
As stated

cc: Heather J. Westra

Memorandum of Understanding Between
The U.S. Nuclear Regulatory Commission
and
The Prairie Island Indian Community
as a Cooperating Agency

I. Introduction

This Memorandum of Understanding (MOU) establishes a cooperating agency relationship between the U.S. Nuclear Regulatory Commission (NRC) and the Prairie Island Indian Community (PIIC) for the purpose of preparing the Supplemental Environmental Impact Statement (SEIS) for renewing the licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP).

The NRC shall be the lead federal agency, and shall supervise the preparation of the PINGP SEIS. The NRC acknowledges that the PIIC requested to be a Cooperating Agency for preparation of the PINGP SEIS. The NRC grants the PIIC's request and recognizes the PIIC has special expertise in the following areas listed in Section IV B. of this document. This MOU describes responsibilities and procedures agreed to by the PIIC, as a Cooperating Agency, and the NRC, as the Lead Agency; the PIIC and the NRC are the Parties to this MOU.
The cooperating agency relationship established through this MOU shall be governed by all applicable statutes, regulations, and policy, including the NRC's regulations (in particular 10 C.F.R. Part 51).

II. Purpose

The purposes of this MOU are:

A. To designate the PIIC as a Cooperating Agency in the PINGP SEIS process.

B. To provide a framework for cooperation and coordination between the NRC and the PIIC that will aid in the successful completion of the PINGP SEIS in a timely, efficient, and thorough manner.

C. To recognize that the NRC is the lead agency with responsibility for the completion of the PINGP SEIS.

D. To describe the respective responsibilities, jurisdictional authority, and expertise of each of the Parties in the planning process.

- 1 -

III. Authorities for the MOU

A. The authorities of the NRC to enter into and engage in the activities described within this MOU include, but are not limited to:

1. National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 *et seq.*)

2. The Atomic Energy Act (42 U.S.C. 2011 *et seq.*)

3. The NRC regulations (10 C.F.R. Part 51 – *Code of Federal Regulations*, Title 10, Energy, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulation Functions.")

B. The authorities of the PIIC to enter into and engage in the activities described within this MOU include, but are not limited to:

1. The Department of Interior regulations (25 U.S.C. Section 476bb -.*United States Code*, Title 25, Indians, Chapter 14, Miscellaneous, Subchapter II, Indian Self-Determination and Education Assistance, Part D - Tribal Self-Governance).

2. The Constitution and Bylaws adopted by the Tribal Members on May 23, 1936, and approved by the Secretary of the Interior on June 20, 1936, as amended.

IV. Roles and Responsibilities

A. The NRC Responsibilities:

1. As lead agency, the NRC retains final responsibility for the content of all documents, which include the Draft PINGP SEIS and the Final PINGP SEIS. The NRC's responsibilities include identifying the purpose of and need for the PINGP SEIS; selecting alternatives for analysis; determining effects of the proposed alternatives; making recommendations on the proposed action; evaluating appropriate mitigation measures; and preparing the draft and final SEIS for PINGP's license renewal. In meeting these responsibilities, the NRC will follow the guidance set forth in NUREG-1555, Supplement 1, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*; and all applicable statutory and regulatory requirements.

2. To the fullest extent consistent with its responsibility as lead agency, the NRC will utilize the comments, recommendations, data, and/or analyses provided by the PIIC in the PINGP SEIS process, giving particular weight to those topics on which the PIIC is acknowledged to possess special expertise.

3. The NRC will provide the PIIC with copies of documents underlying the PINGP SEIS relevant to the PIIC's responsibilities, including technical reports, data, analyses, comments received, and sections of substantive working drafts of the Draft and Final SEIS specific to the PIIC's areas of special expertise, subject to the NRC's information handling requirements.

- 2 -

4. The NRC staff will identify milestones in the standard license renewal review schedule to incorporate activities listed in Attachment B to this MOU.

B. Cooperating Agency Responsibilities:

1. The PIIC is a Cooperating Agency for developing the PINGP SEIS and is recognized to have special expertise in the following areas as they relate to the PIIC:

   a. Historic and Archeological Resources
   b. Socioeconomics
   c. Land Use
   d. Environmental Justice

2. The PIIC will work with the NRC to mutually coordinate, prioritize, identify and manage tasks to provide information, comments, and technical expertise to the NRC regarding those topics, and the data and analyses supporting them, in which it has special expertise or for which the PIIC requests its participation. The NRC and the PIIC will identify staff to implement and coordinate these activities. In particular, the PIIC may provide information on the following topics:

   a. Identification and preservation of the PIIC historic, cultural and archaeological Indian tribe resources
   b. Socioeconomic data and analysis directly related to the PIIC
   c. Land use data and analysis directly related to the PIIC
   d. Environmental justice data and analysis directly related to the PIIC

3. Within its areas of expertise, the PIIC may participate in any of the activities identified in Attachment A. These activities include, but are not limited to: identifying data needs, identifying effects of alternatives, identifying cumulative impacts, suggesting mitigation measures, and providing written comments on sections of substantive working drafts of the Draft and Final SEIS and supporting documents.

4. When the PIIC provides information, technical analyses, data sets or comments, it will provide the data and other information to be used in developing the PINGP SEIS, within the schedule identified in Attachment B.

C. Responsibilities of the Parties:

1. The Parties agree to participate in this planning process in good faith and make all reasonable efforts to resolve disagreements.

2. The Parties agree to comply with the review schedule, which incorporates specific milestones provided in Attachment B and includes dates for PINGP SEIS milestones and timeframes for PIIC's reviews and submissions.

3. Each Party agrees to fund its own expenses and costs associated with the PINGP SEIS process.

V. **Other Provisions**

A. **Authorities Not Altered.** Nothing in this MOU alters, limits, or supersedes the authorities and responsibilities of any Party on any matter within their respective jurisdictions. Nothing in this MOU shall require any of the Parties to perform beyond its respective authority.

B. **Financial Obligations.** Nothing in this MOU shall require any of the Parties to assume any obligation or expend any sum in excess of authorization and appropriations available. This MOU does not obligate any funding.

C. **Immunity and Defenses Retained.** Each Party retains all immunities and defenses provided by law with respect to any action based on or occurring as a result of this MOU. The PIIC does not waive sovereign immunity by entering into this MOU and specifically retains immunity and all defenses available to it as a sovereign identity and all other applicable laws.

D. **Conflict of Interest.** The Parties agree not to utilize any individual for purposes of environmental analysis, or the PIIC representation, including officials, employees, or third party contractors, having a financial interest in the outcome of the PINGP SEIS.

E. **Documenting Disagreement or Inconsistency.** As described in IV.B.3 above, the NRC staff will provide an opportunity for the PIIC to review sections of substantive working drafts of the Draft and Final SEIS specific to the PIIC's areas of special expertise. Where the NRC and the PIIC disagree on significant elements of the PINGP SEIS (such as designation of the alternatives to be analyzed or analysis of effects), and these disagreements cannot be resolved, the PIIC may document its views and submit them as comments to the Draft and Final SEIS.

F. **Management of Information.** The PIIC acknowledges that all data and information provided will become part of the NRC's official record and will be available for public review, except that NRC may withhold information from the public that is exempt from disclosure under the Freedom of Information Act and other applicable statutory authorities. The PIIC agrees that internal working draft documents for the development of the PINGP SEIS will not be made available for review by individuals or entities other than the Parties to this MOU.

Information the PIIC considers confidential, proprietary, Sensitive Unclassified Non-Safeguards Information or protected under NRC regulations will be labeled according to requirements in 10 C.F.R. § 2.390. In particular, all signatories and concurring parties shall ensure that shared data, including data concerning the precise location and nature of historic properties and properties of religious and cultural significance are protected from public disclosure to the greatest extent permitted by law, including conformance to Section 304 of the National Historic Preservation Act, as amended and Section 9 of the Archaeological Resources Protection Act and Executive Order No. 13007 on Indian Sacred Sites (*Federal Register*, Vol. 61 No. 104, May 24, 1996).

In cases where the license applicant provides information it considers confidential or proprietary, PIIC agrees that such information is to be held confidential and kept separate from the information necessary for the environmental analysis. Should the PIIC cause any distribution of confidential or proprietary information to occur, the PIIC

- 4 -

will return the information to the NRC and the PIIC may have its cooperating agency status terminated.

The PIIC agrees that in order to allow full and frank discussion of preliminary analysis and recommendations, meetings to review such pre-decisional and deliberative documents will not be open to the public.

G. **Responsibility for Decision Making.** While the Parties agree to make reasonable efforts to resolve procedural and substantive disagreement, they acknowledge that the NRC retains final responsibility for the decisions identified in the PINGP SEIS.

H. **MOU Limitations.** Nothing in this MOU is intended to confer a binding or enforceable right of action on any party.

I. **Retention of Rights.** Cooperating agency status for the PINGP SEIS does not preclude the PIIC from participating in the NEPA process according to the provisions in 10 C.F.R. Part 51.

VI. **Agency Representatives**
Each Party will designate a representative and alternate representative, as described in Attachment C, to ensure coordination between the PIIC and the NRC during the planning process. Each Party may change its representative at will by providing written notice to the other Party.

VII. **Administration of the MOU**

A. **Approval.** This MOU becomes effective upon signature by the authorized officials of all the Parties.

B. **Amendment.** This MOU may be amended through written agreement of all signatories.

C. **Termination.** If not terminated earlier, this MOU will end when the Final PINGP SEIS is issued by the NRC. Any Party may end its participation in this MOU by providing written notice to the other Party.

D. **Entirety of Agreement.** This MOU, including Attachments A, B, and C, consisting of nine (9) pages represents the entire and integrated MOU between the parties and supersedes all prior negotiations, representations, and agreements, whether written or oral.

- 5 -

VIII. Signatures

The Parties hereto have executed this MOU on the dates shown below.

/Original signed by R. Johnson/	June 17, 2008
Ronald Johnson, Tribal Council President Prairie Island Indian Community (Cooperating Agency) 5636 Sturgeon Lake Road Welch, MN 55089	Date
/Original signed by E. Leeds/	June 14, 2008
Eric Leeds, Director Office of Nuclear Reactor Regulation U. S. Nuclear Regulatory Commission (Lead Agency) 11545 Rockville Pike Rockville, Maryland 20852	Date

- 6 -

Attachment A

Opportunities for Cooperating Agency Participation in the PINGP SEIS

	PINGP SEIS Stage	Potential Activities of the Prairie Island Indian Community (PIIC) within its acknowledged areas of special expertise
1	Conduct scoping and identify issues	Identify significant issues; identify relevant local and regional organizations and interest groups.
2	Collect inventory data	Identify data needs; provide data and technical analyses within the PIIC's areas of special expertise.
3	Estimate effects of alternatives	Provide effects analysis and/or comments within the PIIC's areas of special expertise; identify effects within the PIIC's areas of special expertise.
4	Propose mitigation measures	Suggest mitigation measures to reduce impacts of proposed action and alternatives. Decision to select mitigation measures for analysis is reserved to the NRC.
5	Select the preliminary recommendation regarding the proposed action; issue Draft PINGP SEIS	Collaborate with the NRC project manager in evaluating alternatives and in developing criteria for selecting the preliminary recommendation regarding the proposed action; provide input on sections of substantive working drafts of the Draft SEIS specific to the PIIC's areas of special expertise, subject to the NRC's information handling requirements. The PIIC may provide written, public comments on the Draft SEIS, if desired. Decision to select the preliminary recommendation is reserved to the NRC.
6	Respond to comments	Review comments within the PIIC's areas of special expertise and assist in preparing responses, as appropriate.
7	Working draft of the Final PINGP SEIS	NRC staff will provide sections of substantive working drafts of the Final SEIS specific to the PIIC's areas of special expertise for its review in accordance with this MOU.
8	Select the final recommendation regarding the proposed action; issue Final PINGP SEIS	Action reserved to the NRC.

- 7 -

Attachment B

Schedule

	Potential Activities of Cooperating Agency (PIIC) within its acknowledged areas of expertise	Input to NRC needed by
1	Provide data and information identified under Section IV(B)(2) of the MOU to NRC.	Within 60 calendar days of MOU signing by NRC and PIIC representatives
2	Provide review comments on sections of substantive working drafts of the Draft SEIS specific to the PIIC's areas of special expertise before it is sent to publishing as an official Draft SEIS for public comments; attend draft SEIS review meeting.	Within 15 business days of receiving applicable sections of the working draft of the Draft SEIS for review
3	Provide comments on the Draft SEIS, as appropriate.	Within the time period identified in the *Federal Register* Notice for publication of the Draft SEIS for public comment
4	Provide comments on sections of substantive working drafts of proposed responses to public comments on the Draft SEIS, specific to the PIIC's areas of special expertise.	Within 10 business days of receiving draft compilation of comments and responses
5	Provide comments on sections of substantive working drafts of the Final SEIS, specific to the PIIC's areas of special expertise.	Within 15 business days of receiving applicable sections of the working draft of the Final SEIS for review

- 8 -

Agency Representatives

U.S. Nuclear Regulatory Commission

Primary Representative: Richard Plasse, Project Manager
(301) 415-1427

Backup Representative: To Be Determined

Prairie Island Indian Community

Primary Representative: Heather J. Westra, Interim Director
Land and Environment Department
(651) 329-5796

Backup Representative: Philip R. Mahowald, General Counsel
(651) 267-4006

PRAIRIE ISLAND INDIAN COMMUNITY
LEGAL DEPARTMENT

June 17, 2008

Mr. Richard Plasse, Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2746

Via Federal Express

Re: *Memorandum of Understanding*

Dear Mr. Plasse:

Enclosed please find the fully executed Memorandum of Understanding between the U.S. Nuclear Regulatory Commission (NRC) and the Prairie Island Indian Community (Community) as a cooperating agency in the environmental review for the Prairie Island Nuclear Generating Plant license renewal. The Community looks forward to collaborating with the NRC to complete the environmental review.

Sincerely,

Philip R. Mahowald
General Counsel for the
Prairie Island Indian Community

PRM/nj

Enc.

5638 Sturgeon Lake Road • Welch, MN 55089
(651) 385-4136 • 800-554-5473 • Fax (651) 385-2548 • TTY 800-627-3529 Deaf of Hearing Impaired

July 10, 2008

Mr. Don L. Klima, Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
1100 Pennsylvania Ave, NW, Suite 803
Washington, DC 20004

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Klima:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application to renew the operating licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), located in Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. PINGP is operated by Nuclear Management Company, LLC (NMC). The application for renewal was submitted by NMC in a letter dated April 11, 2008, pursuant to Title 10 of the *Code of Federal Regulations Part* 54 (10 CFR Part 54).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969. In accordance with 36 CFR 800.8(c), the SEIS will include analyses of potential impacts to historic and cultural resources.

The NRC has signed a Memorandum of Understanding (MOU) with the Prairie Island Indian Community (PIIC) for the PINGP license renewal environmental review (Enclosure). The MOU establishes a cooperating agency relationship between the NRC and the PIIC, with the NRC as lead agency responsible for preparing the SEIS.

On July 30, 2008, the NRC will conduct two public meetings. The first session will be held in the afternoon and an identical session will be held later that evening. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. You and your staff are invited to attend the public meetings. In addition, during the week of August 18, 2008, the NRC staff plans to conduct a site audit at PINGP. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is March 2009.

D. Klima -2-

If you have any questions or require additional information, please contact the License Renewal Project Manager, Mr. J.P. Leous, at 301-415-2864 or Justin.Leous@nrc.gov.

Sincerely,

\RA\

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosure:
As stated

cc: See next page

July 21, 2008

Mr. Philip R. Mahowald
General Counsel
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Mahowald:

As you know, the U.S. Nuclear Regulatory Commission (NRC or the staff) recently received an application from Nuclear Management Company, LLC (NMC), for the renewal of the operating licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis.

Under NRC regulations, the original operating license for a nuclear power plant is issued for up to 40 years. The license may be renewed for up to an additional 20 years if NRC requirements are met. The current operating licenses for PINGP will expire in August 9, 2013 and October 29, 2014. The proposed license renewal for PINGP Units 1 and 2 would include the use and continued maintenance of existing plant facilities and transmission lines. For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of this refurbishment activity, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states that there will be no clearing of previously-undisturbed areas. Provided for your information is the PINGP site boundary map (Enclosure 1) and transmission system map (Enclosure 2).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of Title 10 of the *Code of Federal Regulations*, Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969 (NEPA). Additionally, as outlined in Section 51.28(b), the NRC's process includes an opportunity for public and inter-governmental participation. In accordance with 36 CFR 800.8(c), the SEIS will include analyses of potential impacts to historic and cultural resources. The NRC recognizes the Prairie Island Indian Community's (PIIC) expertise in historic and archeological resources, land use, socioeconomics and environmental justice. As outlined in our Memorandum of Understanding, the PIIC has offered to contribute to staff's analysis in these areas.

The GEIS considered the environmental impacts of renewing nuclear power plant operating licenses for a 20-year period on all currently operating sites. In the GEIS the NRC staff identified 92 environmental issues and developed generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. For the remaining 23 issues, plant-specific analyses will be documented in a SEIS. As part of its environmental review, staff considers any new and significant information related to Category 1 issues dispositioned generically in the GEIS. If new and significant information is identified that calls into question conclusions reached in the GEIS, staff's analysis will be documented within the SEIS for PINGP.

The SEIS will document the staff's review of environmental impacts related to land use, environmental justice, terrestrial ecology, aquatic ecology, hydrology, cultural resources, and socioeconomic issues (among others), and will contain a recommendation regarding the environmental acceptability of the license renewal action.

In addition to the PIIC's involvement in the NRC's technical review of land use, socioeconomics, cultural resources and archeology and environmental justice, we are soliciting your comments on the full scope of the environmental review. Please submit any comments that you may have to offer on the scope of the environmental review by September 22, 2008. Written comments should be submitted by mail to the Chief, Rules and Directives Branch, Division of Administrative Services, Mail Stop T-6D59, U.S. Nuclear Regulatory Commission, Washington D.C. 20555-0001. Electronic comments may be submitted to the NRC by e-mail at PrairieIslandEIS@nrc.gov.

To accommodate interested members of the public, the NRC will hold two public scoping meetings for the PINGP license renewal environmental review on July 30, 2008. The first session will be held in the afternoon and an identical session will be held later that evening. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. Additionally, the NRC staff will host informal discussions one hour before the start of each session. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066.

The PINGP license renewal application and the GEIS are available on the internet at http://www.nrc.gov/reactors/operating/licensing/renewal/applications/prairie-island.html. In addition, the Red Wing Public Library has agreed to make the license renewal application and the GEIS available for public inspection; 225 East Avenue, Red Wing, MN 55066. The staff expects to publish the draft SEIS in March 2009. Although the PIIC will be involved in preparing specific sections of the SEIS related to areas of its specialized expertise, a copy of the document will be sent to you for your review and comment on the entire draft SEIS. The NRC will hold another set of public meetings in the site vicinity to solicit comments on the draft SEIS.

P. Mahowald - 3 -

After consideration of public comments received, and collaborative work with the PIIC to resolve comments under the framework of the MOU, the NRC will prepare a final SEIS, which is scheduled to be issued in October, 2009. If you need additional information regarding the license renewal review process, please contact Mr. J.P. Leous, License Renewal Project Manager, at 301-415-2864 or at Justin.Leous@nrc.gov.

Sincerely,

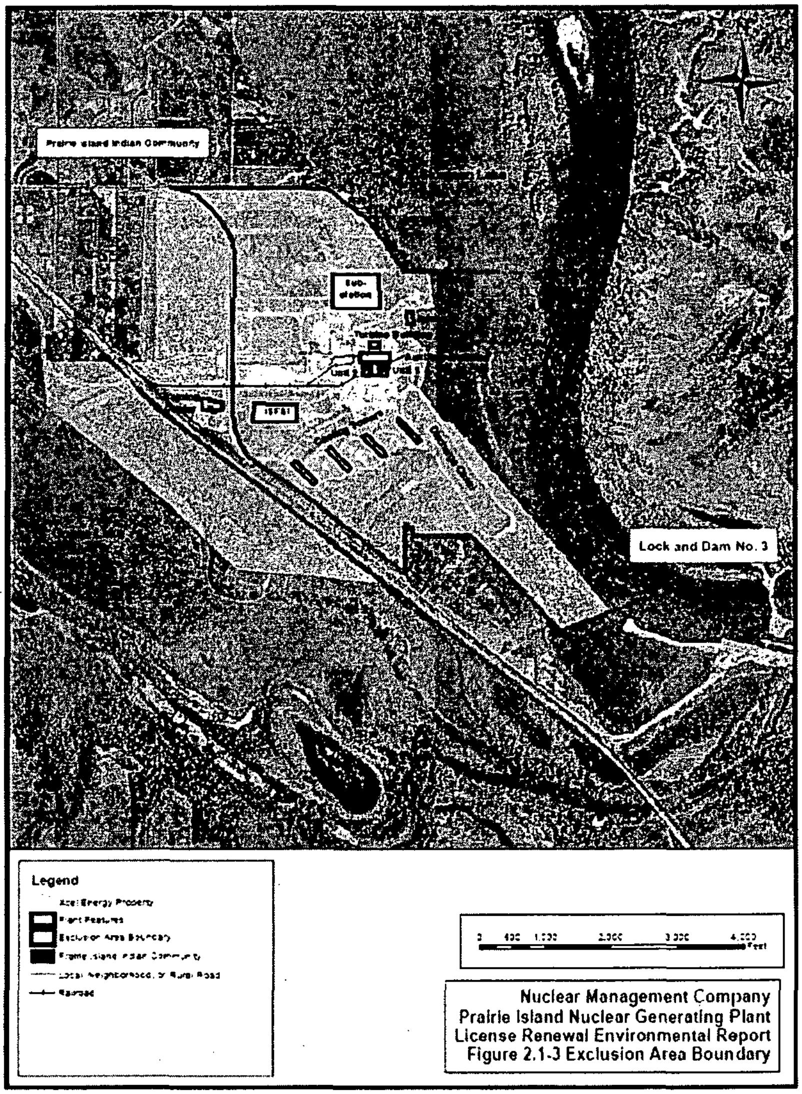
\RA Andrew Stuyvenberg for

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

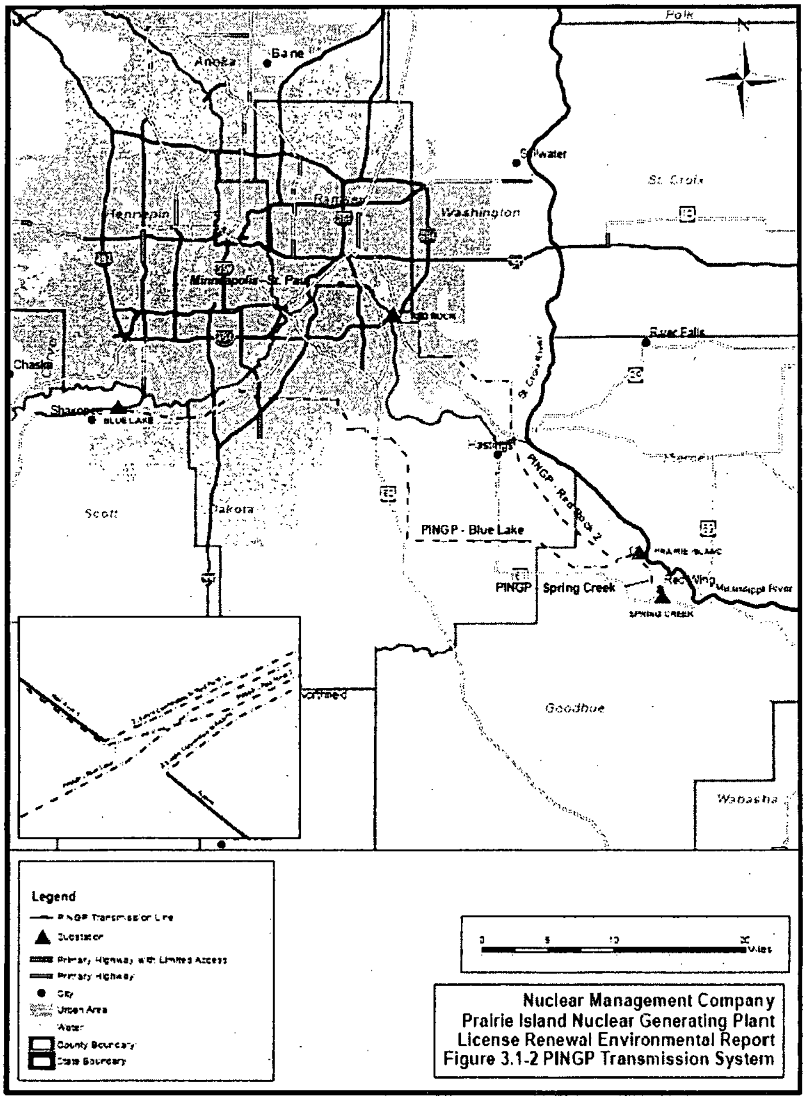
Enclosures:
As stated

cc w/encls.: See next page



Nuclear Management Company
Prairie Island Nuclear Generating Plant
License Renewal Environmental Report
Figure 2.1-3 Exclusion Area Boundary

ENCLOSURE 1


Polk
St. Croix
Anoka
Hennepin
Ramsey
Washington
Minneapolis - St. Paul
Chaska
Shakopee
River Falls
Hastings
Scott
Dakota
PINGP - Blue Lake
PINGP - Red Rock 2
PINGP - Spring Creek
Red Wing
Goodhue
Wabasha
Legend
PINGP Transmission Line
Substation
Primary Highway with Limited Access
Primary Highway
City
Urban Area
Water
County Boundary
State Boundary
Miles
Nuclear Management Company
Prairie Island Nuclear Generating Plant
License Renewal Environmental Report
Figure 3.1-2 PINGP Transmission System

ENCLOSURE 2

July 22 2008

Mr. Terrance Virden
Midwest Regional Director
U.S. Bureau of Indian Affairs
1 Federal Drive
Room #550
Fort Snelling, MN 55111

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Virden:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application to renew the operating licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. PINGP is operated by Nuclear Management Company, LLC (NMC). The application for renewal was submitted by NMC in a letter dated April 11, 2008, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969 (NEPA). In accordance with 36 CFR 800.8(c), the SEIS will include analyses of potential impacts to historic and cultural resources.

In the context of the National Historic Preservation Act of 1966, as amended, the NRC staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs that may be impacted by post-license renewal land-disturbing operations or projected refurbishment activities associated with the proposed action. The APE may extend beyond the immediate environs in those instances where post- license renewal land-disturbing operations or projected refurbishment activities specifically related to license renewal may potentially have an effect on known or proposed historic sites. This determination is made irrespective of ownership or control of the lands of interest. For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of this refurbishment activity, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states that there will be no clearing of previously-undisturbed areas.

The NRC has signed a Memorandum of Understanding (MOU) with the Prairie Island Indian Community (PIIC) for the PINGP license renewal environmental review (Enclosure). The MOU establishes a cooperating agency relationship between the NRC and the PIIC, with the NRC as lead agency responsible for preparing the SEIS.

T. Virden - 2 -

On July 30, 2008, the NRC will conduct two public NEPA scoping meetings. The first session will be held in the afternoon and an identical session will be held later that evening. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. You and your staff are invited to attend. Your office will receive a copy of the draft SEIS along with a request for comments. The staff expects to publish the draft SEIS in March 2009.

If you have any questions or require additional information, please contact Mr. J.P. Leous, License Renewal Project Manager, by phone at 301-415-2864 or by e-mail at Justin.Leous@nrc.gov.

Sincerely,

/RA by AStuyvenberg for/

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosure:
As stated

cc w/encl: See next page

July 22, 2008

Ms. Heather Westra
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Ms. Westra:

As you know, the U.S. Nuclear Regulatory Commission (NRC or the staff) recently received an application from Nuclear Management Company, LLC (NMC), for the renewal of the operating licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis.

Under NRC regulations, the original operating license for a nuclear power plant is issued for up to 40 years. The license may be renewed for up to an additional 20 years if NRC requirements are met. The current operating licenses for PINGP will expire in August 9, 2013 and October 29, 2014. The proposed license renewal for PINGP Units 1 and 2 would include the use and continued maintenance of existing plant facilities and transmission lines. For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of this refurbishment activity, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states that there will be no clearing of previously-undisturbed areas. Provided for your information is the PINGP site boundary map (Enclosure 1) and transmission system map (Enclosure 2).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, will be prepared under the provisions of Title 10 of the *Code of Federal Regulations*, Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969 (NEPA). Additionally, as outlined in Section 51.28(b), the NRC's process includes an opportunity for public and inter-governmental participation. In accordance with 36 CFR 800.8(c), the SEIS will include analyses of potential impacts to historic and cultural resources. The NRC recognizes the Prairie Island Indian Community's (PIIC) expertise in historic and archeological resources, land use, socioeconomics and environmental justice. As outlined in our Memorandum of Understanding, the PIIC has offered to contribute to staff's analysis in these areas.

H. Westra - 2 -

The GEIS considered the environmental impacts of renewing nuclear power plant operating licenses for a 20-year period on all currently operating sites. In the GEIS the NRC staff identified 92 environmental issues and developed generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. For the remaining 23 issues, plant-specific analyses will be documented in a SEIS. As part of its environmental review, staff considers any new and significant information related to Category 1 issues dispositioned generically in the GEIS. If new and significant information is identified that calls into question conclusions reached in the GEIS, staff's analysis will be documented within the SEIS for PINGP.

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After consideration of public comments received, and collaborative work with the PIIC to resolve comments under the framework of the MOU, the NRC will prepare a final SEIS, which is scheduled to be issued in October, 2009. If you need additional information regarding the license renewal review process, please contact Mr. J.P. Leous, License Renewal Project Manager, at 301-415-2864 or at Justin.Leous@nrc.gov.

Sincerely,

*\RA Andrew Stuyvenberg for *

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosures:
As stated

cc w/encls: See next page

July 22, 2008

Ms. Lisa A. Joyal
Endangered Species Environmental Review Coordinator
Natural Heritage and Nongame Research Program
Minnesota Department of Natural Resources
500 Lafayette Road
Box 25
St. Paul, MN 55155

SUBJECT: REQUEST FOR LIST OF STATE-PROTECTED SPECIES AND IMPORTANT HABITATS WITHIN THE AREA UNDER EVALUATION FOR THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Ms. Joyal:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by Nuclear Management Company, LLC (NMC), for the renewal of the operating licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP). PINGP is located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. As part of the review of the license renewal application (LRA), the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437, under the provisions of Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51), the NRC's regulation that implements the National Environmental Policy Act (NEPA) of 1969. The SEIS includes an analysis of pertinent environmental issues, impacts to endangered or threatened species and other fish and wildlife.

NMC is requesting renewal of its operating licenses for PINGP for a period of 20 years beyond the expiration of the current license terms of August 9, 2013, and October 29, 2014, respectively. This proposed action would include the use and continued maintenance of existing plant facilities and transmission lines. For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of these refurbishment activities, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states there will be no clearing of previously-undisturbed areas.

The PINGP site encompasses approximately 578 acres, and is located on the western shore of Sturgeon Lake. Prairie Island, upon which PINGP is located, is a low island terrace in the Mississippi River; please see the attached site boundary map (Enclosure 1). The Prairie Island Indian Reservation is directly north of the site.

One 161-kilovolt (kV) and four 345-kV transmission lines connect Prairie Island to the regional transmission system; please see the attached Prairie Island transmission system map (Enclosure 2). To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests information on state-listed, proposed, and candidate species and critical habitat that may be in the vicinity of PINGP and its associated

L. Joyal - 2 -

transmission line corridors. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

The NRC staff plans to hold two public NEPA scoping meetings on July 30, 2008. The first session will be held in the afternoon and an identical session will be held later that evening. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. In addition, during the week of August 18, 2008, the NRC plans to conduct a site audit. You and your staff are invited to attend both the public meetings and the site audit. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is March 2009.

If you have any questions concerning the NRC staff's review of this license renewal application, please contact Mr. J.P. Leous, License Renewal Project Manager, at 301-415-2864 or by e-mail at Justin.Leous@nrc.gov.

Sincerely,

/RA by AStuyvenberg for/

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosures:
As stated

cc w/encls: See next page

July 22, 2008

Mr. Tony Sullins
Field Supervisor
U.S. Fish & Wildlife Service
Twin Cities Ecological Services Office
4101 East 80th Street
Bloomington, MN 55425

SUBJECT: REQUEST FOR LIST OF FEDERALLY PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Sullins:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by Nuclear Management Company, LLC (NMC), for the renewal of the operating licenses for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP). PINGP is located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. As part of the review of the license renewal application (LRA), the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51), the NRC's regulation that implements the National Environmental Policy Act (NEPA) of 1969. The SEIS includes an analysis of pertinent environmental issues, including impacts to endangered or threatened species and other fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

NMC is requesting renewal of its operating licenses for PINGP for a period of 20 years beyond the expiration of the current license terms of August 9, 2013, and October 29, 2014, respectively. This proposed action would include the use and continued maintenance of existing plant facilities and transmission lines. For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of this refurbishment activity, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states there will be no clearing of previously-undisturbed areas.

The PINGP site encompasses approximately 578 acres and is located on the western shore of Sturgeon Lake. Prairie Island, upon which PINGP is located, is a low island terrace in the Mississippi River; please see the enclosed site boundary map (Enclosure 1). The Prairie Island Indian Reservation is directly north of the site.

PINGP has three cooling system operating modes: once-through, once-through with "helper" (mechanical draft) cooling towers in operation, and closed cycle (mechanical draft cooling towers only). The circulating water and service water systems withdraw water from the Mississippi River. Three groundwater wells are used to meet domestic water needs. River water moves into the intake screenhouse, where the circulating water pumps are housed, through eight intake bays, each equipped with a trash rack, a traveling screen, and high/low pressure wash systems. Four circulating water pumps supply water to the condensers for cooling. Each pump has a design capacity of 147,000 gpm, with a total circulating water flow of approximately 588,000 gpm. Conditions outlined in NMC's National Pollutant Discharge Elimination System permit specify requirements for use of the cooling towers to minimize effects on local aquatic resources.

One 161-kilovolt (kV) and four 345-kV transmission lines connect PINGP to the regional transmission system; please see the enclosed PINGP transmission system map (Enclosure 2). To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests information on federally-listed, proposed, and candidate species and critical habitat that may be in the vicinity of PINGP and its associated transmission line corridors. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

The NRC staff plans to hold two public NEPA scoping meetings on July 30, 2008. The first session will be held in the afternoon and an identical session will be held later that evening. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. In addition, during the week of August 18, 2008, the NRC plans to conduct a site audit. You and your staff are invited to attend both the public meetings and the site audit. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is March 2009.

If you have any questions concerning the NRC staff's review of this LRA, please contact Mr. J.P. Leous, License Renewal Project Manager, at 301-415-2864 or Justin.Leous@nrc.gov.

Sincerely,

/RA by AStuyvenberg for/

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosures:
As stated

cc w/encls: See next page

July 22, 2008

Emily Rusch, Environmental Review Assistant
Wisconsin Department of Natural Resources
Bureau of Endangered Species
PO Box 7921
Madison, WI 53707

SUBJECT: REQUEST FOR LIST OF STATE-PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Ms. Rusch:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by Nuclear Management Company, LLC (NMC), for the renewal of the operating licenses for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP). PINGP is located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. As part of the review of the license renewal application (LRA), the NRC is preparing a Supplemental Environmental Impact Statement (SEIS) under the provisions of Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR Part 51), the NRC's regulation that implements the National Environmental Policy Act (NEPA) of 1969. The SEIS includes an analysis of pertinent environmental issues, including impacts to endangered or threatened species and fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

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One 161-kilovolt (kV) and four 345-kV transmission lines connect PINGP to the regional transmission system; please see the enclosed PINGP transmission system map.
To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests information on state-listed, proposed, and candidate species and critical habitat that may be in the vicinity of PINGP and its associated transmission line corridors. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

The NRC staff plans to hold two public NEPA scoping meetings on July 30, 2008. The first session will be held in the afternoon and an identical session will be held later that evening. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. In addition, during the week of August 18, 2008, the NRC plans to conduct a site audit. You and your staff are invited to attend both the public meetings and the site audit. Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is March 2009.

If you have any questions concerning the NRC staff's review of this LRA, please contact Mr. J.P. Leous, License Renewal Project Manager, at 301-415-2864 or Justin.Leous@nrc.gov.

Sincerely,

/RA by AStuyvenberg for/

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosures:
As stated

cc w/encls: See next page

July 22, 2008

Mr. Dennis A. Gimmestad
Government Programs and Compliance Officer
State Historic Preservation Officer
Minnesota Historical Society
345 Kellogg Boulevard West
Saint Paul, MN 55102-1903

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Gimmestad:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application to renew the operating licenses for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. PINGP is operated by Nuclear Management Company, LLC (NMC). The application for renewal was submitted by NMC in a letter dated April 11, 2008, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54).

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal action, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437, will be prepared under the provisions of 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969 (NEPA). In accordance with 36 CFR 800.8(c), the SEIS will include analyses of potential impacts to historic and archaeological resources.

In the context of the National Historic Preservation Act of 1966, as amended, the staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs that may be impacted by post-license renewal land-disturbing operations or projected refurbishment activities associated with the proposed action. The APE may extend beyond the immediate environs in those instances where post- license renewal land-disturbing operations, transmission line right-of-ways, or projected refurbishment activities specifically related to license renewal may potentially have an effect on known or proposed historic sites. This determination is made irrespective of ownership or control of the lands of interest.

For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of the refurbishment activity, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states that there will be no clearing of previously-undisturbed areas.

The NRC has signed a Memorandum of Understanding (MOU) with the Prairie Island Indian Community (PIIC) for the PINGP license renewal environmental review (Enclosure). The MOU establishes a cooperating agency relationship between the NRC and the PIIC, with the NRC as lead agency responsible for preparing the SEIS.

On July 30, 2008, the NRC will conduct two public NEPA scoping meetings. The first session will be held in the afternoon and an identical session will be held later that evening. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. You and your staff are invited to attend. Your office will receive a copy of the draft SEIS along with a request for comments. The staff expects to publish the draft SEIS in March 2009.

If you have any questions or require additional information, please contact Mr. J.P. Leous, License Renewal Project Manager, by phone at 301-415-2864 or by e-mail at Justin.Leous@nrc.gov.

Sincerely,

/RA by AStuyvenberg for/

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosure:
As stated

cc: See next page

July 24, 2008

Ronald Johnson, President
Prairie Island Indian Community
5636 Sturgeon Lake Road
Welch, MN 55089

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear President Johnson:

The U.S. Nuclear Regulatory Commission (NRC or the staff) has recently received an application from Nuclear Management Company, LLC (NMC), for the renewal of the operating licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP), located near Red Wing, Minnesota, approximately 39 miles southeast of Minneapolis. The NRC is in the initial stages of developing a Supplemental Environmental Impact Statement to the "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (GEIS), NUREG-1437, which will document the impacts associated with the renewal of PINGP. We would like your assistance in our review by providing input to the NRC's environmental review scoping process. The NRC's process includes an opportunity for public and inter-governmental participation in the environmental review. We want to ensure that you are aware of our efforts pursuant to Title 10 of the *Code of Federal Regulations* Part 51 (10 CFR 51), Section 51.28(b). In addition, as outlined in 36 CFR 800.8(c), the NRC plans to coordinate compliance with Section 106 of the National Historic Preservation Act of 1966 through the requirements of the National Environmental Policy Act of 1969. An identical letter has been sent to other tribal organizations with historic ties to the project area.

Under NRC regulations, the original operating license for a nuclear power plant is issued for up to 40 years. The license may be renewed for up to an additional 20 years if NRC requirements are met. The current operating licenses for PINGP will expire on August 9, 2013 and October 29, 2014. The proposed action (license renewal for PINGP Units 1 and 2) would include the use and continued maintenance of existing plant facilities and transmission lines. For the purpose of license renewal, NMC plans to replace the PINGP steam generators. As part of this refurbishment activity, NMC also plans to establish a temporary construction area approximately 100 yards northwest of the turbine building and to build permanent warehouses within existing plant boundaries. NMC states there will be no clearing of previously-undisturbed areas. Provided for your information is the PINGP site boundary map (Enclosure 1) and transmission system map (Enclosure 2).

- 2 -

The GEIS considered the environmental impacts of renewing nuclear power plant operating licenses for a 20-year period on all currently operating sites. In the GEIS the NRC staff identified 92 environmental issues and developed generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. For the remaining 23 issues, plant-specific analyses will be documented in a supplement to the GEIS.

A supplemental environmental impact statement will be prepared for PINGP to document the staff's review of environmental impacts related to land use, environmental justice, terrestrial ecology, aquatic ecology, hydrology, cultural resources, and socioeconomic issues (among others), and will contain a recommendation regarding the environmental acceptability of the license renewal action.

Please submit any comments that you may have to offer on the scope of the environmental review by September 22, 2008. Written comments should be submitted by mail to the Chief, Rules and Directives Branch, Division of Administrative Services, Mail Stop T-6D59, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Electronic comments may be submitted to the NRC by e-mail at PrairieIslandEIS@nrc.gov. At the conclusion of the scoping process, the NRC staff will prepare a summary of the significant issues identified and the conclusions reached, and mail a copy to you.

To accommodate interested members of the public, the NRC will hold two public scoping meetings for the PINGP license renewal supplement to the GEIS on July 30, 2008. The first session will be held in the afternoon and an identical session will be held later that evening. The first meeting will convene at 1:30 p.m. and will continue until 4:30 p.m., as necessary. The second meeting will convene at 7:00 p.m. and will continue until 10:00 p.m., as necessary. Additionally, the NRC staff will host informal discussions one hour before the start of each session. Both sessions will be held at the Red Wing Public Library, 225 East Avenue, Red Wing, MN 55066.

The PINGP license renewal application and the GEIS are available on the internet at http://www.nrc.gov/reactors/operating/licensing/renewal/applications/prairie-island.html. In addition, the Red Wing Public Library has agreed to make the license renewal application and the GEIS available for public inspection; 225 East Avenue, Red Wing, MN 55066.

The staff expects to publish the draft supplemental environmental impact statement in March 2009. A copy of the document will be sent to you for your review and comment. The NRC will hold another set of public meetings in the site vicinity to solicit comments on the draft supplemental environmental impact statement. After consideration of public comments received, the NRC will prepare a final supplemental environmental impact statement, which is scheduled to be issued in October 2009. If you need additional information regarding the license renewal review process, please contact Mr. J.P. Leous, License Renewal Project Manager, at 301-415-2864 or at Justin.Leous@nrc.gov.

Sincerely,

/RA by A. Stuyvenberg for/

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 & 50-306

Enclosures:
As stated

cc w/encls.: See next page

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425-1665

August 13, 2008

Mr. Rani Franovich
Branch Chief
U.S. Nuclear Regulatory Commission
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation
Washington, D.C. 20555-0001

Subject: Request for list of federally protected species within the area under evaluation for the Prairie Island Nuclear Generating Plant, Units 1 and 2, license renewal application review.

This concerns your July 22, 2008, letter requesting a list of federally threatened and endangered species from the U.S. Fish and Wildlife Service that may occur in the vicinity of the Prairie Island Nuclear Generating Plant near Red Wing in Goodhue County, Minnesota.

The following federally-listed endangered (E) species is present in this portion of the Upper Mississippi River:

Species	Scientific Name	Habitat
Higgins eye pearly mussel (E)	*Lampsilis higginsii*	Mississippi River

There is no designated critical habitat for the above species, nor any candidate species listed for Goodhue County. Sturgeon Lake, located upstream from the Prairie Island Nuclear Generating Plant, is a Population Establishment Site for Higgins eye. The St. Paul District Corps of Engineers in association with the interagency Mussel Coordination Team has placed several thousand Higgins eye in Sturgeon Lake to establish a viable population. They are also using Sturgeon Lake to propagate Higgins eye in cages for use in establishing additional populations in Minnesota, Wisconsin and Iowa. Additional information on these activities can be obtained at the following website: http://www.mvp.usace.army.mil/environment/default.asp?pageid=663.

In accordance with Section 7(c) of the Endangered Species Act of 1973, as amended, it is the responsibility of the Federal agency to determine if its actions "may affect" listed species or critical habitat. We recommend that your assessment of project effects on federally-listed species be included in any environmental documentation required for the proposed license renewal.

We also recommend that you contact the Minnesota Department of Natural Resources concerning any state-listed species which may occur within the vicinity of the project. We appreciate the opportunity to comment and look forward to working with you in the future. If you have questions regarding our comments, please call Mr. Gary Wege of my staff at (612) 725-3548, extension 207.

Sincerely,

Tony Sullins
Field Supervisor

cc: Minnesota Department of Natural Resources, St. Paul, MN
Prairie Island Indian Community, Red Wing, MN

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
Midwest Regional Office
Bishop Henry Whipple Federal Building
One Federal Drive, Room 550
Fort Snelling, MN 55111

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
Environmental Services

AUG 18 2008

Rani Franovich, Branch Chief
Projects Branch 2, Division of License Renewal
Office of License Renewal
U.S. Nuclear Regulatory Commission
Washington, D.C. 20520

Dear Branch Chief Franovich:

This is in response to your letter requesting BIA attendance at a scoping meeting for license renewal at the Prairie Island Nuclear Generating Plant on July 30th of this year. Unfortunately your request was received by this office on July 31st making it impossible for us to attend. This is unfortunate as the Department of Interior is the federal trustee for lands held in trust for the beneficial use of the Prairie Island Indian Community and therefore has a vested interest in the process. Our questions/concerns are as follows:

How are the immediate environs defined as part of the APE? Have specific locations been identified for the "post-license renewal land-disturbing operations or projected refurbishment activities" or "transmission line right-of-ways mentioned in your letter to the Minnesota SHPO? Is there a map showing the boundaries of the APE? Have you consulted other Indian tribes?

Can you tell us where in the Section 106 process the NRC is currently?

The Bureau of Indian Affairs (BIA) has an interest in the undertaking and its effect to the Prairie Island Indian Community and on historic properties. The BIA has a variety of legal and economic relations with the Community, and therefore request to participate as a consulting party under 36CFR800.2(c)(5) Additional consulting parties.

What guidance will be used in the analysis of Environmental Justice?

Do you anticipate any earth disturbing activities occurring on tribal trust lands?

Any BIA participation in this process should not be construed to replace consultation with the Prairie Island Indian Community or other interested tribes. Further consultation should occur with each of those tribes on a government-to-government level. The BIA would be happy to assist you in determining which tribes may be affected.

If you have any further questions the environmental staff contact is Scott Doig at 612-725-4514

Sincerely,

Signed/Kevin Bearquiver

Acting Regional Director

Minnesota Department of Natural Resources
Division of Ecological Resources, Box 25
500 Lafayette Road
St. Paul, Minnesota 55155-4025
Phone: (651) 259-5107 Fax: (651) 296-1811 E-mail: heidi.cyr@dnr.state.mn.us

August 26, 2008

Mr. Rani Franovich
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Re: Request for Natural Heritage information in the vicinity of the Prairie Island Nuclear Generating Plant
Correspondence # : ERDB 20070820-0003

Dear Mr. Franovich,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, several rare features have been documented within the search area. For details, please see the enclosed database reports.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area.

The enclosed results include an Index Report and a Detailed Report of records in the Rare Features Database, the main database of the NHIS. To control the release of specific location information, which might result in the destruction of a rare feature, both reports are copyrighted.

The Index Report provides rare feature locations only to the nearest section, and may be reprinted, unaltered, in an environmental review document (e.g., EAW or EIS), municipal natural resource plan, or report compiled by your company for the project listed above. If you wish to reproduce the index report for any other purpose, please contact me to request written permission. The **Detailed Report may include specific location information, and is for your personal use only. If you wish to reprint or publish the detailed report for any purpose, please contact me to request written permission.**

Please be aware that this letter focuses only on potential effects to *rare natural features*; there may be other natural resource concerns associated with the proposed project. This letter does not constitute review or approval by the Department of Natural Resources as a whole. If you would like further information on the environmental review process, please contact your Regional Environmental Assessment Ecologist, Wayne Barstad, at (651) 259-5738. Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

Heidi Cyr
Endangered Species Environmental Review Specialist

enc. Rare Features Database: Index Report
Rare Features Database: Detail Report
Rare Features Database Reports: An Explanation of Fields

Printed August 2008
Data valid for one year

Minnesota Natural Heritage Information System: Rare Features Database
Index Report of records within 1 mile radius of:
Prairie Island Nuclear Generating Plant
Plant Site

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Dakota, Goodhue, Wabasha County, MN						
Polyodon spathula (Paddlefish) #2 Location Description: T112N R18W S14, T113N R14W S19, T110N R10W S3, T111N R10W S33, T [...]		THR	S2	G4	2000-10	16507
Dakota, Goodhue, Washington County, MN						
Ligumia recta (Black Sandshell) #405 Location Description: T114N R15W S30, T113N R15W S4, T115N R17W S25, T115N R17W S23, T [...]		SPC	S3	G5	2003-08-05	33850
Obovaria olivaria (Hickorynut) #138 Location Description: T115N R17W S22, T114N R16W S4, T114N R15W S29, T114N R15W S30, T [...]		SPC	S3	G4	2005-09-07	33655
Polyodon spathula (Paddlefish) #1 Location Description: T28N R20W S12, T28N R20W S14, T114N R16W S36, T113N R15W S5, T [...]		THR	S2	G4	2006-06-24	16529
Goodhue County, MN						
Acipenser fulvescens (Lake Sturgeon) #86 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G3G4	1997-10-23	20145
Acipenser fulvescens (Lake Sturgeon) #153 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G3G4	2000-05-26	27745
Acipenser fulvescens (Lake Sturgeon) #206 Location Description: T114N R15W S29, T114N R15W S32		SPC	S3	G3G4	2002-09-08	30098
Actinonaias ligamentina (Mucket) #115 Location Description: T113N R15W S9, T113N R15W S11, T114N R15W S30, T113N R15W S10, T [...]		THR	S2	G5	2004-07-09	21135
Actinonaias ligamentina (Mucket) #158 Location Description: T113N R15W S4, T113N R15W S9, T113N R15W S8, T113N R15W S5, T [...]		THR	S2	G5	1980-09-17	25515
Alasmidonta marginata (Elktoe) #116 Location Description: T114N R15W S31, T114N R15W S30, T114N R15W S32, T113N R15W S10, T [...]		THR	S2	G4	2004-08-02	31515
Alosa chrysochloris (Skipjack Herring) #17 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G5	1993-08-23	6478
Ammocrypta asprella (Crystal Darter) #23 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G3	1995-06-16	21031
Apalone mutica (Smooth Softshell) #13 Location Description: T113N R15W S10		SPC	S3	G5	1998-06-22	30177

Printed August 2008
Data valid for one year

Minnesota Natural Heritage Information System: Rare Features Database
Index Report of records within 1 mile radius of:
Prairie Island Nuclear Generating Plant
Plant Site

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Goodhue County, MN						
Apalone mutica (Smooth Softshell) #18 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G5	1996-06-19	30178
Arcidens confragosus (Rock Pocketbook) #17 Location Description: T113N R14W S20, T113N R14W S19, T113N R15W S10, T114N R16W S13, T [...]		END	S1	G4	2004-07-09	25720
Clemmys insculpta (Wood Turtle) #6 Location Description: T113N R16W S35, T113N R15W S30, T113N R15W S20, T113N R16W S32, T [...]		THR	S2	G4	2002-05-28	1479
Cycleptus elongatus (Blue Sucker) #30 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G3G4	1992-10-14	16098
Cycleptus elongatus (Blue Sucker) #56 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G3G4	1995-09-05	6434
Cycleptus elongatus (Blue Sucker) #82 Location Description: T114N R15W S29, T114N R15W S28, T114N R15W S32, T114N R15W S33		SPC	S3	G3G4	1997-05-22	23206
Cyclonaias tuberculata (Purple Wartyback) #34 Location Description: T113N R15W S14, T113N R15W S12, T113N R15W S11, T113N R15W S13, T [...]		THR	S2	G5	2004-07-09	21140
Dendroica cerulea (Cerulean Warbler) #41 Location Description: T113N R15W S16, T113N R15W S8, T113N R15W S9		SPC	S3B	G4	1990-07-05	17189
Dendroica cerulea (Cerulean Warbler) #41 Location Description: T113N R15W S16, T113N R15W S9		SPC	S3B	G4	1996-07-05	16976
Dendroica cerulea (Cerulean Warbler) #45 Location Description: T113N R15W S10		SPC	S3B	G4	1990-06-13	16975
Dendroica cerulea (Cerulean Warbler) #47 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3B	G4	1990-06-13	16973
Dry Sand - Gravel Oak Savanna (Southern) Type #36 Location Description: T113N R15W S5		N/A	S2	GNR	1992	14964
Ellipsaria lineolata (Butterfly) #27 Location Description: T113N R15W S10		THR	S2	G4	1999-07	26065
Ellipsaria lineolata (Butterfly) #46 Location Description: T113N R15W S9, T113N R15W S10		THR	S2	G4	2003-Pre	31484

Printed August 2008
Data valid for one year

Minnesota Natural Heritage Information System: Rare Features Database
Index Report of records within 1 mile radius of:
Prairie Island Nuclear Generating Plant
Plant Site

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Goodhue County, MN						
Elliptio crassidens (Elephant-ear) #4 Location Description: T113N R14W S20, T113N R14W S19, T113N R15W S10, T114N R16W S13, T [...]		END	S1	G5	1944-Pre	21139
Elliptio dilatata (Spike) #113 Location Description: T113N R15W S13, T113N R15W S11, T113N R15W S10		SPC	S3	G5	2004-07-09	25825
Elliptio dilatata (Spike) #129 Location Description: T113N R15W S4, T113N R15W S9, T113N R15W S8, T113N R15W S5, T [...]		SPC	S3	G5	1980-09-17	25514
Elliptio dilatata (Spike) #130 Location Description: T113N R15W S10		SPC	S3	G5	1999-07	26069
Elliptio dilatata (Spike) #202 Location Description: T113N R15W S9, T114N R15W S30, T113N R15W S1, T113N R15W S10		SPC	S3	G5	2000-07-PRE	33669
Emydoidea blandingii (Blanding's Turtle) #718 Location Description: T114N R15W S32, T113N R15W S6, T113N R15W S5, T114N R15W S31		THR	S2	G4	1989-07	17731
Falco peregrinus (Peregrine Falcon) #66 Location Description: T113N R15W S5	No Status	THR	S2B	G4	2006-06-07	2788
Fusconaia ebena (Ebonyshell) #11 Location Description: T113N R15W S11, T113N R15W S12, T113N R15W S13, T113N R15W S14, T [...]		END	S1	G4G5	2004-07-PRE	21138
Haliaeetus leucocephalus (Bald Eagle) #1532 Location Description: T113N R15W S8		SPC	S3B,S3N	G5	2000	21811
Haliaeetus leucocephalus (Bald Eagle) #2348 Location Description: T113N R15W S10		SPC	S3B,S3N	G5	2004-Pre	31907
Ictiobus niger (Black Buffalo) #17 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G5	2000-09-25	24744
Ictiobus niger (Black Buffalo) #19 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G5	2002-10-09	30518
Lampsilis higginsi (Higgins Eye) #13 Location Description: T113N R15W S9, T113N R15W S11, T114N R15W S30, T113N R15W S10, T [...]	LE	END	S1	G1	2004-07-09	21134
Lampsilis higginsi (Higgins Eye) #28 Location Description: T113N R14W S19, T113N R15W S10, T114N R16W S13, T113N R13W S32, T [...]	LE	END	S1	G1	2004-07-08	31904

Printed August 2008
Data valid for one year

Minnesota Natural Heritage Information System: Rare Features Database
Index Report of records within 1 mile radius of:
Prairie Island Nuclear Generating Plant
Plant Site

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Goodhue County, MN						
Lampsilis higginsi (Higgins Eye) #36 Location Description: T113N R15W S5, T113N R15W S4, T114N R15W S32, T114N R15W S33	LE	END	S1	G1	2005-09-29	33180
Lampsilis teres (Yellow Sandshell) #19 Location Description: T113N R15W S4, T114N R15W S30, T114N R16W S13, T113N R15W S10, T [...]		END	S1	G5	2004-08-02	31366
Ligumia recta (Black Sandshell) #203 Location Description: T113N R15W S10, T113N R15W S11, T114N R15W S30		SPC	S3	G5	2004-08-02	26070
Megalonaias nervosa (Washboard) #13 Location Description: T113N R15W S10		THR	S2	G5	2004-07-09	26030
Megalonaias nervosa (Washboard) #19 Location Description: T113N R15W S9, T113N R15W S10, T114N R15W S32, T113N R15W S5, T [...]		THR	S2	G5	2005-09-07	31491
Notropis amnis (Pallid Shiner) #11 Location Description: T113N R15W S9, T113N R15W S10		SPC	S3	G4	1949	16054
Obovaria olivaria (Hickorynut) #78 Location Description: T113N R15W S10		SPC	S3	G4	2004-07-09	26071
Panax quinquefolius (American Ginseng) #84 Location Description: T113N R15W S8, T113N R15W S7		SPC	S3	G3G4	1991-09-17	12946
Plethobasus cyphyus (Sheepnose) #2 Location Description: T113N R14W S19, T113N R13W S33, T113N R15W S10, T114N R16W S13, T [...]	C	END	S1	G3	1944-Pre	21137
Pleurobema coccineum (Round Pigtoe) #77 Location Description: T113N R15W S13, T113N R15W S10, T113N R15W S9, T113N R14W S27, T [...]		THR	S2	G4G5	2004-07-09	26072
Pleurobema coccineum (Round Pigtoe) #123 Location Description: T114N R16W S13, T114N R15W S30		THR	S2	G4G5	2004-08-02	31707
Quadrula metanevra (Monkeyface) #29 Location Description: T113N R15W S14, T113N R15W S9, T113N R15W S11, T113N R15W S10, T [...]		THR	S2	G4	2004-07-09	21136
Quadrula metanevra (Monkeyface) #37 Location Description: T113N R15W S10		THR	S2	G4	2000-07-20	26060
Quadrula metanevra (Monkeyface) #62 Location Description: T114N R15W S30		THR	S2	G4	2000-Pre	31546

1

Printed August 2008
Data valid for one year

Minnesota Natural Heritage Information System: Rare Features Database
Index Report of records within 1 mile radius of:
Prairie Island Nuclear Generating Plant
Plant Site

Element Name and Occurrence Number	Federal Status	MN Status	State Rank	Global Rank	Last Observed Date	EO ID #
Goodhue County, MN						
Quadrula nodulata (Wartyback) #20 Location Description: T113N R15W S10		END	S1	G4	1999-07-17	26073
Silver Maple - (Virginia Creeper) Floodplain Forest Type #1 Location Description: T113N R15W S16, T113N R15W S9		N/A	S3	GNR	1990-08-08	11936
Silver Maple - Green Ash - Cottonwood Terrace Forest Type #1895 Location Description: T113N R15W S6		N/A	S3	GNR	1992-08-19	14958
Spikerush - Bur Reed Marsh (Northern) Type #856 Location Description: T114N R15W S31, T114N R15W S30		N/A	S4	GNR	1992-09-01	14790
Spikerush - Bur Reed Marsh (Northern) Type #1058 Location Description: T113N R15W S6		N/A	S4	GNR	1992-08-19	14959
Sugar Maple - Basswood - (Bitternut Hickory) Forest Type #1860 Location Description: T113N R15W S8, T113N R15W S7		N/A	S3	GNR	1991-09-17	13269
Tritogonia verrucosa (Pistolgrip) #37 Location Description: T113N R15W S10		THR	S2	G4G5	1999-07	26074
Non-MN County - Located just outside Minnesota in adjacent jurisdiction(s).						
Haliaeetus leucocephalus (Bald Eagle) #575 Location Description: Just outside Minnesota in adjacent jurisdiction(s).		SPC	S3B,S3N	G5	1990	8201
Haliaeetus leucocephalus (Bald Eagle) #984 Location Description: Just outside Minnesota in adjacent jurisdiction(s).		SPC	S3B,S3N	G5	1991	13047
Haliaeetus leucocephalus (Bald Eagle) #1125 Location Description: Just outside Minnesota in adjacent jurisdiction(s).		SPC	S3B,S3N	G5	1994	15405
Haliaeetus leucocephalus (Bald Eagle) #1264 Location Description: Just outside Minnesota in adjacent jurisdiction(s).		SPC	S3B,S3N	G5	1994	17000
Haliaeetus leucocephalus (Bald Eagle) #1524 Location Description: Just outside Minnesota in adjacent jurisdiction(s).		SPC	S3B,S3N	G5	1998	21803
Tritogonia verrucosa (Pistolgrip) #63 Location Description: Just outside Minnesota in adjacent jurisdiction(s).		THR	S2	G4G5	2000-Pre	31193

Records Printed = 68

1

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
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September 8, 2008

Nathan Goodman
US Nuclear Regulatory Commission
Mail Stop: O-11F1
Washington, DC 20555-0001

Subject: Prairie Island (MN) Nuclear Generating Plant (PINGP) License Renewal - EIS Issue Scoping

Dear Mr. Goodman:

Thank you for inviting Wisconsin Department of Natural Resources (WDNR) to the Nuclear Regulatory Commission (NRC) relicensing "audit" at the PINGP plant on August 20, 2008. It was very informative. At that meeting you invited WDNR to prepare and submit a list of issues we feel should be addressed in NRC's Environmental Impact Statement prepared as part of PINGP relicensing process.

1. Fish Impingement and Entrainment at Water Intake

   Information should be provided describing the extent of fish entrainment and impingement at the water intake and associated fish mortality. What is the incremental effect on fish populations? What measures are in place or proposed to minimize losses?

2. Upper Mississippi River Navigation Pool 3 Drawdowns for Habitat Enhancement

   A consortium of federal and state agencies is considering use of temporary Pool 3 water level manipulations (i.e. 1-2' drawdowns) for purposes of improving aquatic habitat conditions. We have heard there may be PINGP concerns, such as for fire control or design limits of water intake structure(s), that may conflict with the idea of pool drawdowns. Please describe any such concerns and identify measures that are proposed or could be employed to prevent conflicts with any such drawdowns.

3. Cooling Water Discharge Thermal Effects to:

   A. Mississippi River Biological Resources
   Describe past fish kills, particularly those associated with effluent thermal mixing during cold water conditions, resulting from past plant operations. Describe the make-up and extent of other biological resources (i.e. mussel community, etc.) in the discharge canal and Mississippi River mixing zone. What studies/monitoring has been done in effort to document thermal discharge impacts to aquatic organisms? What design and/or operational measures have been employed to minimize adverse effects and how successful have they been? What additional remedial measures are proposed or could be used to further avoid or minimize adverse impacts?

B. Mississippi River Public Recreation Use Opportunities
We have routinely received seasonal complaints from the ice fishing public that access to historic fishing areas in upper Lake Pepin is adversely impacted by warm water discharges, resulting in delayed ice formation at winter's onset and more rapid ice deterioration before spring ice-out. The EIS should describe PINGP discharge effects on winter ice cover and usability of traditional ice fisherman access points. Feasible measures to offset adverse impacts should be identified and incorporated as license conditions.

4. Zebra Mussel Control Impacts to Native Mussels and Other Aquatic Resources

Best management practices for control of biofouling from zebra mussels and other exotic species continues to evolve. What measures (molluscicides, other) are currently employed to control zebra mussels and has there been any monitoring to determine if such practices result in impacts to native mussels or other aquatic life? Measures to minimize adverse impacts should be identified. Given the evolving identification of best management practice control technology the license should provide for a periodic re-assessment and an adaptive management approach to exotic species management and remedial methods.

5. Identification of Planned or Foreseeable Future (over new NRC license term) Physical Improvements (i.e. new/upgraded transmission lines, new/modified water intake structures, etc.) and Any Associated Impacts in Wisconsin

Would relicensing set a precedent that would result in an interest by Xcel in constructing new or upgraded transmission lines or other physical improvements that directly or indirectly impact Wisconsin? At our meeting it was explained that no such improvements are proposed or expected and that a license condition would be incorporated indicating no such improvements would be authorized as part of relicensing. We interpret this to mean that any such unforeseen future improvements would be subject to applicable federal and/or state regulations, including NEPA if appropriate, as a separate action. Please confirm this in the EIS.

As stated at our meeting I am currently the primary WDNR contact person for this project and that Mr. Nick Schaff will serve in that capacity starting in April 2009. If there are any questions regarding the above I would be happy to discuss them. I'm also available to make arrangements for WDNR fisheries, water quality or other program experts to meet with you or other NRC staff, Xcel personnel or representatives from other resource management agencies, to discuss issues of common interest.

Thank you for the opportunity to submit WDNR scoping comments for this project.

Sincerely,
TL 9/8/08

Tom Lovejoy
Environmental Impact Coordinator

cc:
Dave Siebert - Director, WDNR Office of Energy/Environmental Analysis
Nick Schaff - WCR
Gretchen Benjamin, John Sullivan, Ron Benajmin -- LaX, WI
Gary Wege – US FWS, Bloomington, MN
Dan Wilcox – Corps of Engineers, St. Paul, MN
Matt Langan – MDNR, St. Paul, MN
Tim Schlagenhaft – MDNR, Lake City, MN

2

October 23, 2008

Mr. Kevin Bearquiver
Midwest Regional Director
U.S. Bureau of Indian Affairs
1 Federal Drive
Room #550
Fort Snelling, MN 55111

SUBJECT: RESPONSE TO LETTER FROM K. BEARQUIVER REGARDING PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Bearquiver,

This letter responds to your letter dated August 18, 2008, regarding the U.S. Nuclear Regulatory Commission's (NRC) environmental review for the Prairie Island Nuclear Generating Plant (PINGP) license renewal. We regret that you were unable to attend the July 30, 2008, public scoping meeting. Justin Leous, the previous project manager for the PINGP license renewal, left a telephone message for Mr. Terrance Virden the week of July 14, 2008, to notify the Bureau of Indian Affairs (BIA) of the upcoming public scoping meeting. Additionally, NRC staff sent BIA a letter addressed to Mr. Terrance Virden dated July 22, 2008. The NRC also sent a general meeting notice letter on July 17, 2008, to interested and/or affected parties, and BIA was included on the distribution of this letter.

In regard to your questions specifically concerning the NRC letter to the Minnesota State Historic Preservation Office, NRC staff conducts scoping in order to gather information for the scope of its environmental review. The deadline to submit scoping comments was September 22, 2008. Nathan Goodman, Project Manager, tried on several occasions to reach the contact given in your letter, Scott Doig, and left several messages in hopes of reaching Mr. Doig regarding any questions the BIA might have had concerning NRC staff's scoping process prior to closing of the scoping period.

Additionally, Nuclear Management Company submitted an Environmental Report as part of its application for the license renewal of PINGP, which is available on the NRC public website. The Environmental Report addresses many of the questions you have identified in your letter.

Concerning your question about environmental justice, under Executive Order 12898 (59 FR 7629), Federal agencies are responsible for identifying and addressing potential disproportionately high and adverse human health and environmental impacts on minority and low-income populations. The Council on Environmental Quality (CEQ) has oversight of the Federal government's compliance with Executive Order 12898 and the National Environmental Policy Act (NEPA), and in consultation with the Environmental Protection Agency and other affected agencies, CEQ developed guidance to ensure that environmental justice concerns are effectively identified and addressed in the NEPA procedures of Federal agencies. This guidance is presented in *Environmental Justice: Guidance Under the National Environmental Policy Act* (1997). NRC staff uses this guidance as it applies to NRC license reviews.

K. Bearquiver - 2 -

In 2004, the Commission issued a *Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions* (69 FR 52040), which states "The Commission is committed to the general goals set forth in E.O. 12898, and strives to meet those goals as part of its NEPA review process. For determining the impacts to minority and low-income populations, NRC staff follows the Commission's Policy Statement on Environmental Justice as well as guidance set forth in NRR Office Instruction LIC-203, Revision 1, Appendix D – 'Environmental Justice Guidance and Flow Chart.'"

As noted in NRC staff's letter to the BIA regarding scoping, the NRC has signed a Memorandum of Understanding (MOU) with the Prairie Island Indian Community for the environmental portion of the PINGP license renewal review. The MOU establishes a cooperating agency relationship between the NRC and the PIIC, with the NRC as lead agency responsible for preparing a supplemental environmental impact statement.

In regards to the BIA being a consulting party for the Section 106 process under 36CFR800.2, the NRC granted BIA consulting party status by including them on the NRC's distribution list, which enables BIA to receive all related documents throughout the environmental review process for the proposed PINGP license renewal. Currently, the NRC is in the identification phase of the Section 106 process.

NRC staff looks forward to working with the BIA throughout the relicensing process. If you have any questions, please contact Mr. Nathan Goodman, License Renewal Project Manager, by phone at 301-415-2703 or by e-mail at nathan.goodman@nrc.gov.

Sincerely,

\RA\

Rani Franovich, Branch Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosures:
As stated

cc w/encls: See next page

Biological Assessment

Prairie Island Nuclear Generating Plant, Units 1 and 2
License Renewal

October 2009

Docket Nos. 50-282 and 50-2306

U.S. Nuclear Regulatory Commission
Rockville, Maryland

Biological Assessment of the Potential Effects on Federally Listed Endangered or Threatened Species from the Proposed License Renewal for Prairie Island Nuclear Generating Plant, Units 1 and 2

1.0 Introduction and Purpose

The U.S. Nuclear Regulatory Commission (NRC) prepared this biological assessment to support the draft supplemental environmental impact statement (SEIS) for the renewal of the operating licenses for Prairie Island Nuclear Generating Plant Units 1 and 2 (PINGP 1 and 2), located on the west bank of the Mississippi River in Goodhue County, Minnesota. The current 40-year licenses for PINGP 1 and 2 expire on August 9, 2013 (DPR-42) and October 29, 2014 (DPR-60), respectively. The proposed license renewal for which this biological assessment has been prepared would extend the operating licenses to 2033 and 2034.

The NRC is required to prepare the draft SEIS as part of its review of a license renewal application. The draft SEIS supplements NUREG-1437, Volumes 1 and 2, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)," (NRC 1996, 1999) for the license renewal of commercial nuclear power plants. The draft SEIS covers specific issues, such as the potential impact on endangered and threatened species, that are of concern at PINGP 1 and 2 and that NRC could not address on a generic basis in the GEIS.

Pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended, the NRC staff requested, in a letter dated July 22, 2008 (NRC 2008b), that the U.S. Fish and Wildlife Service (FWS) provide information on Federally listed endangered or threatened species, as well as on proposed or candidate species, and on any designated critical habitats that may occur in the vicinity of PINGP 1 and 2. In its response, dated August 13, 2008 (FWS 2008), the FWS indicated that the Higgins eye pearlymussel (Lampsilis higginsii) is present in Upper Mississippi River within the vicinity of PINGP 1 and 2, though no designated critical habitat is present for the species in Goodhue County. Currently, no Federally listed threatened or endangered terrestrial species are known to occur on the PINGP 1 and 2 site or within the in-scope transmission line right-of-ways.

Under ESA Section 7, the NRC is responsible for providing information on the potential impact that the continued operation of PINGP 1 and 2 could have on the Federally listed species, the Higgins eye pearlymussel. The potential affect of relicensing PINGP 1 and 2 on Higgins eye pearlymussels occurs through the extending for an additional 20 years the operation of the cooling water system, which can affect the mussels and the species on which they depend through entrainment, impingement, and changes to the thermal environment. Additional information can be found in Chapters 2 and 4 of the draft SEIS.

2.0 Proposed Action

Northern State Power Co. (NSP) submitted an application for license renewal of PINGP 1 and 2, for which the existing licenses expire in 2013 and 2014, respectively. The Federal action is NRC's decision to renew or not renew the licenses for an additional 20 years beyond the original 40-year term of operation. Nuclear power plant owners or operators may need to undertake or, for economic or safety reasons, may choose to perform refurbishment activities in anticipation of license renewal or during the license renewal term. NSP plans to replace two of the four steam generators at PINGP 1 and 2, Unit 2, with new, once-through, enhanced steam generators to support the extended life of PINGP 1 and 2 through the renewed license period. NSP replaced the steam generators on Unit 1 in 2004, and so would replace steam generators only on Unit 2 during the period of extended operation. In Chapter 3 of the draft SEIS, NRC analyzed steam generator replacement as a refurbishment activity as part of license renewal.

3.0 Site Description

PINGP 1 and 2 are located on Prairie Island on the Mississippi River (Figures 2-1 and 2-22). The Mississippi is the longest river in North America and spans 2302 miles (mi; 3705 kilometers [km]) from its source at Lake Itasca in Minnesota to the Gulf of Mexico, where it empties. The river drains approximately 189,000 mi2 and 31 different states. The Mississippi can be divided into six sub-basins (EPA 2006), and the PINGP 1 and 2 site is located in the Upper Mississippi Sub-basin. The Upper Mississippi Sub-basin encompasses over 20,000 mi2 and has 12 major tributaries, the most notable being the Missouri River, the Illinois River, the Wisconsin River, and the Iowa River (MPCA 2008).

Prairie Island itself is low-lying and located in a 1- to 3 mi- (1.6- to 4.8 km)-wide section of the Mississippi River Valley, with the majority of the island being less than 25 feet (ft; 7.6 meters [m]) above the river surface. On either side of the valley are 360-ft (110-m) high bluffs composed of Paleozoic limestones and sandstones (Cowdery 1999). Prairie Island is located between the Mississippi River and the Vermillion River, with the confluence of the two rivers at the downstream end of the island (EPA 2006). About 1.5 mi (2.4 km) downstream from the island is Lock and Dam Number 3, which controls the water level and flow of this stretch of the Mississippi (USGS 2006).

Prairie Island itself is located on Sturgeon Lake (Figure 2), an area of the Mississippi created by the rise in water elevation by Lock and Dam Number 3 and the subsequent flooding of sections of the floodplain. The PINGP 1 and 2 cooling system withdraws from and discharges to the main stem of the Mississippi River 13 river miles below the confluence of the St. Croix River and 4 river miles north of where the Vermillion River joins the Mississippi (AEC 1973). Lock and Dam 3, about 1.5 mi (2.4 km) downstream and Lock and Dam 2, upstream, bound the area of the river adjacent to PINGP 1 and 2 known as Pool 3. The two dams lie about 18 river miles (29 river kilometers) apart (NMC 2008). Immediately northeast of the plant is Sturgeon Lake, a side slough or impoundment that would be considered a marsh if it were not associated with the main stem of the river (AEC 1973). The Vermillion River borders the southwest portion of the site.

[2] Figures 2-1 and 2-2 are taken from Chapter 2 of the draft SEIS for PINGP 1 and 2.

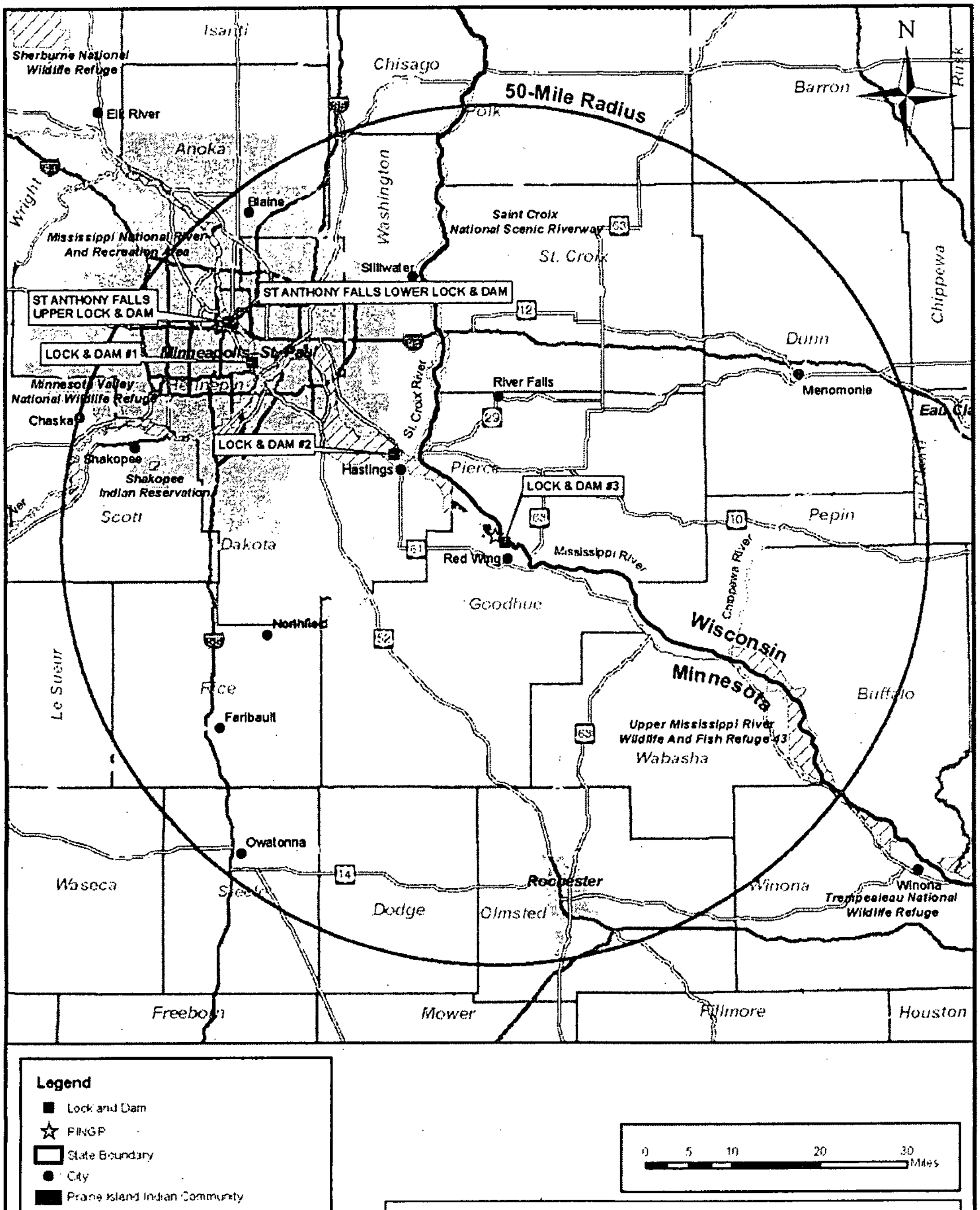

Figure 2-1. Location of Prairie Island Nuclear Generating Plant, Units 1 and 2, 50-mi (80-km) Region (Source: NMC 2008)

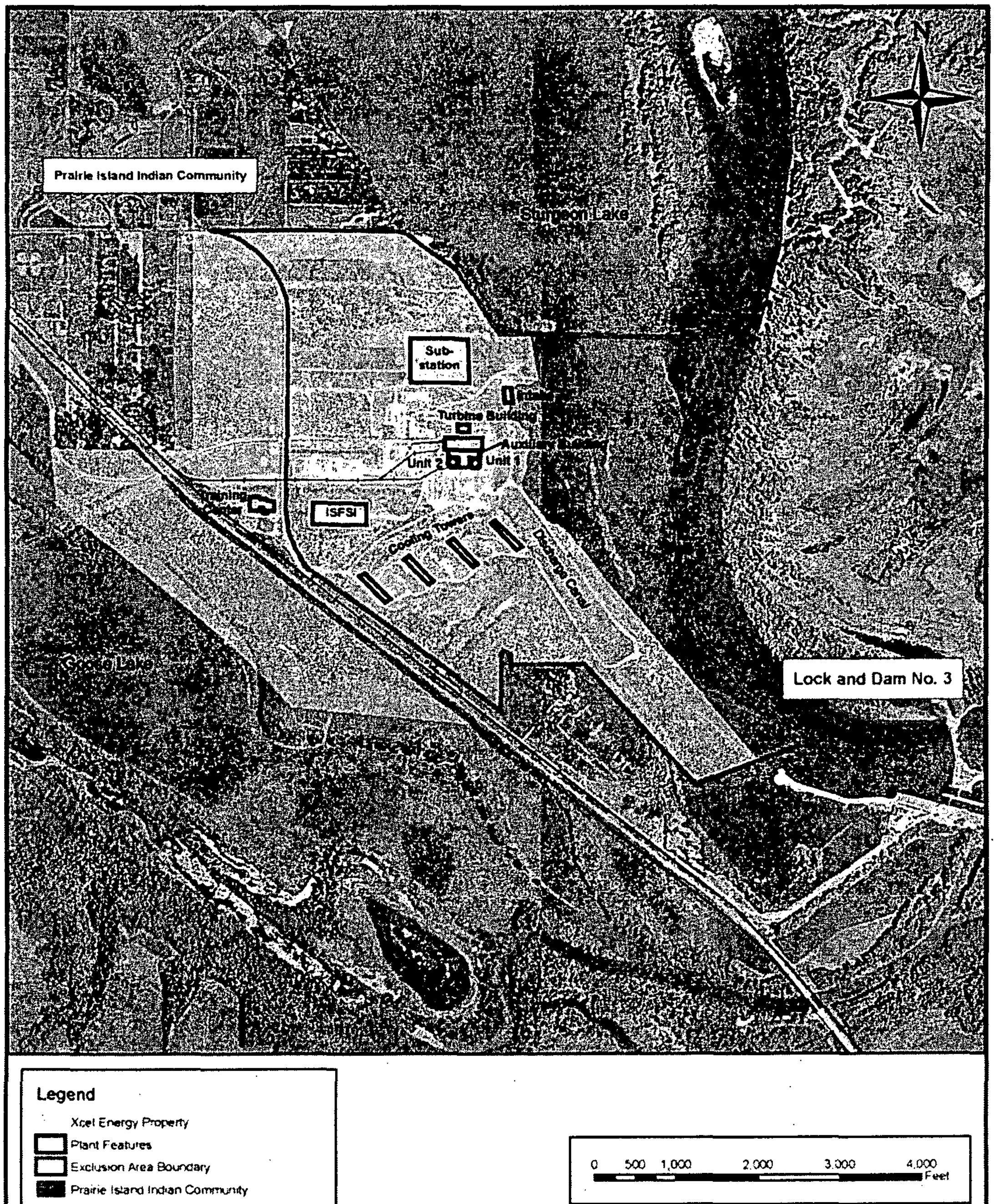

Figure 2-2. PINGP General Site Layout and Exclusion Area Boundary
(Source: NMC 2008)

3.1. Cooling and Auxiliary Water Systems

The Mississippi River is the source for cooling water for the main condenser at PINGP 1 and 2. Cooling river water can be circulated through the station in one of three modes of operation: open cycle (once-through cooling, with no cooling towers in operation), helper cycle (once-through cooling, with mechanical draft cooling towers in operation), and closed cycle (using cooling towers to recirculate up to 95 percent of the cooling water). The mode of operation is selected by NSP to limit the heat discharged to the river to ensure compliance with the thermal limits of the NPDES permit No. MD0004006 (MPCA 2006; NMC 2008).

The components of the current cooling water system are the eight intake bays, the Intake Screenhouse, trash racks, traveling screens, high/low pressure wash systems, fish return system, bypass gates, intake canal, Plant Screenhouse, circulating water pumps, condensers, discharge basin, mechanical draft cooling towers, discharge canal, and distribution basin. (NMC 2008)

The Final Environmental Statement (FES) for Operation of PINGP 1 and 2 (AEC 1973) describes the original cooling water system. Water was withdrawn from the Mississippi River into the 750-ft (230-m)-long intake canal, and into what is now called the Plant Screenhouse. Inside the screenhouse, the water passed through trash racks and coarse-mesh traveling screens to remove fish and debris before supplying the condensers. The plant could operate in each of the three modes described above, and so the heated effluent from the plant was either pumped to the cooling towers or released to the river, via an 800-ft (240-m)-long canal. In the early 1980s, the State of Minnesota directed PINGP 1 and 2 to modify the cooling system to reduce impacts to aquatic communities by installing the Intake Screenhouse, equipped with trash racks, coarse- and fine-mesh traveling screens, variable pressure wash systems, and a fish return system, described below (Stone and Webster 1983).

With the current cooling water system in place, water flows from the river, under a skimmer wall, and into the eight intake bay openings, each 18.5 by 11.2 ft (5.6 by 3.4 m), of the Intake Screenhouse. The intake bays each have a trash rack, a traveling screen, and high/low pressure wash systems, and a fish return system. After passing through the Intake Screenhouse, water flows down the intake canal to the Plant Screenhouse, where four 147,000-gallon-per-minute (gpm; 9.3-cubic meters per second [m^3/s]) circulating water pumps supply water to the condensers for a total flow for both units of approximately 588,000 gpm (37.1 m^3/s). (NMC 2008)

After leaving the condensers, the cooling water then enters the discharge basin, and from there the final path of the cooling water is determined by the operating mode of the plant. In open cycle, the cooling water flows from discharge basin, through the distribution basin, into the discharge canal, ultimately returning to the Mississippi River. In helper and closed cycles, the water is pumped from discharge basin to the cooling towers, and from there returns to the intake canal for recirculation (closed cycle) or flows through the distribution basin, into the discharge canal, and out to the Mississippi River (helper cycle). A small amount of warm water from the discharge canal is pumped to the intake structure to prevent ice formation on trash racks, traveling screens, and bypass gates. (NMC 2008)

Intake Screenhouse and Fish Return

Within the Intake Screenhouse are the trash racks and traveling screens. The trash rack in each bay is made of 3/8-inch (in.) by 3-in. (0.95-centimeter [cm] by 7.6-cm) steel bars, mounted on an incline 1.5 in. (3.8 cm) apart; a trash rake clears accumulated debris (NMC 2008; Stone and Webster 1983). After passing through the trash rack, the water flows through the traveling screens.

The NPDES permit No. MD0004006, issued June 30, 2006, by the Minnesota Pollution Control Agency (MPCA), dictates that from September 1 through March 31, PINGP 1 and 2 may operate with up to 3/8-in. (0.95-cm) mesh traveling screens, and that from April 1 through August 31, the traveling screens must be 0.5 millimeters (mm; 0.02 in.) fine mesh screens (MPCA 2006). Before the cooling water system was modified in 1983, the approach velocity to the existing traveling screens was 1.3 feet per second (fps; 0.40 meters per second [m/s]) at normal water levels and 1.4 fps (0.43 m/s) at low water levels. The design criteria for the average face velocity through the gross area of the screen material for the fine mesh screens should not exceed 0.5 fps (0.15 m/s) at low water level and a discharge rate of 800 cubic feet per second (cfs; 22.6 m^3/s). Flow measurements taken in 1983 and 1984 were less than 0.2 m/s (0.66 fps), and most were below 0.1 m/s (0.33 fps). Intake velocities were again studied in 2003 during coarse mesh screen operation. The authors of the study concluded that the actual intake velocities were not outside those design requirements. (Xcel Energy Environmental Services 2006)

To remove larvae and fish from the upward travel side of the screen, a low pressure spray is used at 10 pounds per square inch (psi; 0.7 kilograms per square centimeter [kg/cm^2]) from the inside for the fine mesh screen (larval screenwash), and at 20 psi (1.4 kg/cm^2) from the outside when the coarse mesh screen is in use (fish screenwash) (Stone and Webster 1983; NMC 2008). On the downward travel side of the screen, a high pressure spray from the inside is used to remove debris from the screens, at 50 psi (3.5 kg/cm^2) for the fine mesh screen and 100 psi (7 kg/cm^2) for the coarse mesh screen (NMC 2008). The fine mesh screens rotate continuously between 3 and 20 feet per minute (fpm; 1 and 6 meters per minute [m/min]), based on the amount of debris collected; the coarse mesh screens rotate at the same range of speeds when the screen differential is higher than 4 in. (10 cm) or if the screens have not rotated for 8 hours (Xcel Energy Environmental Services 2006; NMC 2008).

Fish are washed off the upward travel side of the screens into a trough and debris is washed from the downward travel side into a separate trough. The troughs combine into a common trough and are transported back to the river via a 2200-ft-(670-m)-long, buried pipe, which discharges into the river 1500 ft (460 m) south of the Intake Screenhouse, below mean water elevation, and at a depth below any ice cover. Fish and debris travel through the pipe at velocities between 3 to 5 ft/s (1 to 1.5 m/s), but may speed up in sections of the pipe. (Stone and Webster 1983; Xcel Energy Environmental Services 2006; NMC 2008)

If the screens are clogged, the head differential across the traveling screens or across the intake screenhouse can become too high and trigger the opening of bypass gates to allow water to circumvent the intake screenhouse. The plant screenhouse (part of the original cooling system) is still equipped with 3/8-in. screens that remove debris before the water enters the condensers, and the intake screens are cleared to minimize the time the bypass gates are open. (Stone and Webster 1983)

Discharge and Cooling Tower System

The discharge basin receives all of the cooling water from the condensers. The path that the water takes next is dependent on the operating mode of the cooling system. During open cycle, the water flows through the distribution basin, into the discharge canal, and out to the Mississippi River. During closed and helper cycles, the water is pumped to the cooling towers. The cooled water (blowdown) from the cooling towers then moves via the cooling tower return canal to the distribution basin. In closed cycle, the distribution basin returns the water to the intake canal to recycle through the condensers. In helper cycle, the distribution basin routes the water to the discharge canal and into the river. (NMC 2008)

Water enters the discharge canal through four 10- by 11-ft (3- by 3.4-m) openings to four sluice gates operated by motors. The sluice gates lead to four pipes, which vary in diameter [5, 6, 7, and 8 ft (1.5, 1.8, 2.1, and 2.4 m)] and are used in different combinations to achieve the desired discharge rate. If only the smallest pipe is in use, the discharge rate is 150 cfs (4 m^3/s). If all four pipes are used (all sluice gates are open), the maximum discharge rate is 1390 cfs (39 m^3/s), and the velocity of the discharging water is 10.17 ft/s (3.1 m/s). (Stone and Webster 1983)

The mechanical draft cooling tower system includes four cooling towers, fans, water distribution headers, and basins. Each tower, made up of a bank of 12 sections cells, includes a cooling tower pump, which pumps water from the discharge basin through distribution pipes to the top of the cooling tower. Spray nozzles disperse the water, which drops through a maze of "fill" to the basin at the base of the cooling towers. Fans blow air up through the falling water, evaporating water and allowing the heat to disperse out the top of the cooling towers into the atmosphere. The water in the cooling tower basin flows through the cooling tower return canal to the distribution basin, where it can either be routed back through the facility's condensers by way of the intake canal (closed cycle) or sent to the discharge canal to return to the Mississippi River (helper cycle). The cooling towers can be used for the total circulating water flow of 588,000 gpm (37.1 m^3/s) and can remove up to 96 percent of the waste heat created by the facility. (NMC 2008)

Requirements Under NPDES Permit

In accordance with the Federal Water Pollution Control Act (or the Clean Water Act [CWA]), PINGP 1 and 2 effluent discharges are regulated by the NPDES and State Disposal System Permit No. MN0004006 issued and enforced by the MPCA. Section 402 of the CWA states that "NPDES prohibits [discharges] of pollutants from any point source into the nation's waters except as allowed under an NPDES permit." The purpose of this permit is to regulate wastewater discharge to preserve the water quality of the surrounding water bodies. As of the most recent permit issued, there have been no notices of violation for the PINGP 1 and 2 site. Information in this section was obtained from the most recent PINGP 1 and 2 NPDES permit, a copy of which is included in the applicant's license renewal environmental report. The most recent renewal of this permit occurred in June 2006 and expires August 2010.

In order to minimize the impacts from the PINGP 1 and 2 cooling system on entrainment and impingement of fish and shellfish, the NPDES permit dictates the screen size the plant must use during the spring and summer. Additionally, the NPDES permit imposes limits on the discharge of cooling water from April to June, in order to minimize the impacts of entrainment and impingement of fish and shellfish. This indirectly restricts the withdrawal rates, as the discharge rate approximates the withdrawal rate.

To minimize the impacts the heated discharge from the PINGP 1 and 2 cooling system, the NPDES permit specifies the times and trigger points when the plant must switch the operating mode of the cooling system. The permit defines the fall trigger point as when the daily average upstream ambient river temperature falls below 43 degrees Fahrenheit (°F; 6 degrees Celcius [°C]) for five consecutive days. (MPCA 2006)

The only surface discharge aside from the discharge canal outfall (SD 001) that discharges directly to the Mississippi is SD 012. SD 012 discharges the plant intake screen backwash as well as the fish return system of any impinged fish, aquatic organisms, or debris directly to the river.

The cooling water discharge restrictions are as follows. From April 15 to April 30 discharge is restricted to 194 million gallons per day (mgd; 7.34×10^5 cubic meters per day [m^3/day]) if the flow of the Mississippi River is at or above 15,000 cfs (424.8 m^3/s). If the river flow is below this level, discharge is limited to 97 mgd (3.67×10^5 m^3/day). From May 1 to May 31 discharge is restricted to 194 mgd (7.34×10^5 m^3/day), from June 1 to June 15 it raises to 259 mgd (9.80×10^5 m^3/day), and from June 16 to 30 is raises again to 517.5 mgd (1.96×10^6 m^3/day). Outfall SD 001 is permitted to exceed these discharge limitations only in the event that it is necessary in order to prevent temperatures from exceeding 85 °F (29 °C).

Thermal limitations require temperature monitoring at five different locations: the discharge canal outfall (SD 001), the plant intake (SW 002), a specified point in the main river channel (SW 003), a specified point in Sturgeon Lake (SW 004), and a point directly downstream of Lock and Dam No. 3 (SW 001) which is to be monitored using three different temperature probes. The permit states that the daily average temperature should under no circumstances exceed 86 °F (30 °C) and that the temperature of the receiving water should not raise over 5 °F (2.8 °C) above the ambient water temperature. The permit specifies that if the ambient water temperature reaches 78 °F (26 °C) for two consecutive days, all cooling towers should operate to their maximum extent.

4.0 Assessment of Listed Species and Critical Habitat

Life History of Higgins Eye Pearlymussel

The Higgins eye pearlymussel was Federally listed as an endangered species on June 14, 1976 (41 FR 24064). Although the historical range is not completely known, the Higgins eye was never abundant. The current distribution, which includes the Upper Mississippi River above Lock and Dam 19 and the St. Croix, Wisconsin, and Rock Rivers, is about half the historical range (FWS 2000a). Although FWS (2004a) lists no critical habitat for the species, it has designated 10 Essential Habitat Areas for the Higgins eye: Six in the Mississippi River, 3 in the St. Croix River, and 1 in the Wisconsin River. The closest Essential Habitat Area to PINGP 1 and 2 is in the St. Croix River, just upstream of the junction with the Mississippi River, near Prescott, Wisconsin (FWS 2004a).

Higgins eye pearlymussels are typically found in large, stable, species-diverse mussel beds in medium to large rivers with firm substrate ranging from sand to boulders (FWS 2000a; 2004a). Water current velocities typical of Higgins eye habitat range from 0.5 to 1.5 fps (1.5 to 4.5 cm/s), and depths range from 3.3 to 19.7 ft (1-6 m) (FWS 2000a). To reproduce, males release sperm into the water column. As females siphon water for food, they also take in the sperm to fertilize eggs in gill sacs (marsupia), where the fertilized eggs mature into glochidia (a larval stage). The ribbon-like mantle edge near the posterior of the female acts as a lure to attract fish; when the fish attack the mantle, glochidia are released into the water and attach to the gills of the host fish. If the glochidia successfully attach to fish gills, they can mature into juvenile mussels (typically 3 weeks), excyst from the gills, settle to suitable substrate, and mature into adults. Some studies suggest glochidia remain in the marsupia through winter and are released in spring or summer. (FWS 2000a; FWS 2004a)

Fish known to be suitable hosts for the glochidia of the Higgins eye pearlymussel include freshwater drum (*Aplodinotus grunniens*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieu*), yellow perch (*Perca falvescens*), sauger (*Stizostedion canadense*), and walleye (*S. vitreum vitreum*); marginal fish hosts include northern pike (*Esox lucius*), bluegill (*Lepomis macrochirus*), and green sunfish (*L. cyanellus*) (FWS 2004a).

Status of Higgins Eye Pearlymussel in the Vicinity of PINGP Units 1 and 2

Currently, the major threat to the Higgins eye pearlymussel, like most other native mussels in the Upper Mississippi River, is the invasion of zebra mussels (*Dreissena polymorpha*), which compete for food and space, and even colonize on native mussels. The subfamily Lampsilinae to which the Higgins eye belongs is among the most sensitive groups of mussels to zebra mussel invasion (FWS 2000a). Researchers have not developed effective and practical measures to control zebra mussel populations without harming native aquatic organisms (WDNR 2004).

Other threats to the survival of native mussel species, including Higgins eye pearlymussel, include dredging, the disposal of dredged material, channelization, and commercial navigation. The creation of the lock and dam system in the Upper Mississippi River caused pools to replace once-flowing water, and the movement of fish species that serve as hosts to native mussel species and participate in their distribution are now restricted. Damming the upper Mississippi may have favored Higgins eye populations in some pools, because low velocity waters provide favorable habitat for the species. Yet some observations indicate that populations of Higgins eye in some pools have decreased, possibly due to conditions such as increased sedimentation. The net effect of damming the Mississippi River on Higgins eye populations therefore remains uncertain. Few documented reports of the commercial harvest of Higgins eye exist. (FWS 2000a)

In 1993, the USACE began a consultation with the FWS under Section 7 of the ESA for the operation and maintenance of the 9-foot Navigation Project on the Upper Mississippi River. The Higgins eye pearlymussel was included in this consultation. As a result, FWS (2000a) issued a biological opinion with a jeopardy determination for the Higgins eye. FWS provided reasonable and prudent alternatives to allow for the project while offsetting adverse impacts to the species involved, including the alternative that USACE develop a Higgins' eye pearlymussel relocation action plan and conduct a study to control the spread of zebra mussels.

The USACE (2002), in cooperation with the Mussel Coordination Team, an interagency team of biologists, issued an environmental assessment for a relocation plan of the Higgins eye, with a proposal to establish five new populations of the Higgins eye by moving adults from zebra mussel-infested areas into sections of the river that had no or low levels of zebra mussels, as well as raising juvenile mussels at hatcheries and stocking areas of the river (USACE 2002). State and Federal agencies, including the FWS, determined that an area within Pool 3, 0.5 mi (0.8 km) upstream of the PINGP 1 and 2 intake structure, was a suitable habitat for a relocation project for subadult Higgins eye. In 2002, USACE, in cooperation with the Mussel Coordination Team, prepared an environmental assessment for the relocation plan for the Higgins eye, in which they report "good recovery of mussels" following the relocation of 100 adult Higgins eye by the Minnesota Department of Natural Resources (MNDNR), the Wisconsin Department of Natural Resources (WDNR), and the FWS (USACE 2002). The environmental assessment also identified the location as a good relocation site based on the 2000 Minnesota 305(b) water quality status report, which listed Pool 3 as providing "full support" for aquatic life (USACE 2002). Over 4000 sub-adults have been relocated to the Sturgeon Lake section of Pool 3, as of the 2005 Status Report (Mussel Coordination Team 2005). The Mussel Coordination Team (2005) reported "good recovery" for Pool 3 subadults after conducting monitoring in 2003.

Effects of PINGP Units 1 and 2 on Higgins Eye Pearlymussel

The cooling water intake structure of a power plant can pose a threat to fish and shellfish, and mussels have the potential to be impinged on screens or entrained by the cooling system. The life cycle of the Higgins eye pearly mussel renders it unlikely that individuals of this species would be at risk of impingement or entrainment. Gravid females carry fertilized eggs until they mature into glochidia. The female uses a lure to attract host fish and releases the glochidia into the water column, where they can attach to the gills of the fish; if they fail to attach to the host, glochidia are unlikely to attach later and mature into juveniles. Glochidia that successfully attach to fish gills mature into juveniles, drop from the gills to the river bottom, and settle on the river bottom. Juveniles that settle on suitable substrate mature into adults. Because juveniles and adults do not live in the water column, their likelihood of entrainment is very low.

The one period of the life cycle during which the Higgins eye could be at risk from the cooling system of a power plant is when the glochidium is attached to the fish host. If the host fish is impinged and killed on the screens of the cooling system, the glochidium would be unlikely to be able to mature into a juvenile; if it had already matured into a juvenile and dropped off the fish while the fish was impinged, it would be swept into the cooling system and entrained. FWS (2004) reported that suitable fish hosts for the glochidia of the Higgins eye pearlymussel include freshwater drum (*Aplodinotus grunniens*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), yellow perch (*Perca falvescens*), sauger (*Sander canadense*), and walleye (*S. vitreus vitreus*); marginal fish hosts include northern pike (*Esox lucius*), bluegill (*Lepomis macrochirus*), and green sunfish (*Lepomis cyanellus*). In its Impingement Mortality and Entrainment Characterization Plan, Xcel Energy Environmental Center (2006) reported impingement or entrainment of these species during various life stages.

The biology of some life stages of some of these host species limits their susceptibility to impingement and entrainment by PINGP 1 and 2. The centrarchids (largemouth and smallmouth bass, bluegill, and green sunfish) build nests where they spawn and the males guard the eggs and larvae for weeks to months, depending on the species. The eggs of the centrarcheds and percids (yellow perch, sauger, and walleye) are demersal and sticky, and so are not particularly vulnerable to entrainment. The larvae of these percids, however, are planktonic, and vulnerable to entrainment. Only the freshwater drum has planktonic eggs and larvae, and Xcel Energy (2006) reports high numbers of these impinged on the PINGP 1 and 2's fine-mesh screens. Xcel Energy (2006) also reported that immediate impingement survival of prolarvae and postlarve of all fish species is low, averaging 7.2 and 5.5 percent, respectively, and but did not measure or estimate the more meaningful, longer-term incipient survival, which would be even lower.

Juvenile freshwater drum, sunfish, and percids are impinged, but the average immediate survival of all juvenile fish impinged on the fine-mesh screens is relatively high (71.5 percent (Xcel Energy 2006), although incipient survival is unknown. The adults of the host fish species typically can swim fast enough to have low vulnerability, although Xcel Energy (2006) reports impingement of some adult percids and centrarchids on the fine-mesh screens. When taken together, these results suggest that populations of fish species that serve as hosts for Higgins eye pearlymussel have some limited vulnerability to entrainment and impingement at PINGP 1 and 2, at least locally, that might result in somewhat reduced population numbers. NRC staff finds that any such reductions, if they occur, would not adversely affect Higgins eye pearlymussels, however, because no population of the Higgins eye has been reported in the vicinity of the plant.

5.0 Conclusion

In order to assess the potential adverse affects on the Higgins eye pearlymussel, the NRC staff considered the life cycle of the Higgins eye, the limited time the mussel spends in the water column during which it could be subject to entrainment, and the low probability of the primary fish hosts for the species being impinged (and therefore the even lower probability of a fish host being impinged while carrying Higgins eye glochidia). In addition, Higgins eye pearlymussels were not found in the area around Lock and Dam 3 in studies conducted in 1986, 1999, 2000, and 2003. The NRC staff concludes that renewal of the PINGP Units 1 and 2 licenses to operate for an additional 20 years is not likely to adversely affect Higgins eye pearlymussel.

NRC staff also recognizes that the FWS determined that the area just upstream of the PINGP 1 and 2 intake structure is a suitable site for the Higgins eye relocation project. If that project is successful in establishing a reproducing population of Higgins eye during the renewal term of the licenses, impingement and entrainment at PINGP 1 and 2 of suitable fish hosts may adversely affect the mussel population. Therefore, NRC may have to re-assess the potential for adverse effects at some time in the future.

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Appendix E

Chronology of Environmental Review Correspondence

E. Chronology of Environmental Review Correspondence

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and external parties as part of its environmental review for Prairie Island Nuclear Generating Plant, Units 1 and 2. All documents, with the exception of those containing proprietary information are available electronically from the NRC's Public Electronic Reading Room found on the Internet at the following Web address: http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents in ADAMS. The ADAMS accession number for each document is included below.

E.1 Environmental Review Correspondence

January 29, 2008	Letter from the Prairie Island Indian Community, regarding potential application to renew the license for the Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML080390402).
February 23, 2008	Letter to Ronald Johnson, Prairie Island Indian Community, regarding anticipated license renewal review for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML080460246).
March 21, 2008	Letter to Ronald Johnson, Prairie Island Indian Community, regarding request for cooperating agency status for the Prairie Island Nuclear Generating Plant, Units 1 and 2, license renewal environmental review (ADAMS Accession No. ML080710522).
April 11, 2008	Letter from NMC forwarding the application for renewal of operating license for Prairie Island Nuclear Generating Plant, Units 1 and 2, requesting an extension of operating license for an additional 20 years (ADAMS Accession No. ML081130666).
April 14, 2008	Letter from the Prairie Island Indian Community, "Re: Request for Cooperating Agency Status" (ADAMS Accession No. ML081080036).
April 28, 2008	Letter to NMC, "Receipt and Availability of the License Renewal Application for the Prairie Island Nuclear Generating Plant, Units 1 and 2" (ADAMS Accession No. ML081050091).
May 1, 2008	Letter from the Prairie Island Indian Community to Terry Virden, Bureau of Indian Affairs, regarding Prairie Island Nuclear Generating Plant, Units 1 and 2, license renewal review (ADAMS Accession No. ML0814006650).
May 2, 2008	Letter to Ronald Johnson, Prairie Island Indian Community, regarding request to participate as a cooperating agency (ADAMS Accession No. ML081200867).

May 6, 2008	*Federal Register* notice, "Nuclear Management Company, LLC; Notice of Receipt and Availability of Application for Renewal of Prairie Island Nuclear Generating Plant, Units 1 and 2, Facility Operating License Nos. DPR-42 and DPR-60 for an Additional 20-Year Period" (73 FR 25034).
May 13, 2008	NRC press release announcing the availability of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2, for public inspection (ADAMS Accession No. ML081340103).
May 15, 2008	Email from Heather Westra, Prairie Island Indian Community, transmitting the markup of the draft Memorandum of Understanding (ADAMS Accession Nos. ML081630551 and ML081630555).
May 19, 2008	Letter to NMC forwarding the correction to notice of receipt and availability of the license renewal application for the Prairie Island Nuclear Generating Plant, Units 1 and 2" (ADAMS Accession No. ML081330711).
June 10, 2008	Letter to NMC, "Determination of Acceptability and Sufficiency for Docketing, Proposed Review Schedule, and Opportunity for a Hearing Regarding the Application from Nuclear Management Company, LLC, for Renewal of the Operating Licenses for the Prairie Island Nuclear Generating Plant, Units 1 and 2" (ADAMS Accession No. ML081370273).
June 14, 2008	Letter to Ronald Johnson, Prairie Island Indian Community, transmitting the Memorandum of Understanding between the U.S. Nuclear Regulatory Commission and the Prairie Island Indian Community as a Cooperating Agency for the Prairie Island Nuclear Generating Plant, Units 1 and 2, license renewal environmental review (ADAMS Accession No. ML081610245).
June 14, 2008	Memorandum of Understanding between the U.S. Nuclear Regulatory Commission and the Prairie Island Indian Community as a Cooperating Agency (ADAMS Accession No. ML081610273).
June 17, 2008	*Federal Register* notice, "Nuclear Management Company, LLC, Prairie Island Nuclear Generating Plant, Units 1 and 2, Notice of Acceptance for Docketing of the Application and Notice of Opportunity for Hearing Regarding Renewal of Facility Operating License Nos. DPR-42 and DPR-60 for and Additional 20-Year Period" (73 FR 34355).
June 17, 2008	Letter from Philip R. Mahowald, Prairie Island Indian Community, transmitting the fully executed Memorandum of Understanding between the U.S. Nuclear Regulatory Commission and the Prairie Island Indian Community as a Cooperating Agency (ADAMS Accession No. ML081710160).

June 26, 2008	Letter to NMC, "Notice of Intent to Prepare and Environmental Impact Statement and Conduct Scoping Process for License Renewal for the Prairie Island Nuclear Generating Plant, Units 1 and 2" (ADAMS Accession No. ML081620382).
June 26, 2008	NRC press release, "NRC and Prairie Island Indian Community Sign First-of-a-Kind Memorandum of Understanding" (ADAMS Accession No. ML081780445).
July 10, 2008	Letter to Don L. Klima, Advisory Council on Historic Preservation, inviting participation in scoping process related to NRC's environmental review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081850189).
July 15, 2008	Letter to NMC, "Notice of Intent to Prepare and Environmental Impact Statement and Conduct Scoping Process for License Renewal for the Prairie Island Nuclear Generating Plant, Units 1 and 2" (ADAMS Accession No. ML081970679).
July 17, 2008	Memoradum to Rani Franovich, NRC, "Forthcoming Meeting to Discuss the License Renewal and Environmental Scoping Process for the Prairie Island Nuclear Generating Station, Units 1 and 2, License Renewal Application" (ADAMS Accession No. ML081910743).
July 21, 2008	Letter to Philip R. Mahowald, Prairie Island Indian Community, "Request for Scoping Comments Concerning the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application Review" (ADAMS Accession No. ML081850414).
July 22, 2008	*Federal Register* notice, "Nuclear Management Company, LLC, Prairie Island Nuclear Generating Plant, Units 1 and 2, Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process" (73 FR 42628).
July 22, 2008	Letter to Terrance Virden, U.S. Bureau of Indian Affairs, inviting participation in scoping process related to NRC's environmental review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081930470).
July 22, 2008	Letter to Heather Westra, Prairie Island Indian Community, inviting participation in scoping process related to NRC's environmental review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081850178).
July 22, 2008	Letter to Lisa A. Joyal, Minnesota Department of Natural Resources, "Request for List of State-Protected Species and Important Habitats Within the Area Under Evaluation

	for the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application Review" (ADAMS Accession No. ML081890395).
July 22, 2008	Letter to NMC, "Revision of Schedule for the Review of the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application" (ADAMS Accession No. ML081980353).
July 22, 2008	Letter to Tony Sullins, U.S. Fish and Wildlife Service, "Request for List of Federally Protected Species Within the Area Under Evaluation for the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Review Application" (ADAMS Accession No. ML081850485).
July 22, 2008	Letter to Emily Rusch, Wisconsin Department of Natural Resources, "Request for List of State-Protected Species Within the Area Under Evaluation for the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application Review" (ADAMS Accession No. ML081930340).
July 22, 2008	Letter to Dennis A. Gimmestad, State Historic Preservation Officer, Minnesota Historical Society, inviting participation in scoping process related to NRC's environmental review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081840682).
July 24, 2008	Letter to Ronald Johnson, Prairie Island Indian Community,[a] inviting participation in scoping process related to NRC's environmental review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML082070095).
July 25, 2008	NRC press release, "NRC Seeks Public Input on Environmental Impact Statement for Prairie Island License Renewal Review" (ADAMS Accession No. ML082070110).
July 30, 2008	Letter to NMC, "Environmental Site Audit Regarding Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application" (ADAMS Accession No. ML082040527).
July 30, 2008	Summary of telephone conference call held on July 2, 2008, between the NRC and the Prairie Island Indian Community, concerning the license renewal of Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML082050652).
August 13, 2008	Letter from Tony Sullins, U.S. Fish and Wildlife Service, regarding request for list of Federally protected species within the area under evaluation for the Prairie Island Nuclear Generating Plant, Units 1 and 2, license renewal application review (ADAMS Accession No. ML082470303).

August 18, 2008	Letter from Kevin Bearquiver, U.S. Bureau of Indian Affairs, regarding invitation to participate in scoping process related to NRC's environmental review of the license renewal application for Prairie Island Nuclear Generating Plant, Units 1 and 2 (ADAMS Accession No. ML081470304).
August 26, 2008	Letter from Heidi Cyr, Minnesota Department of Natural Resources, "Re: Request for Natural Heritage Information in the Vicinity of the Prairie Island Nuclear Generating Plant" (ADAMS Accession Nos. ML083290584 and ML083290592).
September 8, 2008	Letter from Tom Lovejoy, Wisconsin Department of Natural Resources, "Prairie Island Nuclear Generating Plant License Renewal – EIS Scoping Issues" (ADAMS Accession No. ML083080277).
September 8, 2008	Letter from Xcel Energy transmitting "Prairie Island Nuclear Generating Plant License Renewal Environmental Report Additional Information: Documents Requested During NRC Environmental Review" (ADAMS Accession No. ML083120219).
September 26, 2008	Letter from Xcel Energy, "Submittal of Documents for Public Disclosure as Requested During NRC License Renewal Environmental Audit" (ADAMS Accession No. ML083120218).
September 29, 2008	Letter from Xcel Energy, "Submittal of Archaeological Documents Requested During NRC License Renewal Environmental Audit" (ADAMS Accession No. ML082880304).
October 23, 2008	Letter to Kevin Bearquiver, U.S. Bureau of Indian Affairs, "Response to Letter from K. Bearquiver Regarding Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application Review" (ADAMS Accession No. ML082820382).
October 23, 2008	Letter to NMC, "Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application (ADAMS Accession No. ML0829505510).
October 23, 2008	Attachment to letter to NMC, "Request for Additional Information for the Review of the Prairie Island Nuclear Generating Plant, Units 1 and 2, License Renewal Application" (ADAMS Accession No. ML082950604).

[a]Similar letters went to twenty eight other Native American Tribes listed in Section 1.8.

APPENDIX F

U.S Nuclear Regulatory Commission Staff Evaluation of Severe Accident Mitigation Alternatives (SAMAs) for Prairie Island Nuclear Generating Plant, Units 1 and 2, in Support of License Renewal Application Review

F. U.S Nuclear Regulatory Commission Staff Evaluation of Severe Accident Mitigation Alternatives (SAMAs) for Prairie Island Nuclear Generating Plant, Units 1 and 2, in Support of License Renewal Application Review

F.1. Introduction

Northern States Power Company (NSP) submitted an assessment of severe accident mitigation alternatives (SAMAs) for Prairie Island Nuclear Generating Plant, Units 1 and 2, (PINGP 1 and 2) as part of the Environmental Report (ER) (NMC 2008). This assessment was based on the most recent PINGP 1 and 2 Probabilistic Risk Assessment (PRA) available at that time, a plant-specific offsite consequence analysis performed using the MELCOR Accident Consequence Code System 2 (MACCS2) computer code, and insights from the PINGP 1 and 2 Individual Plant Examination (IPE) (NSP 1994) and Individual Plant Examination of External Events (IPEEE) (NSP 1998). In identifying and evaluating potential SAMAs, NSP considered SAMAs that addressed the major contributors to core damage frequency (CDF) and large early release frequency (LERF) at PINGP 1 and 2, as well as SAMA candidates for other operating plants that have submitted license renewal applications. NSP identified 25 potential SAMA candidates for each unit. This list was reduced to nine unique SAMA candidates for each unit by eliminating SAMAs that: are not applicable at PINGP 1 and 2 because of design differences, have already been implemented, have no significant benefit or have benefits which have been achieved by other means, or require extensive changes that would involve implementation costs known to exceed any possible benefit. NSP assessed the costs and benefits associated with each of the potential SAMAs and concluded that several of these would be potentially cost-beneficial.

Based on a review of the SAMA assessment, the U.S. Nuclear Regulatory Commission (NRC) issued requests for additional information (RAI) to NSP by letters dated October 23, 2008 (NRC 2008a) and December 24, 2008 (NRC 2008b). Key questions concerned: unit-to-unit differences and their treatment in the PRA model, PRA peer review and quality controls, treatment of reactor coolant pump (RCP) seal LOCA and induced steam generator tube rupture (SGTR) events in the PRA, justification for the multiplier used for external events, the identification and screening of internal flood related enhancements, and further information on several specific candidate SAMAs and potential lower-cost alternatives. NSP submitted additional information by letters dated November 21, 2008 (NSP 2008), and January 23, 2009 (NSP 2009a). In the responses, NSP provided: descriptions of unit-to-unit differences and how they were reflected in the PRA, further information regarding the PRA peer review and self-assessments, additional analyses of the impact of alternative RCP seal LOCA model and induced SGTR model assumptions on SAMA results, additional information regarding external event SAMAs and justification for the treatment of external events, additional information regarding internal flood related enhancements and their screening, and additional information regarding several specific SAMAs. NSP's responses addressed the NRC staff's concerns and resulted in the identification of several additional potentially cost-beneficial SAMAs.

An assessment of SAMAs for PINGP 1 and 2 is presented below.

F.2. Estimate of Risk for PINGP 1 and 2

NSP's estimates of offsite risk at PINGP 1 and 2 are summarized in Section F.2.1. The summary is followed by the NRC staff's review of NSP's risk estimates in Section F.2.2.

F.2.1. NSP's Risk Estimates

Two distinct analyses are combined to form the basis for the risk estimates used in the SAMA analysis: (1) the PINGP 1 and 2 Level 1 and Level 2 PRA model, which is an updated version of the IPE (NSP 1994), and (2) a supplemental analysis of offsite consequences and economic impacts (essentially a Level 3 PRA model) developed specifically for the SAMA analysis. The SAMA analysis is based on the most recent PINGP 1 and 2 Level 1 and Level 2 PRA model available at the time of the ER, referred to as the Rev. 2.2 (SAMA) model. The scope of the PINGP 1 and 2 PRA does not include external events.

The baseline CDF for the purpose of the SAMA evaluation is approximately 9.79×10^{-6} per year for Unit 1 and 1.21×10^{-5} per year for Unit 2. The CDF is based on the risk assessment for internally initiated events including internal flooding. NSP did not include the contribution from external events within the PINGP 1 and 2 risk estimates; however, it did account for the potential risk reduction benefits associated with external events by doubling the estimated benefits for internal events. This is discussed further in Sections F.2.2 and F.6.2.

The breakdown of CDF by initiating event is provided in Table F-1. As shown in this table, events initiated by small LOCA, loss of cooling water and loss of offsite power are the dominant contributors to internal event CDF for each unit. Although not separately reported, station blackout sequences contribute about 9 percent and 8 percent for Unit 1 and 2, respectively, of the total internal events CDF, while anticipated transient without scram (ATWS) sequences contribute about 2 percent and 1 percent for Unit 1 and 2, respectively (NSP 2008). The differences in the CDF contributions result largely from several differences between the two PINGP 1 and 2 units. Section F.2.2 discusses these differences in greater detail.

Table F-1. PINGP Core Damage Frequency

Initiating Event	**Unit 1**		**Unit 2**	
	CDF (per year)	**% Contribution to CDF**	**CDF (per year)**	**% Contribution to CDF**
Small LOCA	4.8 x 10-6	49	5.4 x 10-6	45
Loss of Cooling Water	1.8 x 10-6	18	1.8 x 10-6	15
Loss of Offsite Power	1.0 x 10-6	11	1.2 x 10-6	10
Loss of Main Feedwater	3.9 x 10-7	4	4.1 x 10-7	3
Medium LOCA	3.4 x 10-7	3	5.4 x 10-7	4
Loss of Component Cooling Water	2.9 x 10-7	3	2.9 x 10-7	2
Large LOCA	2.8 x 10-7	3	3.1 x 10-7	3
Internal Flooding	2.4 x 10-7	2	2.4 x 10-7	2
Normal Transient	2.4 x 10-7	2	2.8 x 10-7	2
Steam Generator Tube Rupture (STGR)	1.9 x 10-7	2	1.1 x 10-6	9
Loss of Train A DC	3.8 x 10-8	<1	4.0 x 10-7	3
Other	2.1 x 10-7	2	1.7 x 10-7	1
Total CDF (internal events)	**9.79 x 10-6**	**100**	**1.21 x 10-5**	**100**

The current PINGP 1 and 2 Level 2 PRA model is based on the IPE models with updates to reflect changes to the plant and modeling techniques, including the steam generator replacement for Unit 1. The Level 1 core damage sequences are assigned to core damage bins (plant damage states) that provide the interface between the Level 1 and Level 2 analyses. The Level 2 models use containment event trees (CETs) with functional nodes representing both systemic and phenomenological events. CET nodes are evaluated using supporting fault trees and event trees.

The result of the Level 2 PRA is a set of 18 release categories with their respective frequency and release characteristics. The frequency of each release category was obtained by summing the frequency of the CET endstates assigned to each release category. Source terms were developed for each of the release categories using the results of Modular Accident Analysis Program (MAAP) 3.0B computer code calculations. The 18 release categories were collapsed into 10 bounding release categories used for the SAMA analysis. The release categories and their release characteristics are presented in Tables F.3-5 and F.3-6 of the ER.

The offsite consequences and economic impact analyses use the MACCS2 code to determine the offsite risk impacts on the surrounding environment and public. Input for these analyses includes plant-specific and site-specific values for core radionuclide inventory, source term and release characteristics, site meteorological data, projected population distribution (within an 80-km [50-mi] radius) for the year 2034, emergency response evacuation modeling, and economic data. The magnitude of the onsite impacts (in terms of cleanup and decontamination costs and occupational dose) is based on information provided in NUREG/BR-0184 (NRC 1997a).

NSP estimated the dose to the population within 50 mi of the PINGP 1 and 2 site to be approximately 2.94 person-rem per year for Unit 1 and 8.37 person-rem per year for Unit 2. The breakdown of the total population dose by containment release mode is summarized in Table F-2. This table reflects minor corrections to several entries provided by NSP in response to an RAI (NSP 2008). Releases due to steam generator tube rupture (SGTR) events, interfacing system loss-of-coolant accidents (ISLOCAs), and late containment failures dominate the population dose risk at PINGP 1 and 2.

Table F-2. Breakdown of Population Dose by Containment Release Mode

Containment Release Modes		Unit 1		Unit 2	
		Population Dose (person-rem(a) per year)	**Percent Contribution**	**Population Dose (person-rem(a) per year)**	**Percent Contribution**
Intact Containment	Normal Leakage	0.01	0.4	0.01	0.2
Early Containment Failure	Over-pressure Failure	0.12	4.1	0.14	1.7
	Isolation Failure	<0.01	0.1	<0.01	<0.1
Late Containment Failure	Basemat Failure	0.63	21.4	0.76	9.0
	Over-pressure Failure	0.12	4.1	0.12	1.4
Containment Bypass	SGTR	1.32	44.9	6.66	79.0
	ISLOCA	0.74	25.0	0.74	8.7
Total		**2.94**	**100**	**8.43**	**100**

F.2.2. NRC Staff's Review of NSP's Risk Estimates

NSP's determination of offsite risk at PINGP 1 and 2 is based on the following three major elements of analysis:

- the Level 1 and 2 risk models that form the basis for the 1994 IPE submittal (NSP 1994) and the external events analyses of the 1998 IPEEE submittal (NSP 1998),
- the major modifications to the IPE model that have been incorporated into the PINGP 1 and 2 PRA, and
- the MACCS2 analyses performed to translate fission product source terms and release frequencies from the Level 2 PRA model into offsite consequence measures.

Each of these analyses was reviewed to determine the acceptability of NSP's risk estimates for the SAMA analysis, as summarized below.

The NRC staff's review of the PINGP 1 and 2 IPE is described in an NRC report dated May 16, 1997 (NRC 1997b). On the basis of a review of the IPE submittal, the staff concluded that the IPE submittal met the intent of Generic Letter (GL) 88-20; that is, the IPE was of adequate quality to be used to look for design or operational vulnerabilities. Although no vulnerabilities were identified in the IPE, several plant improvements were identified. These improvements have either been implemented at the site or addressed by a SAMA in the current evaluation. These improvements are discussed in Section F.3.2.

There have been over five revisions to the Level 1 model since the 1994 IPE submittal. A comparison of the internal events CDF between the IPE and the Rev. 2.2 (SAMA) PRA model indicates a decrease of approximately 80 percent for both units (from 5.0×10^{-5} per year to 9.79×10^{-6} per year for Unit 1 and from 5.1×10^{-5} per year to 1.21×10^{-5} per year for Unit 2). A comparison of the contributors to the total CDF indicates that the frequency of each major contributor (e.g., LOCAs, loss of offsite power (LOOP), internal flooding) has decreased by factors of 2 to 10 since the IPE. A description of those changes that resulted in the greatest impact on the internal events CDF is provided in Section F.2.1 of the ER (NMC 2008) and in response to an RAI (NSP 2008a), and is summarized in Table F-3.

Table F-3. PINGP 1 and 2 PRA Historical Summary

PRA Version	Summary of Changes from Prior Model	Unit 1 CDF (per year)	Unit 2 CDF (per year)
1994 (Rev. 0)	IPE submittal	5.0 x 10-5	5.1 x 10-5
Rev. 1.0	1996 Update • Added selected balance-of-plant systems • Updated the plant safeguards electrical systems • Updated component failure and unavailability data for six key systems • Reanalyzed LOCA frequencies	2.4 x 10-5	NA
Rev. 1.1	1999 Update • Changed PRA quantification to a single top fault tree approach	2.4 x 10-5	NA
Rev. 1.2	2001 Update • Resolved selected Westinghouse Owners Group PRA Certification Team Review comments • Updated component failure rates	2.2 x 10-5	NA
Rev. 2.0	2002 Update • Developed a Unit 2 PRA model from Unit	2.2 x 10-5	2.5 x 10-5

PRA Version	Summary of Changes from Prior Model	Unit 1 CDF (per year)	Unit 2 CDF (per year)
	1 • Removed boric acid storage tank input to the safety injection pumps suction logic • Enhanced existing quantification methodology • Modified charging pump system fault tree logic to include an operator action to restart the pumps after a LOOP event • Modified RHR to include the same common cause failure event in the injection, recirculation and shutdown cooling modes • Added operator action to prevent load sequencer failure • Updated logic modeling for the supply/exhaust fans		
Rev. 2.1	2005 Update • Updated LOOP initiating frequency • Updated various system fault trees • Upgraded the human reliability analysis (HRA) • Corrected the process used to model pre-initiator latent errors • Added modeling of 120 V AC panel faults • Updated failure and common cause data for EDG and AFW systems • Updated internal flooding analysis	1.5 x 10-5	1.6 x 10-5
Rev. 2.2	2006 Update • Closed all remaining Level B WOG Peer Certification Review findings • Updated initiating event frequency to reflect the installation of new steam generators (for Unit 1 only)	9.8 x 10-6	1.1 x 10-5
Rev. 2.2 (SAMA)	2006 Update • Corrected Units 1 and 2 Level 1 core damage sequence success logic for the small LOCA event	9.8 x 10-6	1.2 x 10-5

The IPE CDF value for PINGP 1 and 2 was the lowest CDF value reported in the IPE for Westinghouse two-loop plants. Figure 11.6 of NUREG-1560 shows that the IPE-based total internal events CDF for Westinghouse two-loop plants ranges from 5×10^{-5} to 1.2×10^{-4} per reactor-year (NRC 1997c). It is recognized that other plants have updated the values for CDF subsequent to the IPE submittals because of modeling and hardware changes. The internal events CDF based on the latest PRA (9.79×10^{-6} per year and 1.21×10^{-5} per year for Units 1 and 2, respectively) remains lower than the latest CDF values reported in the license renewal applications for other two-loop Westinghouse plants, which are in the range of 3×10^{-5} to 4×10^{-5} per year. The NRC staff concludes that although lower than for the other two-loop plants, the current internal events CDF results for PINGP 1 and 2 are still reasonably consistent with that for plants of similar vintage and characteristics.

The ER identifies several design differences between Unit 1 and Unit 2. The NRC staff requested additional information on how the differences between the units impacted core damage frequency and release frequencies. In its response, NSP identified the following unit differences and their estimated impacts (NSP 2008):

- As the result of a motor-driven Auxiliary Feedwater (MDAFW) pump control power asymmetry, the Loss of Train A DC initiating event contributes more significantly to the Unit 2 CDF (4.0 x 10^{-7} per year) than it does to the Unit 1 CDF (3.8 x 10^{-8} per year) because the loss of this bus results in the loss of main feedwater and the loss of breaker control power for the Unit 2 MDAFW pump. The Unit 1 pump is not impacted. The control power asymmetry also contributes to a higher potential for induced SGTR on Unit 2 due to the inability of one AFW pump to automatically start on loss of Train A DC power increasing the potential for the event to degrade into a core damage event at high pressure due to loss of heat sink.

- The Unit 1 emergency diesel generators (EDGs) are the original EDGs that provided backup power to both units, while the Unit 2 EDGs were added in response to the Station Blackout (SBO) Rule and differ in manufacturer, design, capacity, and in the external systems required to support their operation. Due to the independent design of the EDGs between units combined with the ability to cross-tie the 4kV buses across units, the contribution to the CDF from a loss of all AC power is less than 10 percent for both units.

- A Unit 1 steam generator replacement project was completed in 2004, while the replacement of the Unit 2 steam generators has not yet been completed. Therefore, there is a lower potential for an SGTR-initiated core damage event at Unit 1. The licensee notes that the Level 2 PRA analysis does not credit a possibly lower potential for pressure- and temperature-induced SGTR events on Unit 1.

The NRC staff considered the peer review performed for the PINGP 1 and 2 PRA, and the potential impact of the review findings on the SAMA evaluation. In the ER (NMC 2008) and in response to NRC staff RAIs (NSP 2008 and 2009), NSP described the peer review by the (former) Westinghouse Owners Group (WOG) of the 1994 PRA model (i.e., the IPE) conducted in September 2000. NSP states that the WOG review concluded that the PINGP 1 and 2 PRA can be effectively used to support applications involving relative risk significance. NSP further states that all Level A (important and necessary to address before the next regular PRA update) and Level B (important and necessary to address, but disposition may be deferred until the next PRA update) facts and observations (F&Os) from the peer review have been resolved.

In response to an RAI (NSP 2008), NSP noted that one of the F&Os involved the PRA maintenance and update process, and had been subsequently resolved. In a follow-up response (NSP 2009a), NSP described two procedures that were developed to address this F&O. One procedure addresses the maintenance and update process to ensure that the PRA represents the as-built, as-operated plant such that it is sufficient to support applications for which the PRA is being used. The other provides instructions on how to structure the quantification of the PRA model following a periodic or maintenance update of the PRA model, and prescribes reviews that should be performed (e.g., of cutsets, recovery actions, mutually exclusive events, circular logic, asymmetries, initiating event distributions, and important operator actions). NSP states that the PRA model quantification procedure/guideline was created to meet the model quantification element in the ASME PRA standard.

In addition to the WOG Peer Certification review, NSP stated that the PINGP 1 and 2 PRA model has been reviewed three times as part of the self-assessment process (NSP 2009a).

These three reviews were: (1) the PRA Program Snapshot Evaluation, in April 2007, that benchmarked the PINGP 1 and 2 PRA against Regulatory Guide 1.200, Revision 1, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," (2) the PRA Program Focused Self-Assessment, in May 2004, that assessed the PRA Program against the NMC Fleet PRA Standard and industry best practices, and (3) the Nuclear Oversight Observation Report, in June 2003, that reviewed the PINGP 1 and 2 PRA Risk Assessment Program against NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance Activities at Nuclear Power Plants."

The NRC staff noted that the PINGP 1 and 2 PRA uses a Westinghouse reactor coolant pump seal loss-of-coolant accident (LOCA) model that pre-dates the WOG 2000 model approved by the NRC in 2003 for plants using high-temperature O-rings. In addition, the WOG Peer Review, discussed above, occurred prior to the approval of the WOG 2000 model, and as such would not have identified the use of an older model as an issue. In response to an RAI (NSP 2009a), NSP stated that all four of the Prairie Island's installed RCPs have been updated with high temperature O-rings, that high temperature O-rings and hard seal parts manufactured by Areva have been evaluated and accepted as interchangeable with the same parts manufactured by Westinghouse, and that Westinghouse and Areva O-rings and hard seal parts are installed in various combinations in all four RCPs. NSP states that although the Areva O-rings have been qualified for the same high temperature service as the Westinghouse O-rings, there may be a difference in the beyond design basis failure pressure characteristics. As this difference has not been resolved, NSP performed a sensitivity analysis using the Rhodes model (as presented in WCAP-16141) with a bounding 480-gpm per pump leakage rate. In conjunction with this sensitivity analysis, NSP integrated the impact of migrating from MAAP 3.0B (on which the current model is based) to MAAP 4.0.6. NSP stated that this change was made because MAAP 3.0B is known to be significantly conservative with respect to the timing of core uncovery and core damage following initiation of RCP seal LOCA events. The results of this sensitivity analysis showed an estimated 22 percent (1.9×10^{-7} per year) increase in CDF for SBO events. However, NSP argued that when sufficient plant-specific MAAP analysis case runs are available to allow modeling of the lower leakage rates specified in the Rhodes model, it is anticipated that the contribution to overall CDF will actually be lower than currently calculated. In consideration of the above factors, the NRC staff concludes that NSP's use of its current RCP model is reasonable for the purposes of the SAMA evaluation.

In response to an NRC inquiry into the bases for not implementing two IPE-identified internal flooding enhancements, NSP identified a potential model limitation associated with the use of deterministic arguments to address an estimate of the probabilistic pipe break frequency associated with a Cooling Water System flood in the Auxiliary Feedwater Pump/Instrument Air Compressor Room. In response to this issue, NSP has entered into their Corrective Action Program the re-evaluation of selected flooding enhancements to be performed after the PRA limitation has been corrected (NSP 2009b). This issue is fully discussed in Section F.3.2. As NSP's actions directly address the identified model limitation by including the previously screened improvements in their Corrective Action Program for future evaluation, the NRC staff finds that NSP actions adequately address the impact of this model limitation on the SAMA evaluation.

Given that the PINGP 1 and 2 Level 1 internal events PRA model has been both peer reviewed and subjected to an extensive self-assessment process and the review findings have been resolved or judged to have no adverse impact on the SAMA evaluation, and that NSP has satisfactorily addressed NRC staff questions regarding the PRA, the NRC staff concludes that the Level 1 PRA model is of sufficient quality to support the SAMA evaluation.

As indicated above, the current PINGP 1 and 2 PRA models do not include external events. In the absence of such an analysis, NSP used the PINGP 1 and 2 IPEEE in conjunction with minor adjustments in fire and seismic scenarios to identify the highest risk accident sequences and the potential means of reducing the risk posed by those sequences, as discussed below.

The PINGP 1 and 2 IPEEE was submitted in December 1996, in response to Supplement 4 of GL 88-20 (NSP 1996). NSP did not identify any vulnerabilities to severe accident risk in regard to the external events related to seismic, fire, or other external events. This submittal included a seismic margins analysis, a fire-induced vulnerability evaluation, and a screening analysis for other external events. In a letter dated February 8, 2001, the NRC staff concluded that the submittal met the intent of Supplement 4 to GL 88-20, and that the licensee's IPEEE process is capable of identifying the most likely severe accidents and severe accident vulnerabilities (NRC 2001b).

The PINGP 1 and 2 IPEEE details how NSP had originally planned to respond to GL 88-20, Supplement 4, by performing a seismic PRA for Prairie Island, but changed the approach of completing the seismic IPEEE from a seismic PRA to a Seismic Margins Assessment (SMA). This change was based on information incorporated in Supplement 5 of GL 88-20, regarding large reductions in the seismic hazard estimates for sites in the eastern United States. The seismic margin assessment follows the NRC guidance (NRC 1991) and Electric Power Research Institute (EPRI) guidance (EPRI 1991) and was completed in conjunction with the Seismic Qualification User Group (SQUG) program (SQUG 1992). This method is qualitative and does not provide the means to determine the numerical estimates of the CDF from seismic initiators. The conclusions of the PINGP 1 and 2 IPEEE seismic margin analysis found that all components included in the SAMA have high confidence low probability of failure (HCLPFs) greater than or equal to 0.3 g with the exception of the component cooling water heat exchangers. As the component cooling water heat exchangers have HCLPFs of 0.28g, the PINGP 1 and 2 IPEEE states that they are considered to be adequate. The IPEEE findings also included one recommendation to restrain or remove wall hung ladders and scaffolding located near safety related equipment and 22 outliers designated for resolution under the A-46 program where each outlier represents one or more like components (NSP 1996, NSP 2000 and NRC 2001a). All A-46 outliers were either resolved or scheduled for resolution by the May 1999 Unit 1 outage (NRC 1998b).

In response to a NRC staff request for information regarding the seismic contribution to risk, NSP stated that a bounding estimate of seismic risk was developed in support of another NRC submittal using a methodology known as the "Simplified Hybrid Method" (Kennedy 1999). Using this method NSP provided a seismic core damage frequency estimate of 7.8×10^{-6} per year (NSP 2008). An independent estimate of 2.5×10^{-6} per year was developed by NRC staff based on the simplified seismic methodology and 2008 updated U. S. Geological Survey (USGS) seismic hazard information (USGS 2008), which confirms the bounding nature of NSP's estimate.

The PINGP 1 and 2 IPEEE fire analysis employed a combination of classical PRA techniques with EPRI's Fire Induced Vulnerability Evaluation (FIVE) methodology. The FIVE methodology was used to establish fire boundaries and to evaluate the probability and the timing of damage to components located in a compartment involved in a fire. Each fire area that remained after an initial qualitative screening was evaluated for fire detection and suppression, and fire growth and propagation. Fire scenarios that were found to have the potential to spread beyond the initiating compartment were examined and addressed. All remaining fire areas were assessed using a bounding estimate ("all-engulfing fire") against a screening criterion of 1×10^{-6} per year. The remaining fire areas were subjected to a more detailed fire analysis. The CDF for each of these areas was obtained by accounting for the frequency of a fire in a given fire area, conditional core damage probability associated with that fire scenario in the fire area including, and where appropriate, the impact of fire suppression. The potential impact on containment performance and isolation was evaluated following the core damage evaluation. The total fire CDF from the IPEEE was estimated to be less than 5×10^{-5} per year (NSP 1998). The dominant fire scenarios and their contributions to the fire CDF are listed in Table F-4.

Table F-4. Significant Fire Areas for PINGP 1 and 2

Fire Area	Description	CDF (per year)
FA 13	Control Room	3.22 x 10-5
FA 32	Train "B" Hot Shutdown Panel and Air Compressor/AFW Room	8.23 x 10-6
FA 80	480V Safeguards Switchgear Room-Bus 111	2.24 x 10-6
FA 20	4160V Safeguards Switchgear Room-Bus 16	1.74 x 10-6
FA 59	Aux Building Mezzanine	1.45 x 10-6
FA 73	Aux Building Ground Floor	1.28 x 10-6
FA 18	Relay & Cable Spreading Room	1.08 x 10-6
FA 69	Turbine Building Ground and Mezzanine Floor	1.08 x 10-6

The NRC staff notes that the fire results are based on the Unit 1 fire analysis. An evaluation of the applicability of the Unit 1 results to Unit 2 is included in the PINPG IPEEE (NSP 1998). This evaluation notes that there are potentially significant asymmetries between the units including:

- The Unit 2 4160 V safeguard bus rooms have been identified in the Appendix R Shutdown Analysis as being of concern for loss of offsite power to Unit 2. This is not expected for the corresponding Unit 1 rooms.
- The emergency buses (Buses 25 and 26) for Unit 2 are located in fire areas that are not separated by Appendix R-credited fire barriers from the diesel generators. This separation exists for Unit 1.
- Cooling Water pump power supply asymmetries result in: a greater impact of a fire on Pump 121 for Unit 2 than Unit 1, greater electrical separation between diesel and motor-driven pumps for Unit 2, and a lesser impact of Unit 2 switchgear fires on Pumps 11 and 21.

The IPEEE states that the asymmetries associated with Unit 2's increased potential for loss of offsite power has the impact of raising the Unit 2 fire risk, while the independence of the operation of the two diesel cooling water pumps from Unit 2 AC power tends to offset this risk increase. Based on this, the NRC staff concludes that the use of the Unit 1 fire risk results to support the SAMA analysis for both units is reasonable.

In the ER (NMC 2008), the licensee noted that a number of conservative assumptions were used in the fire analysis. Further, in response to staff RAIs, NSP stated that the IPEEE Fire analysis was performed in order to meet GL 88-20 requirements (identify vulnerabilities to severe accidents initiated by internal fires), that the analysis was not intended to determine the internal fires CDF to a high degree of accuracy, and that it is not appropriate to compare a conservative CDF estimate for fire hazards to the present-day internal events CDF (NSP 2008). The conservatisms identified by NSP include:

- All fires were assumed to result in shutdown of both units therefore limiting the ability to credit system cross-ties.
- Credit for automatic and manual suppression was limited to cutsets representing less than 13 percent of the internal fires CDF.
- No credit was given to the ability of fire brigade to extinguish local fires before shutdown of the plant.
- Credit for manual suppression was only applied to the Control Room, Relay Room, and certain AFW pump room fires. Credit for automatic fire suppression was only applied in the AFW pumps rooms.
- No credit was given to the availability of the RCS pressure operated relief valve (PORV) passive air accumulators. Any fire that impacted the instrument air system was assumed to result in the loss of the ability to perform RCS bleed and feed.
- Detailed fire modeling was not performed in a number of fire areas that did not screen out.

In response to a follow-up request to better clarify the identified conservatisms, NSP provided additional rationale as to why the fire CDF would be lower. This included quantitative estimates of the extent to which the fire results would be reduced through the use of updated fire ignition frequencies and conditional core damage probabilities, and additional credit for automatic and manual fire suppression. NSP indicated that based on the more recent methodology of NUREG/CR-6850, the fire ignition frequencies for the Control Room and the AFW/Instrument Air Compressor Room would be approximately 40 percent lower than calculated in the IPEEE. They also noted that relative to the Level 1 Revision 1 internal events model used for the fire IPEEE analysis, the conditional core damage probability (CCDP) based on the updated internal events PRA model (Rev 2.2 SAMA) has been reduced by 46 percent for normal (or general) plant transient initiated events (NSP 2008), 32 percent for loss of main and auxiliary feedwater initiated events, and 81 percent for loss of offsite power initiated events. With respect to the credit for fire suppression, NSP stated that within the control room, manual suppression was only credited in fires that were large enough to propagate beyond the boundaries of the initiating Control Room panel zone, and that this credit for successful fire suppression was limited to cutsets representing less than 13 percent of the internal fires CDF (NSP 2009a). Based on the quantitative information provided by NSP, the NRC staff estimates that use of the updated fire ignition frequencies and conditional core damage probabilities, and additional credit for fire suppression would result in about a factor of 3 reduction in the fire CDF.

The NRC staff finds that NSP provided reasonable justification that that the ignition frequency for risk significant fire areas would be less than previously analyzed and that the CCDP for fire sequences is also lower. NRC staff also agrees that the assumption that any fire initiated in a Control Room panel zone (regardless of intensity, location or other factors) damages all equipment within the zone appears conservative for the purposes of the SAMA evaluation and that only limited credit was given to fire suppression. The NRC staff concludes that when all the qualitative and quantitative factors are taken into consideration, a realistic estimate of the PINGP 1 and 2 fire CDF would likely be in the range of 1 x 10^{-5} per year.

The IPEEE analysis of other external events (NSP 1998) followed the screening specified in Supplement 4 to GL 88-20 (NRC 1991) and did not identify any unduly significant sequences or vulnerabilities. The plant design was reviewed to determine if it met 1975 Standard Review Plan design criteria for high winds, floods, and other external events. If it met these criteria and a walkdown did not identify any unique vulnerabilities, then the CDF from the external hazard was considered to be less than 1×10^{-6} per year. If it did not meet the criteria, then additional analysis was performed to evaluate the specific concern. Since the plant design for high wind effects did not conform fully to the criteria specified in the 1975 SRP, high winds and tornadoes could not be screened out. Further analysis summarized in the IPEEE SER (NRC 2001b) indicated that the CDF due to high winds and tornadoes is less than 1×10^{-6} per year.

In the ER, NSP estimated that the external events CDF is comparable to the internal events CDF. Accordingly, the total CDF from internal and external events would be approximately 2 times the internal events. In the SAMA analysis, NSP doubled the benefit that was derived from the internal events model to account for the combined contribution from internal and external events (NMC 2008). In response to an RAI requesting justification for increasing the benefits by only a factor of 2, NSP provided additional information regarding the estimated CDF for seismic events and the conservatisms in the CDF, as described above. In consideration of this additional information, the NRC staff concurs that the external event CDF is comparable to that for internal events at PINGP 1 and 2 (based on a seismic CDF of 2.5×10^{-6} per year, a fire CDF of 1×10^{-5} per year, and a CDF of 1×10^{-6} per year for other external events), and concludes that the licensee's use of a multiplier of 2 to account for external events is reasonable for the purposes of the SAMA evaluation.

The NRC staff reviewed both the general process used by NSP to translate the results of the Level 1 PRA into containment releases and the results of the Level 2 analysis, as described in the ER and in response to the NRC staff RAIs (NSP 2008 and 2009). The current PINGP 1 and 2 Level 2 PRA model is based on the IPE models with updates to reflect changes to the plant and modeling techniques, including the steam generator replacement for Unit 1. The Level 1 core damage sequences are assigned to core damage bins (plant damage states) that provide the interface between the Level 1 and Level 2 analyses. The Level 2 models use CETs with functional nodes representing both systemic and phenomenological events. CET nodes are evaluated using supporting fault trees and event trees. The result of the Level 2 PRA is a set of 18 release categories with their respective frequency and release characteristics. The frequency of each release category was obtained by summing the frequency of the CET endstates assigned to each release category. Source terms were developed for each of the release categories using the results of MAAP 3.0B computer code calculations. The 18 release categories were collapsed into 10 bounding release categories used for the SAMA analysis. The release categories and their release characteristics are presented in Tables F.3-5 and F.3-6 of the ER.

The NRC staff's review of the Level 2 IPE for PINGP 1 and 2 concluded that it addressed the most important severe accident phenomena normally associated with a large, freestanding steel shell containment, and identified no significant problems or errors (NRC1997b). The Level 2 PRA model was included in the PINGP 1 and 2 peer review mentioned previously. NSP states that all Level A and B F&Os have been resolved. As noted above, additional reviews have been performed since the completion of the WOG peer review. It also should be noted, however, that the current Level 2 model is a revision to the version that was peer reviewed. The changes to the Level 2 model are described in Section F.2.1.3 of the ER and in response to an RAI (NMC 2008, NSP 2008). The PINGP 1 and 2 Level 2 PRA is based on Revision 2.2 which was developed in 2006, and incorporates several changes that were implemented subsequent to the peer review. These changes to the model include: the elimination of induced SGTR events in

Revision 1 of the Level 2 PRA model, but re-introduction of these events in the Revision 2.2 model update used for the SAMA analysis; changes to the human error probability for failure to cool down and depressurize the RCS following a SGTR; and the addition of a containment isolation fault tree for each unscreened containment penetration to model the failure of containment isolation.

During the review of the Level 2 analysis, the NRC staff could not determine the modeling approach used to assess the likelihood of a thermally-induced SGTR following core damage in the current PRA. In response to an RAI, NSP stated that the treatment of induced SGTR events follows the guidance of WCAP-16341-P, "Simplified Level 2 Modeling Guidelines." WCAP-16341-P was developed by the WOG with the intent that Level 2 models developed using its methodology would meet requirements of the ASME PRA standard (ASME 2002). Additional discussion on NSP modeling of induced SGTR is provided in Section F.6.2 including the results of a sensitivity analysis in which the conditional probability of an induced SGTR was increased.

Based on the NRC staff's review of the Level 2 methodology, the fact that the Level 2 model was reviewed in more detail as part of the WOG peer review and updated to address peer review findings, the staff's review of the subsequent Level 2 model changes, and NSP's responses to the RAIs, the NRC staff concludes that the PINGP 1 and 2 Level 2 PRA provides an acceptable basis for evaluating the benefits associated with various SAMAs.

As indicated in the ER, the reactor core radionuclide inventory used in the consequence analysis is based on a plant-specific calculation and corresponds to end-of-cycle values (core average exposure of 50,000 MWD/MTU). All releases were modeled as occurring at the top of the Containment Building. The thermal content of each of the releases is assumed to be 10^7 watts based on values provided in Sample Problem A in the MACCS2 user's manual (NRC 1998a) and NUREG/CR-4551 (NRC 1990). NSP assessed the impact of alternatively assuming either a ground level release or an ambient (non-buoyant) plume. The results of these sensitivity cases showed that reducing the release height to ground level results in about a 2 percent increase in the 50-mile population dose risk and a 6 percent decrease in offsite economic cost risk, and reducing the thermal plume heat content to ambient conditions results in a negligible change in population dose risk and a 6 percent decrease in offsite economic cost risk.

The NRC staff reviewed the process used by NSP to extend the containment performance (Level 2) portion of the PRA to an assessment of offsite consequences (essentially a Level 3 PRA). This included consideration of the source terms used to characterize fission product releases for the applicable containment release categories and the major input assumptions used in the offsite consequence analyses. The MACCS2 code was utilized to estimate offsite consequences. Plant-specific inputs to the code includes the source terms for each release category and the reactor core radionuclide inventory (both discussed above), site-specific meteorological data, projected population distribution within a 50-mi radius for the year 2034, emergency evacuation modeling, and economic data. This information is described in Section F.3 of the ER (NMC 2008).

NSP used site-specific meteorological data for the 2003 calendar year as input to the MACCS2 code. The data were collected from the onsite meteorological tower. Data from 2004 and 2005 were also considered, but the 2003 data were chosen because they were the most complete and because results of a MACCS2 sensitivity analyses indicated that the 2003 data produced more conservative results than the data sets for the other years. Small data voids (five gaps of less than six consecutive hours) were filled using interpolation between data points. Larger data voids (three gaps of six or more consecutive hours) were filled using data from the same time of day from the day just before or after the missing data. The NRC staff notes that previous SAMA analyses results have shown little sensitivity to year-to-year differences in meteorological data and concludes that the use of the 2003 meteorological data in the SAMA analysis is reasonable.

The population distribution the licensee used as input to the MACCS2 analysis was estimated for the year 2034, based on the U.S. Census Bureau population data for 2000, as provided by the SECPOP2000 program (NRC 2003), and the expected annual population growth rate. The baseline population was determined for each of sixteen directions and each of ten concentric rings (total of 160 sectors) out to a radius of 50 miles (80 km) surrounding the site. U.S Census block-group level population data was allocated to each sector based on the area fraction of the census block-groups in that sector. The 1990 and 2000 census data from SECPOP2000 were used to estimate an annual average population growth rate for each of the 50-mile (80 km) radius rings. The annual growth rate estimate for each ring was applied uniformly to all sectors in the ring to calculate the year 2034 population distribution. Population sensitivity cases were performed in which the baseline 2034 population was increased by 30 percent, and then decreased to the year 2000 population data rather than the projected year 2034 population. The resulting population dose and offsite economic cost risk increased by approximately 30 percent and decreased by approximately 40 percent, respectively. The NRC staff considers the methods and assumptions for estimating population reasonable and acceptable for purposes of the SAMA evaluation.

The emergency evacuation model was modeled as a single evacuation zone extending out 10 miles (16 km) from the plant. NSP assumed that 95 percent of the population would evacuate. This assumption is conservative relative to the NUREG-1150 study (NRC 1990), which assumed evacuation of 99.5 percent of the population within the emergency planning zone. The evacuees were assumed to begin evacuating 90 minutes after a General Emergency has been declared and to evacuate at an average radial speed of 3.35 miles per hour (1.5 meters per second). This speed is the time weighted value accounting for season, day of the week, time of day, weather conditions, and special events. A sensitivity analysis was performed in which the evacuation speed was decreased by a factor of two (to 0.75 meters per second). The result was a 2 percent increase in the total population dose. The NRC staff concludes that the evacuation assumptions and analysis are reasonable and acceptable for the purposes of the SAMA evaluation.

Much of the site-specific economic data were provided from SECPOP2000 (NRC 2003) by specifying the data for each of the counties surrounding the plant to a distance of 50 miles. SECPOP2000 utilizes economic data from the 1997 Census of Agriculture (USDA 1998) and from other 1998 and 1999 data sources. Generic economic data that applies to the region as a whole was taken from the MACCS2 sample problem input and revised when better information was available. Revised values included daily living expenses for people who have been evacuated and relocated, and the value of farm and non-farm wealth. The economic data were inflation-adjusted to the year 2006 using the consumer price index.

NSP addressed the impact on the SAMA analysis of three recently reported problems with SECPOP2000. These problems involved: (1) an inconsistency in the format in which several economic parameters were output from the SECPOP2000 code and input to the MACCS2 code, (2) an error that resulted in use of agricultural/economic data for the wrong counties in the SECPOP2000 calculations, and (3) an error that resulted in the economic data for some counties being handled incorrectly. NSP states in Section F.3.1 of the ER that all three errors have been addressed in the PINGP 1 and 2 analyses provided in the ER via industry-developed formatting fixes, and that the MACCS2 outputs used to quantify economic impacts have been verified to be correct (NMC 2008).

The NRC staff concludes that the methodology used by NSP to estimate the offsite consequences for PINGP 1 and 2 provides an acceptable basis from which to proceed with an assessment of risk reduction potential for candidate SAMAs. Accordingly, the NRC staff based its assessment of offsite risk on the CDF and offsite doses reported by NSP.

F.3. Potential Plant Improvements

The process for identifying potential plant improvements, an evaluation of that process, and the improvements evaluated in detail by NSP are discussed in this section.

F.3.1. Process for Identifying Potential Plant Improvements

NSP's process for identifying potential plant improvements (SAMAs) consisted of the following elements:

- Review of the most significant basic events from the Rev. 2.2 (SAMA) version of the PINGP 1 and 2 Level 1 and 2 PRA for each unit,
- Review of potential plant improvements identified in the PINGP 1 and 2 IPE and IPEEE,
- Review of dominant contributors to seismic and fire events in the current external event risk models,
- Review of Phase II SAMAs from license renewal applications for eleven other U.S. nuclear sites, and
- Input from PINGP 1 and 2 Group during the PRA update process and the development of the SAMA list.

On the basis of this process, an initial set of 25 candidate SAMAs, referred to as Phase I SAMAs, was identified for Unit 1 and Unit 2. In Phase I of the evaluation, NSP performed a qualitative screening of the initial list of SAMAs and eliminated SAMAs from further consideration using one of the following criteria:

- The SAMA is not applicable at PINGP 1 and 2 because of design differences;
- The SAMA has already been implemented at PINGP 1 and 2;
- The SAMA has no significant benefit in PWRs such as PINGP 1 and 2;
- The SAMA has benefits which have been achieved by other means; and
- The SAMA requires extensive changes that would involve implementation costs known to exceed any possible benefit.

Based on this screening, 16 SAMAs were eliminated, leaving nine for further evaluation. The remaining SAMAs, referred to as Phase II SAMAs, are listed in Table F.5-3 of the ER (NMC 2008). In Phase II, a detailed evaluation was performed for each of the nine remaining SAMA candidates, as discussed in Sections F.4 and F.6 below. To account for the potential impact of external events, the estimated benefits based on internal events were multiplied by a factor of 2, as previously discussed.

F.3.2. Review of NSP's Process

NSP's efforts to identify potential SAMAs focused primarily on areas associated with internal initiating events, but also included explicit consideration of potential SAMAs for seismic, fire, and high wind events. The initial list of SAMAs generally addressed the accident sequences considered to be important to CDF from functional, initiating event, and risk reduction worth (RRW) perspectives at PINGP 1 and 2, and included selected SAMAs from other plants.

NSP provided a tabular listing of the PRA basic events sorted according to their RRW (NMC 2008). SAMAs impacting these basic events would have the greatest potential for reducing risk. NSP used a RRW cutoff of 1.02, which corresponds to about a 2 percent change in CDF given 100-percent reliability of the SAMA. This equates to a benefit of approximately $22,000 for Unit 1 and $58,000 for Unit 2 (after the benefits have been doubled to account for external events). NSP also provided and reviewed the LERF-based RRW events down to an RRW of 1.02. NSP correlated the top CDF and LERF events with the SAMAs evaluated in Phase I or Phase II and showed that, with a few exceptions, all of the significant basic events are addressed by one or more SAMAs (NMC 2008). Of the basic events of high risk importance that are not addressed by SAMAs, each is closely tied to other basic events that had been addressed by one or more SAMAs.

The NRC staff noted that the top two events in the Level 1 importance listing shown in Table F.5-1a of the ER, involve failure of operator actions (Operator Fails to Perform RCS Cooldown and Depressurization on Small LOCA, and Operator Fails to Initiate High Head Recirculation (conditional on failure of the first action)). Improvements for these actions were dismissed by NSP due to the large uncertainty regarding the operator failure probability estimates. The NRC requested additional clarification on the characteristics of these actions that prevents further improvement in operator performance (and lower calculated human error probability values). NSP stated that both of these operator actions are emergency operating procedure-driven and are trained on at least once during a 2-year training cycle (NSP 2008). In a follow-up response, NSP included a detailed discussion on the critical role timing plays for these actions showing that there is limited time available for recovery and that the second action is questioned on failure of the first therefore lowering its success likelihood (NSP 2009a). In consideration of the above factors, the NRC staff concludes that improvements in these actions are unlikely for the purposes of the SAMA evaluation.

The NRC staff noted that the description of the screening criteria provided in Section 4.17.1 of the ER (and summarized in Section F.3.1 above), is different than that provided in Section F.5.2 of the ER. In response to an NRC staff request for clarification regarding the actual screening criteria used, NSP provided a mapping of the screened candidate SAMAs to the two sets of criteria. For most screened SAMAs, the "no significant benefit" criterion of Section 4.17.1 was equated to the engineering judgment criterion found in Section F.5.2. Although the approach of listing two sets of screening criteria and the inclusion of an "engineering judgment" criterion was found to be confusing, the NRC staff did not identify any candidate SAMAs as being inappropriately screened.

For a number of the Phase II SAMAs listed in the ER, the information provided did not sufficiently describe the proposed modifications or other considerations that might have been taken into account in estimating the benefit and implementation cost. Therefore, the NRC staff requested and the licensee provided more information on certain proposed modifications listed for the Phase II SAMA candidates. The requested information included clarification of the $300K implementation cost for SAMA 2 (Install alternate cooling water supply), description of the basis for the $2M per unit cost for SAMA 6a (Segregate Auxiliary Building flooding zones), and clarification of the $100K life-cycle cost for SAMA 20 (Close low head injection motor operated valves (MOVs) to prevent RCS backflow to safety injection system) (NRC 2008a, NSP 2008). The responses to these requests are discussed in Section F.5.

For several SAMA candidates, the NRC staff questioned if lower cost alternatives could have been considered, and identified a number of specific alternatives for further consideration by NSP. In response, NSP addressed the lower cost alternatives and gave specific reasons why the cost of most of these alternative SAMA candidates would be high enough that the decision on final SAMA selection would not have been affected. However, NSP found that one alternative associated with the purchase of a gagging device that could be used to close a stuck-open SG safety valve would be potentially cost-beneficial (NSP 2008). The evaluation of these SAMAs is discussed further in Section F.6.2.

NSP considered the potential plant improvements identified in the IPE and IPEEE in the identification of plant-specific candidate SAMAs for internal and external events, as summarized below.

As a result of the PINGP 1 and 2 IPE, nine modifications to plant procedures, operator training, or plant hardware were identified. These enhancements are listed in the Section F.5.1.5 of the ER. Based on information provided in the ER and in response to NRC staff RAIs (NSP 2008, 2009a and 2009b), all but two of these items have been implemented by either procedure modifications, operator training revisions, or hardware modifications. The two unresolved items involve procedure and/or plant modifications related to internal flooding events, specifically, a procedure change to crosstie Cooling Water System Headers A and B in order to supply the MFW pumps' lube oil coolers following a break in one of the headers (referred to as Enhancement 2), and modifications to promote water flow out of the Auxiliary Feedwater Pump/Instrument Air Compressor Room following a break in the Cooling Water System or to segregate the room into two compartments (referred to as Enhancement 3). For these items, the ER credits an engineering calculation (ENG-ME-148, Revision 0, "Cooling Water Header Pipe Failure Causing Flooding in the Auxiliary Feedwater Pump/Instrument Air Compressor Room") for providing confidence that the probability of a double-ended guillotine break is negligible and that leak-before-break detection will provide sufficient warning for the accomplishment of mitigation actions. This calculation, in conjunction with the 1992 installation of 33 percent thicker walled piping, was provided as the present resolution for these internal flooding enhancements. The calculation and piping modification were also used as the bases for reducing the significance of the Cooling Water Header flood in the PRA. After reviewing the engineering calculation, the NRC staff noted that it used deterministic arguments to address a probabilistic pipe break frequency issue. The NRC staff also noted that two SAMAs, SAMA 6a (Segregate Flooding Zones) and SAMA 13 (Install Automatic Sump Pump for Zone 7 Auxiliary Building Flooding), are improvements that address Cooling Water floods and their significance could have been underestimated as a result of the above method. In response to a follow-up RAI, NSP stated that the method used to resolve these issues was not consistent with current PRA practices and that its use could have caused the value of Enhancements 2 and 3 to be understated. As a result, NSP has entered IPE Potential Enhancements 2 and 3 into their Corrective Action Program for further evaluation after the PRA has been updated with improved methodology for modeling pipe breaks (NSP 2009b).

Based on this information, the NRC staff concludes that the set of SAMAs evaluated in the ER, together with those identified in supplemental information to the ER and in response to NRC staff RAIs, addresses the major contributors in internal event CDF.

NSP did not identify PINGP 1 and 2-specific candidate SAMAs for seismic events. In the IPEEE analysis, a total of 10 potential enhancements were identified to address external events. These enhancements are:

- Add fire wrap or other fire barrier material to exposed control power cable for Bus 16.
- Add instructions to locally start the available roof exhaust fan to Fire Safety Procedure F5.
- Add instructions to manually open a suction supply valve to the 12 Auxiliary Feedwater pump on a fire in Fire Area 32.
- Ensure fire brigade training includes a discussion of the risk significance associated with manual fire suppression for control room and relay room fires.
- Ensure operator training includes a discussion of the risk significance associated with plant shutdown from outside the control room in accordance with Fire Safety Procedure F5.
- Ensure operator training includes a discussion of the risk significance associated with bleed and feed cooling of the RCS due to internal fires.
- Ensure operator training is implemented to perform DC panel switching in the battery and relay rooms for a fire in Fire Area 59.
- Verify cable separation between trains in the G-panel.
- Upgrade the anchorage for the main Cardox tank associated with the Relay Room automatic fire suppression system.
- Upgrade the battery and fuel oil day tank anchorages for the diesel driven fire water pump.

The above list of potential plant improvements is primarily related to fire events and seismic/fire interactions. As noted in the ER, all identified improvements have either been implemented or otherwise resolved, and therefore were not considered further in the SAMA analysis.

The IPEEE seismic margin analysis identified 22 outliers, where each outlier represents one or more like components (NSP 1996, NSP 2000 and NRC 2001a). These were designated for resolution under the A-46 program. As stated in the NRC's A-46 safety evaluation report, all A-46 outliers were either resolved or scheduled for resolution by the May 1999 Unit 1 outage (NRC 1998b).

In addition to the 22 outliers discussed above, NSP identified several potential seismic outliers that were dispositioned through an analysis process described in the IPEEE that concluded that the impacted function was not required or could be recovered, or that an alternate means for performing the associated function was available. The outliers include: turbine-driven AFW pump trip and throttle valves, diesel generator fuel oil storage tanks 122 and 124, the boric acid transfer pumps, charging pumps 12 and 23, panel 117, cooling water pump 121, condensate storage tanks 11, 12 and 13, component cooling water pressure switches, and diesel-driven cooling water pump pressure switches. NRC staff requested that NSP demonstrate for these selected outliers that enhancing the ruggedness of the associated components is not cost-beneficial. NSP provided a detailed discussion of each of the selected outliers. No additional SAMAs were identified as a result of this further evaluation. (NSP 2008). The NRC staff reviewed the rationale used to disposition each of these seismic-related outliers and found the rationale to be reasonable.

The NRC staff also noted that the PINGP 1 and 2 IPEEE seismic margin analysis found the component cooling water heat exchangers to have a HCLPF of 0.28g which is below the 0.3 g screening value. In response to a NRC request to assess whether increased seismic capacity would be cost-beneficial, NSP stated that the component cooling heat exchangers were considered to be very close to the 0.3g threshold, and were thus considered to be adequate. NSP also stated that the component cooling function which is to provide cooling to the RCP seals, can be accomplished by the Chemical and Volume Control System (CVCS) therefore reducing the significance of the heat exchanger seismic capacity (NSP 2008).

The NRC staff noted that the PINGP 1 and 2 IPEEE seismic margin analysis included a recommendation to restrain or remove wall hung ladders and scaffolding located near safety related equipment. In response to an NRC staff request for information regarding this recommendation, NSP stated that during a recent field walkdown it was noted that ladders are still located near safety-related equipment such as 4160 VAC Bus 25 and D2 and that an investigation determined that there was no clear guidance for the location and construction of ladder storage. NSP stated that this condition has been entered into the PINGP 1 and 2 Corrective Action Program to further investigate the issue and to determine whether current ladder storage standards are adequate (NSP 2008).

Based on the licensee's efforts to identify and address seismic outliers and the expected cost associated with further seismic risk analysis and potential plant modifications, the NRC staff concludes that the opportunity for seismic-related SAMAs has been adequately explored and that it is unlikely that there are additional potentially cost-beneficial, seismic-related SAMA candidates.

NSP did not identify PINGP 1 and 2-specific candidate SAMAs for fire events. In order to better understand the process used to identify fire-related SAMAs, the NRC staff requested that NSP demonstrate that no viable SAMA candidates exist for each fire scenario included in the IPEEE. In response, NSP stated that the IPEEE fire analysis has not been updated, contains significant conservative assumptions, and does not include the plant modifications, procedure changes and changes in risk analysis methodology that have occurred in the twelve years since its completion. Notwithstanding the above considerations, NSP provided a list of additional SAMAs that specifically address the risk from internal fires. These SAMAs were either implemented (e.g., enhanced control of transient combustibles and ignition sources, enhanced fire brigade awareness, upgraded fire comportment barriers) or considered not to be cost-beneficial (e.g., relocate instrument air compressors out of the AFW pump rooms, re-route cables that currently run through risk significant fire areas). For each identified SAMA candidate, they provided a disposition that resulted in the elimination of these fire-related SAMAs from further consideration (NSP 2008). The NRC staff reviewed the rationale used to disposition each of these fire-related SAMAs and found the rationale to be reasonable.

The NRC staff concludes that the opportunity for fire-related SAMAs has been adequately explored and that it is unlikely that there are additional potentially cost-beneficial, fire-related SAMA candidates.

The NRC staff notes that the set of SAMAs submitted is not all inclusive, since additional, possibly even less expensive, design alternatives can always be postulated. However, the staff concludes that the benefits of any additional modifications are unlikely to exceed the benefits of the modifications evaluated and that the alternative improvements would not likely cost less than the least expensive alternatives evaluated, when the subsidiary costs associated with maintenance, procedures, and training are considered.

The NRC staff concludes that NSP used a systematic and comprehensive process for identifying potential plant improvements for PINGP 1 and 2, and that the set of SAMAs evaluated in the ER, together with those identified in response to the NRC staff inquiries, is reasonably comprehensive and therefore acceptable. This search included reviewing insights from the plant-specific risk studies, reviewing plant improvements considered in previous SAMA analyses, and using the knowledge and experience of its PRA personnel. While explicit treatment of external events in the SAMA identification process was limited, it is recognized that the prior implementation of plant modifications for seismic and fire events and the absence of external event vulnerabilities reasonably justifies examining primarily the internal events risk results for this purpose.

F.4. Risk Reduction Potential of Plant Improvements

NSP evaluated the risk-reduction potential of the nine remaining SAMAs that were applicable to PINGP 1 and 2. The SAMA evaluations were performed by using realistic assumptions with some conservatism. On balance, such calculations overestimate the benefit and are conservative.

For all of the SAMAs, NSP used model re-quantification to determine the potential benefits. The CDF and population dose reductions were estimated using the Rev. 2.2 (SAMA) model version of the PINGP 1 and 2 PRA. The changes made to the model to quantify the impact of the SAMAs are detailed in Section F.6 of Attachment F to the ER (NMC 2008). Table F-6 lists the assumptions considered to estimate the risk reduction for each of the evaluated SAMAs, the estimated risk reduction in terms of percent reduction in CDF and population dose, and the estimated total benefit (present value) of the averted risk. The estimated benefits reported in Table F-6 reflect the combined benefit in both internal and external events. The determination of the benefits for the various SAMAs is further discussed in Section F.6.

In the SAMA analysis submitted in the ER, NSP increased the benefit that was derived from the internal events model by a factor of 2 to account for the combined contribution from internal and external events. The NRC staff agrees with the licensee's overall conclusion concerning the impact of external events and concludes that the licensee's use of a multiplier of 2 is adequate. This is discussed further in Section F.6.2.

Based on the description in the ER, the dominant internal flooding sequence (involving cooling water header rupture) would result in core damage to both units. In response to a NRC staff question, NSP explained that the dominant internal flooding sequences involved flooding of the 695' elevation of the Auxiliary Building from a rupture of a Cooling Water system header. If the operators fail to identify and isolate the rupture prior to submergence of the component water pumps, then residual heat removal pumps, containment spray pumps as well as motor control centers supporting the charging pumps and other safeguards equipment will be lost. This results in the loss of reactor coolant pump seal cooling and eventually leads to an unrecoverable RCP seal LOCA. As this flooding event impacts both units (NSP 2008), the NRC requested clarification as to the basis for the $2M per unit estimated cost for installation of flood barriers shown in Table F.5.3 of the ER. NSP stated that at least 22 (11 per unit) individual, custom-designed enclosures would be required and that the estimated cost for the design, fabrication, installation and maintenance of these enclosures could reach $200,000 each. In a follow-up question, staff requested an evaluation of a less extensive, alternative that would limit water damage to single unit. In response, NSP stated that the room impacted by this flood is located in the basement of the Auxiliary Building between the two units and the equipment within the room is not separated by unit. Therefore a wall or other flood-limiting barrier would not be practical.

The NRC staff has reviewed NSP's bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and somewhat conservative (i.e., the estimated risk reduction is similar to or somewhat higher than what would actually be realized). Accordingly, the staff based its estimates of averted risk for the various SAMAs on NSP's risk reduction estimates

Table F-6. SAMA Cost/Benefit Screening Analysis for PINGP 1 and 2 [(a)]

SAMA	Modeling Assumptions	Unit	% Risk Reduction		Total Benefit ($)		Cost ($) per Unit
			CDF	Population Dose	Using 7% discount rate	Using 3% discount rate (b)	
2 - Install alternate cooling water supply	An independent, diverse, auto-start diesel-driven alternate cooling water pump was added to the models. Pump failure rates were assumed to be the same as existing pumps.	1	21.2	6.8	88,000	123,000	1.2M (c)
		2	17.1	2.5	88,200	123,000	
3 - Provide alternate flow path from RWST to charging pump station (d)	A bypass line for each unit that contains a normally closed, fail closed air-operated valve that opens on low VCT level was added. The valve was assumed to have no air dependency and to have a failure rate of a typical air-operated valve.	1	13.0	3.4	53,700	75,000	250K
		2	10.7	1.3	54,900	76,700	
5 - Install additional diesel-driven HPI pump	An independent, diverse, auto-start diesel-driven pump was added. The pump was assumed to have no common cause coupling with the existing safety injection (SI) pumps. Pump failure rates were assumed to be the same as one of the existing diesel-driven cooling water pumps.	1	0.3	18.4	54,300	76,000	1.5M
		2	0.8	12.6	159,000	223,000	
9 - Analyze room heat-up for natural / forced circulation (Screenhouse Ventilation)	The safeguards vertical cooling water pump (12, 121 and 22) were assumed to not fail due to Screenhouse Ventilation system failures.	1	10.7	3.4	45,000	62,700	62.5K
		2	8.6	1.3	45,100	62,900	
12 - Alternate component cooling water supply (e)	The cooling water upgrade from SAMA 2 has been performed, and an automatic means of supplying water on loss of component cooling flow using motor-operated valves was added with typical valve failure rates.	1	30.1	8.9	133,000	186,000	900K
		2	25.2	8.2	216,000	302,000	
15 - Provide portable DC power source	A dedicated DC backup supply for 21 AFW pump breaker control power was added with a typical battery failure on demand probability.	1	0	0	0	0	130K
		2	2.8	0.3	13,800	19,300	

F.5. Cost Impacts of Candidate Plant Improvements

NSP estimated the costs of implementing the nine candidate SAMAs through the application of engineering judgment, use of other licensees' estimates for similar improvements, and development of site-specific cost estimates. The cost estimates do not include the cost of replacement power during extended outages required to implement the modifications. In response to an RAI, NSP stated that the implementation costs also did not include contingency costs associated with unforeseen implementation obstacles, nor do they include any inflation adjustments (NSP 2008). Neglecting these factors is conservative.

The NRC staff reviewed the bases for the applicant's cost estimates. For certain improvements, the staff also compared the cost estimates with estimates developed elsewhere for similar improvements, including estimates developed as part of other licensees' analyses of SAMAs for operating reactors and advanced light-water reactors. The NRC staff reviewed the costs and found them to be reasonable, and generally consistent with estimates provided in support of other plants' analyses.

The NRC staff requested additional information regarding the estimated costs for certain SAMAs, as summarized below.

- For SAMA 2 (Install alternate cooling water supply), the NRC staff requested clarification on the $300K implementation cost for each unit. In response, NSP stated that the estimate was for procedure changes as implementation of this SAMA credits a potable fire pump connected to the cooling water system and utilizes existing connections. NSP further noted that additional analysis now indicates that the portable fire pump capacity was not adequate and that a diesel-driven pump would be required with an estimated cost of $2.4 million shared between the two units. This estimate is stated as being comparable to cost of a similar installation at another power plant (NSP 2008)

- For SAMA 6a (Segregate Auxiliary Building flooding zones), the NRC staff requested additional information on the description of the proposed modification to better understand the cost estimate of $2M per unit. In response, NSP stated that the modification would have to consist of a series of enclosures that surround individual equipment. Some enclosures would only consist of walls to protect from rising water while others would need to provide full covered enclosures to protect from spray. At least 22 (11 per unit) individual, custom-designed enclosures would be required. In response to a follow-up question to consider a less extensive alternative that would limit water damage to the systems, structures and components for a single unit, NSP stated that the equipment is separated not by unit, but by train. Therefore, a wall or other flood-limiting barrier to protect one unit is not practical (NSP 2008 and 2009)

- For SAMA 20 (Close low head injection MOVs to prevent RCS backflow to safety injection system), staff requested clarification of the $100K life-cycle cost component of the cost estimate, since this SAMA simply changes the operation of an existing valve. In response, NSP stated that additional review revealed the life-cycle cost would be inherent to maintaining these valves whether the valves are normally open or closed. Therefore, NSP removed the $100K life cycle cost from the cost estimate for SAMA 20 (NSP 2009a). Table F-6 reflects this corrected value.

- The NRC staff also requested clarification as to the treatment of candidate SAMAs that have a positive risk benefit to both units. In response, NSP stated that the costs were evenly apportioned between the two units (NSP 2009a). This is appropriate since the risk reduction benefit for each unit is determined separately.

The NRC staff reviewed the additional information provided by NSP and found it to be reasonable. The NRC staff concludes that the cost estimates provided by NSP are sufficient and appropriate for use in the SAMA evaluation.

F.6. Cost-Benefit Comparison

NSP's cost-benefit analysis and the NRC staff's review are described in the following sections.

F.6.1. NSP's Evaluation

The methodology used by NSP was based primarily on NRC's guidance for performing cost-benefit analysis, i.e., NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC 1997a). The guidance involves determining the net value for each SAMA according to the following formula:

Net Value = (APE + AOC + AOE + AOSC) – COE where,

APE = present value of averted public exposure ($)

AOC = present value of averted offsite property damage costs ($)

AOE = present value of averted occupational exposure costs ($)

AOSC = present value of averted onsite costs ($)

COE = cost of enhancement ($).

If the net value of a SAMA is negative, the cost of implementing the SAMA is larger than the benefit associated with the SAMA, and it is not considered cost-beneficial. NSP's derivation of each of the associated costs is summarized below.

NUREG/BR-0058 was revised in 2004 to reflect the agency's policy on discount rates. Revision 4 of NUREG/BR-0058 states that two sets of estimates should be developed: one at 3 percent and one at 7 percent (NRC 2004b). NSP provided both sets of estimates (NMC 2008).

<u>Averted Public Exposure (APE) Costs</u>

The APE costs were calculated by using the following formula:

APE = Annual reduction in public exposure (Δperson-rem per year)
× monetary equivalent of unit dose ($2000 per person-rem)
× present value conversion factor (15.04 based on a 20-year period with a 3-percent discount rate).

As stated in NUREG/BR-0184 (NRC 1997a), it is important to note that the monetary value of the public health risk after discounting does not represent the expected reduction in public health risk due to a single accident. Rather, it is the present value of a stream of potential losses extending over the remaining lifetime (in this case, the renewal period) of the facility. Thus, it reflects the expected annual loss due to a single accident, the possibility that such an accident could occur at any time over the renewal period, and the effect of discounting these potential future losses to present value. For the purposes of initial screening, which assumes elimination of all severe accidents due to internal events, NSP calculated an APE of approximately $88,000 for Unit 1 and $254,000 for Unit 2 for the 20-year license renewal period.

Averted Offsite Property Damage Costs (AOC)

The AOCs were calculated by using the following formula:

AOC = Annual CDF reduction
× offsite economic costs associated with a severe accident (on a per-event basis)
× present value conversion factor.

For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, NSP calculated an annual offsite economic risk of about $16,000 for Unit 1 and $63,000 for Unit 2 based on the Level 3 risk analysis. This results in a discounted value of approximately $238,000 for Unit 1 and $953,000 for Unit 2 for the 20-year license renewal period.

Averted Occupational Exposure (AOE) Costs

The AOE costs were calculated by using the following formula:

AOE = Annual CDF reduction
× occupational exposure per core damage event
× monetary equivalent of unit dose
× present value conversion factor.

NSP derived the values for averted occupational exposure from information provided in Section 5.7.3 of the regulatory analysis handbook (NRC 1997a). Best estimate values provided for immediate occupational dose (3300 person-rem) and long-term occupational dose (20,000 person-rem over a 10-year cleanup period) were used. The present value of these doses was calculated by using the equations provided in the handbook in conjunction with a monetary equivalent of unit dose of $2000 per person-rem, a real discount rate of 3 percent, and a time period of 20 years to represent the license renewal period. For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, NSP calculated an AOE of approximately $6,100 for Unit 1 and $7,500 for Unit 2 for the 20-year license renewal period.

Averted Onsite Costs (AOSC)

Averted onsite costs (AOSC) include averted cleanup and decontamination costs (ACC) and averted power replacement costs. Repair and refurbishment costs are considered for recoverable accidents only and not for severe accidents. NSP derived the values for AOSC based on information provided in Section 5.7.6 of NUREG/BR-0184, the regulatory analysis handbook (NRC 1997a).

NSP divided this cost element into two parts: the onsite cleanup and decontamination cost, also commonly referred to as averted cleanup and decontamination costs, and the replacement power cost.

Averted cleanup and decontamination costs were calculated by using the following formula:

ACC = Annual CDF reduction
× present value of cleanup costs per core damage event
× present value conversion factor.

The total cost of cleanup and decontamination subsequent to a severe accident is estimated in the regulatory analysis handbook to be $\$1.5 \times 10^9$ (undiscounted). This value was converted to present costs over a 10-year cleanup period and integrated over the term of the proposed license extension. For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, NSP calculated an ACC of approximately $191,000 for Unit 1 and $235,000 for Unit 2 for the 20-year license renewal period.

Long-term replacement power costs (RPC) were calculated using the following formula:

RPC = Annual CDF reduction
× present value of replacement power for a single event
× factor to account for remaining service years for which replacement power is required
× reactor power scaling factor

NSP based its calculations on the value of 560 megawatt electric (MW(e)). Therefore, NSP applied a power scaling factor of 560/910 (the ratio of the actual power level to the "generic" power plant level in NUREG/BR-0184) to determine the replacement power costs. For the purposes of initial screening, which assumes all severe accidents due to internal events are eliminated, NSP calculated an RPC of approximately $33,000 for Unit 1 and $41,000 for Unit 2, and an AOSC of $224,000 for Unit 1 and $276,000 for Unit 2.

By using the above equations, NSP estimated the total present dollar value equivalent associated with completely eliminating severe accidents due to internal events at PINGP 1 and 2 to be about $557,000 for Unit 1 and $1.49 million for Unit 2. The higher baseline risk for Unit 2 is attributed to the higher CDF and LERF resulting from the fact that Unit 2 has not yet replaced its steam generators. To account for additional risk reduction in external events, NSP doubled this value (to $1.11 million for Unit 1 and $2.98 million for Unit 2) to provide the modified maximum averted cost risk (MMACR), which represents the dollar value associated with completely eliminating all internal and external event severe accident risk at PINGP 1 and 2. The total site MMACR for PINGP 1 and 2 is then $4.09 million.

<u>NSP's Results</u>

If the implementation costs for a candidate SAMA were greater than the MMACR of $1.11 million for Unit 1 and $2.98 million for Unit 2, then the SAMA was screened from further consideration. A more refined look at the costs and benefits was performed for the remaining SAMAs. If the implementation costs for a candidate SAMA exceeded the calculated benefit, the SAMA was considered not to be cost-beneficial. In the baseline analysis contained in the ER (using a 3 percent discount rate), NSP identified one potentially cost-beneficial SAMA for Unit 1 and two potentially cost-beneficial SAMAs for Unit 2. The potentially cost-beneficial SAMAs are:

- SAMA 9 (Unit 1 and Unit 2) – Implement procedure or plant modification to improve ventilation for safeguards equipment in the Screenhouse. This would be achieved by either performing a best-estimate room heat-up analysis to show that procedural practices (opening doors, installing portable fans) would allow safeguards cooling water pumps to run for at least 24 hours without forced ventilation following a loss of the safeguard ventilation system serving those rooms, or improving Screenhouse ventilation reliability via hardware modifications.

- SAMA 22 (Unit 2 only) – Provide compressed air backup for instrument air to containment. This would be achieved by either qualifying the existing accumulator air supply for bleed and feed cooling when the normal supply of instrument air to the PORVs is unavailable, or providing a backup to the accumulators to support feed and bleed operation.

NSP performed additional analyses to evaluate the impact of parameter choices and uncertainties on the results of the SAMA assessment (NMC 2008). If the benefits are based on use of the 95th percentile CDF results rather than the point estimates for CDF, one additional SAMA candidate was determined to be potentially cost-beneficial for Unit 1. This is SAMA 22, which had already been shown to be cost-beneficial for Unit 2.

In response to NRC staff inquiries regarding the treatment of consequential SGTR in the baseline PRA, the approach used to estimate uncertainty, and the consideration of lower cost alternatives, NSP identified three additional potentially cost-beneficial SAMAs. In addition, in response to NRC questions regarding modeling of internal floods, NSP entered two unimplemented IPE enhancements into the PINGP 1 and 2 Corrective Action Program for further evaluation after the PRA has been updated with improved methodology for modeling pipe breaks.

The potentially cost-beneficial SAMAs and NSP's plans for further evaluation of these SAMAs are discussed in more detail in Section F.6.2.

F.6.2. Review of NSP's Cost-Benefit Evaluation

The cost-benefit analysis performed by NSP was based primarily on NUREG/BR-0184 (NRC 1997a) and was implemented consistent with this guidance.

SAMAs identified primarily on the basis of the internal events analysis could provide benefits in certain external events, in addition to their benefits in internal events. To account for the additional benefits in external events, NSP multiplied the internal event benefits for each internal event SAMA by a factor of 2. Potential benefits in external events were estimated in this manner since the external events models are generally less detailed than the internal events models and do not lend themselves to quantifying the benefits of the specific plant changes associated with internal event SAMAs. For example, the benefits of a procedure change associated with an important internal event sequence can not be readily assessed using the seismic risk model if that operator action or system is not represented in the seismic risk model. The use of a multiplier on the benefits obtained from the internal events PRA to incorporate the impact of external events implicitly assumes that each SAMA would offer the same percentage reduction in external event CDF and population dose as it offers in internal events. While this provides only a rough approximation of the potential benefits, such an adjustment was considered appropriate given the risk contribution from external events relative to internal events and the lack of information on which to base a more precise risk reduction estimate for external events.

As the IPEEE results indicate an external events contribution that is about 4 to 5 times the internal events CDF, additional information and analysis was provided by NSP in response to NRC staff questions regarding the basis for the use of a multiplier of 2 for external events. As discussed in Section F.2.2, NSP demonstrated that the PINGP 1 and 2 fire risk would be in the range of 1×10^{-5} per year rather than the fire CDF of about 5×10^{-5} per year from the IPEEE. NSP also estimated the seismic contribution by using what they referred to as a bounding "Simplified Hybrid Method" to quantify the results of the seismic margin analysis. This method resulted in a CDF of 7.8×10^{-6} per year. A corresponding NRC staff estimate using updated USGS seismic hazard information is 2.5×10^{-6} per year. For other external hazards (i.e., high winds, tornadoes, external flooding, transportation and nearby industrial facility accidents), NSP stated that PINGP 1 and 2 meets the applicable Standard Review Plan requirements, and therefore has an acceptably low risk with respect to these hazards. In conclusion, NSP stated that no higher multiplier is believed to be warranted (NSP 2008). In view of the additional justification provided by NSP, including the remaining conservatism in the external events CDF, and the licensee's further evaluation of the impacts of uncertainty on SAMA results (discussed below), the NRC staff agrees that the internal and external event CDF values would be comparable, and that use of a multiplier of 2 for external events is reasonable for the purposes of the SAMA evaluation.

NSP considered the impact that possible increases in benefits from analysis uncertainties would have on the results of the SAMA assessment. In the ER, NSP presents the results of an uncertainty analysis of the internal event CDF for Units 1 and 2. The NSP approach quantified the Level 1 model uncertainty and uncertainty multiplier for each SAMA. (In previous license renewal uncertainty analyses, licensees determined and applied a single uncertainty multiplier based on the uncertainty distribution in the baseline risk model.) In response to a NRC staff question on the uncertainty analysis, NSP provided additional justification on their approach. However, in reviewing the application of their uncertainty approach, NSP did find that the 95th percentile result for each SAMA had been incorrectly divided by the baseline CDF value as opposed to the estimated CDF value for the SAMA. Corrected uncertainty multipliers were provided (NSP 2008). The factor by which the 95th percentile CDFs exceed the point estimate CDFs ranged from 1.8 to 2.9 over the set of SAMAs (NMC 2008).

NSP reexamined the initial set of SAMAs to determine if any additional Phase I SAMAs would be retained for further analysis if the benefits (and MMACR) were increased by the 95th percentile uncertainty factor for each SAMA. Five such Phase I SAMAs were identified: SAMA 1 - Automate the swap-over of ECCS from the RWST to the containment sump, SAMA 10 - Automate the transfer of charging pump suction from the VCT to the RWST on low VCT level, SAMA 17 - Provide a bypass line around the RHR Loop B return valve to reduce the risk associated with failure of the return valve to open, SAMA 19a - Upgrade equipment and procedures for replenishing RWST inventory from a large water source, and SAMA 21 - Increase the reliability of PORV closure. These SAMAs were further evaluated as described below.

NSP also considered the impact on the Phase II screening if the estimated benefits were increased by the 95th percentile uncertainty factor for each SAMA. NSP reported in the ER that one additional SAMA could be cost-beneficial for Unit 1. This additional SAMA is SAMA 22, which was already shown to be cost-beneficial for Unit 2 in the baseline analysis. However, the results of the revised uncertainty assessment show that SAMA 19a (Upgrade equipment and procedures for replenishing RWST inventory from a large water source) is also potentially cost-beneficial for Unit 2. SAMA 19a which improves the SGTR mitigation capability is not cost-beneficial for Unit 1 as this unit had its steam generators replaced in 2004. NSP has entered SAMA 19a into the PINPG Corrective Action Program for further evaluation for Unit 2 (NSP 2008 and 2009a). The NRC staff finds that the updated uncertainty analysis and the application of this analysis to the SAMA screening process to be adequate for the identification of potential SAMAs.

The NRC noted that, for certain SAMAs considered in the ER, there may be lower-cost alternatives that could achieve much of the risk reduction at a lower cost. Several of these alternatives were evaluated by NSP subsequent to the ER, and described in the supplemental information to the ER (NSP 2008). These alternatives include:

- Procedure for manually controlling the degree of SG depressurization and reclosing the SG PORVs in the event core damage is imminent
- Procedure for enhancing manual operation of turbine-driven Auxiliary Feedwater pumps including the consideration of alternate water sources and operator aids for using local flow indication

- Procedure and equipment for using a portable pump to provide Feedwater to the SGs with suction from either the external fire ring header or intake canal
- Procedure for recovering emergency diesel generators D-1 and D-2 by supplying alternate cooling from well water
- Reconfiguring the non-safety main feedwater loads to be powered from DC Bus B (as an alternative to SAMA 15)
- Modifying the charging pumps electrical connections to enable re-powering from alternate 480 power supply using pre-staged cables
- Installing a connection flange and valve on safety injection pump flow test return line to the refueling water storage tank to enable cross-connection of SI pumps to AFW piping
- Modifying the charging and volume control system to allow cross-tie of the charging pumps from the opposite unit
- Purchase of a gagging device that could be used to close a stuck-open SG safety valve on the ruptured steam generator prior to core damage in SGTR events

In response, NSP indicated that for some of the above candidate SAMAs plant guidance currently exists, and for others, their implementation would not be cost-beneficial. The disposition is summarized as follows. Procedures for manually controlling the degree of SG depressurization, manual operation of the turbine-driven pumps, use of a portable pump to provide feedwater to the SGs, and the recovery of cooling water for emergency diesel generators D-1 and D-2 were stated as already being in place. The alternate to SAMA 15 was estimated to have a higher implementation cost than SAMA 15 as it would involve modifications to a larger set of components. The alternative that suggested re-powering the charging pumps using alternate 480V power and pre-staged cables was stated as not being cost-beneficial due to the ability to cross-tie the 4kV buses between units, the availability of dedicated EDGs for each 4kV safeguards bus, and the design differences between each unit's EDG sets which limits the likelihood of common cause failure of all the site EDGs. The alternative of enabling cross-connection of SI to AFW pumps was stated as likely to be ineffective as such a connection would require a long length of hose able to withstand high pressures and that other alternative means have already been implemented. The alternative to modify the charging and volume control system to allow it to be cross-tied from the opposite unit was stated as having an implementation cost that would be greater than that of SAMA 3 (Provide alternate flow path form RWST to charging pump suction) as the piping for this alternative is longer. However, NSP concluded that the last alternative identified above, purchase of a gagging device for closing a stuck-open steam generator safety valve, may be cost-beneficial at PINGP 1 and 2 (for both units). NSP has entered this SAMA into the PINPG Corrective Action Program for a more detailed examination of its viability and implementation cost (NSP 2008).

As discussed in Section F.2.2, the NRC staff could not clearly establish the modeling approach used to assess the likelihood of a thermally-induced SGTR following core damage in the current PRA. In response to an RAI, NSP stated that the treatment of induced SGTR events follows the guidance of WCAP-16341-P, "Simplified Level 2 Modeling Guidelines." However, this guidance has not been submitted to or reviewed by the NRC. NSP stated that all accident sequences where core damage occurs at high reactor pressure and the steam generators are dry at the time of core damage are assumed to have the potential to lead to pressure-induced SGTR. In addition, all high reactor pressure, dry steam generator sequences in which the RCS is not depressurized prior to vessel failure are assumed to have the potential to lead to temperature-induced SGTR. In order to progress to an induced SGTR, NSP assumed that the secondary side must be depressurized, either through failure of a relief valve upstream of the MSIV, or through a main steam or feedwater line break. However, implementation details were not provided or reviewed.

In order to demonstrate the sensitivity of the SAMA analysis results to this issue, the NRC staff requested that NSP assess the impact on results if an induced SGTR conditional probability of 0.25 were used in the baseline analysis (i.e., a 0.25 probability of an induced SGTR given core damage with high primary side pressure and a dry secondary side at low pressure). A conditional probability of 0.25 is consistent with the base case results of an NRC study of induced SGTR events documented in NUREG-1570 (NRC 1998c) and cited in the ASME PRA Standard (ASME 2002). NSP's sensitivity analysis identified one additional cost-beneficial SAMA. i.e., SAMA 3 - Provide alternate flow path from RWST to charging pump suction. Although NSP stated that it does not feel the 0.25 conditional probability assumption is valid for Prairie Island, they agreed to add SAMA 3 to the list of SAMAs that will be further evaluated for possible implementation (NSP 2009b).

As discussed in Section F.3.2, two unimplemented IPE enhancements were found to have been inappropriately dismissed, i.e., IPE Enhancement 2 - Procedure change to crosstie Cooling Water System Headers A and B in order to supply the MFW pumps' lube oil coolers following a break in one of the headers, and IPE Enhancement 3 - Modifications to promote water flow out of the Auxiliary Feedwater Pump/Instrument Air Compressor Room following a break in the Cooling Water System or to segregate the room into two compartments. As a result, NSP has entered IPE Enhancements 2 and 3 into their Corrective Action Program for further evaluation after the PRA has been updated with improved internal flood methodology.

Finally, as discussed in Section F.3.2, one previously identified IPEEE improvement associated with restraining wall hung ladders was also found to not have been implemented. As a result, NSP has entered the ladder storage issue into their Corrective Action Program.

The NRC staff concludes that, with the exception of the potentially cost-beneficial SAMAs discussed above, the costs of the SAMAs evaluated would be higher than the associated benefits.

F.7. Conclusions

NSP compiled a list of 25 SAMAs based on a review of the most significant basic events from the plant-specific PRA, insights from the plant-specific IPE and IPEEE, and Phase II SAMAs from license renewal activities for other plants. An initial screening removed SAMA candidates that (1) were not applicable at PINGP 1 and 2 because of design differences, (2) had already been implemented at PINGP 1 and 2, (3) had no significant benefit, or had benefits which have been achieved by other means, or (4) required extensive changes that would involve implementation costs known to exceed any possible benefit (i.e., more than $1.11 million for Unit 1 and $2.98 million for Unit 2). Based on this screening, sixteen SAMAs were eliminated, leaving nine candidate SAMAs for evaluation.

For the remaining SAMA candidates, a more detailed evaluation was performed as shown in Table F-6. The cost-benefit analyses in the ER showed that two SAMA candidates were potentially cost-beneficial in the baseline analysis (SAMA 9 for Units 1 and 2, and SAMA 22 for Unit 2). NSP performed additional analyses to evaluate the impact of parameter choices and uncertainties on the results of the SAMA assessment. As a result, SAMA 22 was identified as potentially cost-beneficial for Unit 1. (This SAMA was already shown to be cost-beneficial for Unit 2.) Based on additional analysis, three additional SAMAs were identified as potentially cost-beneficial, i.e., SAMA 3 - provide alternate flow path from RWST to charging pump suction (for Units 1 and 2), SAMA 19a - provide a reliable backup water source for replenishing the RWST (for Unit 2), and a SAMA regarding purchase of a gagging device for closing a stuck-open steam generator safety valve in SGTR events (for Units 1 and 2). NSP has indicated that these potential cost-beneficial SAMAs have been entered into the PINGP 1 and 2 Corrective Action Program to be further evaluated for possible implementation (NSP 2009a and 2009b). NSP has also indicated that as a result of an identified internal flood modeling limitation, two internal flood related enhancements previously identified in the IPE have also been entered into the Corrective Action Program for further evaluation after the PRA has been updated with improved methodology for modeling pipe breaks (NSP 2009b). Additionally, the lack of clear guidance for the location and construction of ladder storage has been entered into the PINGP 1 and 2 Corrective Action Program to further investigate the issue and to determine whether current ladder storage standards are adequate for seismic events (NSP 2008).

The NRC staff reviewed the NSP analysis and concluded that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs support the general conclusion that the SAMA evaluations performed by NSP are reasonable and sufficient for the license renewal submittal. Although the treatment of SAMAs for external events was somewhat limited, the likelihood of there being cost-beneficial enhancements in this area was minimized by improvements that have been realized as a result of the IPEEE process, and inclusion of a multiplier to account for external events.

The NRC staff concurs with NSP's identification of areas in which risk can be further reduced in a cost-beneficial manner through the implementation of the identified, potentially cost-beneficial SAMAs. Given the potential for cost-beneficial risk reduction, the staff agrees that further evaluation of these SAMAs by NSP is warranted. However, these SAMAs do not relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of license renewal which is submitted pursuant to Title 10 of the *Code of Federal Regulations*, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants" (10 CFR Part 54).

F.8. References

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NRC FORM 335 (9-2004) NRCMD 3.7 U.S. NUCLEAR REGULATORY COMMISSION **BIBLIOGRAPHIC DATA SHEET** *(See instructions on the reverse)*	1. REPORT NUMBER (Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.) NUREG-1437, Supplement 39
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10. SUPPLEMENTARY NOTES

Docket Nos. 05000282 and 050000306

11. ABSTRACT *(200 words or less)*

This Supplemental Environmental Impact Statement (SEIS) has been prepared in response to an application submitted by Northern States Power Co. (NSP) to the NRC to renew the operating licenses for Prairie Island Nuclear Generating Plant, Units 1 and 2 (PINGP 1 and 2) for an additional 20 years under 10 CFR Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." This draft SEIS contains the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the NRC staff's preliminary recommendations regarding the proposed action.

The NRC staff's preliminary recommendation is that the Commission determine that the adverse environmental impacts of license renewal for PINGP 1 and 2 are not so great that preserving the option of license renewal for energy planning decsionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS, (2) the environmental report submitted by NSP, (3) consultation with other Federal, State, and Local agencies, (4) the NRC staff's own independent review, and (5) the NRC's staff's consideration of public comments received during the scoping period.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*	13. AVAILABILITY STATEMENT
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