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STATE OF MINNESOTA

OFFICE OF ADMINISTRATIVE HEARINGS

FOR THE PUBLIC UTILITIES COMMISSION

In the Matter of the Application of Northern States Power Company d/b/a Xcel Energy for Certificates of Need for the Prairie Island Nuclear Generating Plant for an Extended Power Uprate

In the Matter of the Application of Northern States Power Company d/b/a Xcel Energy for Certificates of Need for the Prairie Island Nuclear Generating Plant for Additional Dry Cask Storage

In the Matter of the Application of Northern States Power Company d/b/a Xcel Energy for an LEPGP Site Permit for the Prairie Island Nuclear Generating Plant (PINGP) Extended Power Uprate Project

ADVISORY BRIEF OF PRAIRIE ISLAND NUCLEAR GENERATING PLANT STUDY GROUP

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Respectfully submitted,

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INTRODUCTION

The Prairie Island Nuclear Generating Plant ("PINGP") Study Group respectfully submits this Advisory Brief opposing the application of Xcel Energy for a certificate of need to more than double (from 29 casks to 64) the amount of highly radioactive spent nuclear fuel stored in casks at the Nuclear Plant in order to continue operations at Units 1 and 2 from 2013 and 2104 to 2033 and 2034, respectively. (Docket 08-510). The PINGP Study group also opposes the applications of Xcel Energy for a certificate of need (Docket 08-509) and a site permit (Docket 08-690) to increase the power generated by the Nuclear Plant by 164 megawatts ("MW") through increases in temperature, pressure and the amount of uranium in the reactor core.

The PINGP Study Group represents public and community interests neither constrained nor funded by Xcel Energy. Our resources are minimal, and we were unable to intervene as a formal party to this matter before applicable deadlines expired. We have greatly appreciated the generosity of the Administrative Law Judge and the forbearance of the parties in allowing us to cross-examine witnesses in the contested case proceeding and to submit this Advisory Brief.

The PINGP Study Group believes that granting the requested certificates of need would contradict Minnesota's public policy priorities for renewable energy and environmental protection and would violate applicable laws. The expansion of spent fuel storage and the continued operation of the Prairie Island Nuclear Plant for another twenty years should be denied on the following grounds:

1. The Applicant has not demonstrated that certification of the cask increase and continued operation of the Nuclear Plant is consistent with Minnesota's renewable energy preference under Minn. Stat. §216B.243, subd. 3a. It has not been demonstrated that an alternative of wind backed up by natural gas is more expensive than continued reliance on nuclear power, particularly if cost savings from repowering the Nuclear Plant with gas and the environmental costs of decommissioning are factored into the analysis.

2. The Applicant has not demonstrated that a renewable energy wind/natural gas alternative to continued reliance on the Nuclear Plant is "not in the public interest" as required by Minn. Stat. §216B.2422, subd. 4. There is a trade-off between continued reliance on the Nuclear Plant and development of renewable wind energy.

3. Certification of additional nuclear waste storage along with the continued operations of the Nuclear Plant, Minn. Stat. § 216B.243 subd. 3b(b), will conflict with the policies, rules and regulations of other state and federal agencies, in violation of Minn. Stat. §216B.243, subd.3 (7) and Minn. R. 7855.0120D. Gamma radiation exposures from spent fuel casks and risks to workers will exceed acceptable health risks under Minnesota rules; the burdens of radiation exposures will be disproportionately borne by the Prairie Island

Indian Community, in violation of state and federal environmental justice policies; and the inadequacy of the emergency response plan violates federal regulations.

4. The Applicant has not demonstrated that the consequences of increasing nuclear waste cask storage and continued operations of the Nuclear Plant are more favorable to society than denying the certificate, considering the effects of the proposed facility on the natural and socioeconomic environment, including human health pursuant to Minn. Stat. §216B.243, Subd. 3(5); Minn. R. 7855.0120C. Radioactive emissions increase health risks and inadequate monitoring fails to demonstrate safety; continued operations and waste storage increase the risk that high-level nuclear waste will be permanently stranded at Prairie Island; and the inability to ensure long-term institutional control, as well as the inadequacy of the current emergency response plan, creates the risk of untenable socioeconomic, human health and environmental consequences.

5. Applicant's radionuclide releases from cask storage and continued operation of the Nuclear Plant are likely to violate Minn. Stat. §§ 116C.83 and 116C.76. The provisions of the Minnesota Environmental Policy Act ("MEPA"), applicable under this law, require selecting an alternative that avoids risks of untenable environmental harm.

The PINGP Study Group believes that the certificate of need and site permit for the power uprate become moot if additional cask storage is denied and the Prairie Island Nuclear Plant is decommissioned in 2013 and 2014. The uprate is also unnecessary under current demand conditions and creates cumulative risks. It should be denied on the following grounds:

1. Under current demand conditions, the Applicant cannot demonstrate the need for a power uprate at the Nuclear Plant under Minn. R. 7849.0120A. Electric demand has declined since the Application was submitted and there would be no adverse effect from denial of the power uprate.

2. The Applicant has not demonstrated that the uprate is consistent with Minnesota's renewable energy preference under Minn. Stat. §216B.243, subd. 3a. Specifically, it has not been demonstrated that an alternative of purchased power from hydro energy is more expensive than the uprate.

3. The Applicant has not demonstrated that an alternative including wind and repowering of a coal plant to natural gas is "not in the public interest" as required by Minn. Stat. §216B.2422, subd. 4. There is a trade-off between the uprate and development of renewable wind energy, while repowering of the Black Dog coal plant to natural gas would markedly reduce air emissions while increasing generation capacity.

4. Issuance of a certificate of need and site plan for the uprate will conflict with the policies, rules and regulations of other state and federal agencies, in violation of Minn. Stat. §216B.243, subd.3 (7) and Minn. R. 7855.0120D. Cumulative gamma radiation exposures exceed acceptable health risk, emergency response plan inadequacies violate federal regulations and the burdens borne by members the Prairie Island Indian Community violate state and federal environmental justice policies.

5. The Applicant has not demonstrated that the consequences of the uprate are more favorable to society than denying the certificate, considering the effects of the proposed facility on the natural and socioeconomic environment, including human health pursuant to Minn. Stat. §216B.243, Subd. 3(5); Minn. R. 7849.0120C. Certification is premature,

since cumulative safety of the power uprate for the aging reactor has not been determined. Radiation and thermal impacts are significant and monitoring for their effects is inadequate.

The PINGP Study Group believes that mitigation is not sufficient to justify granting either the certificates of need or the site permit, but it is required under applicable law and as a result of the facts contained in this record. The Commission should mitigate the adverse impacts on the socioeconomic and human environment, including human health, resulting from expanding casks at the Prairie Island independent spent fuel storage installation ("ISFSI"), increasing power at the Nuclear Plant and, from continued operations at the Plant itself. Even under current conditions, where operations are permitted through 2014 and 29 dry storage casks may remain on site indefinitely, we believe that the following conditions would be appropriate to protect the environment and public health:

1. The Commission should require Xcel Energy to provide comprehensive and improved monitoring of the radioactive emissions from the Nuclear Plant and ISFSI to improve accuracy of assessment of human exposures over time with appropriate numbers and locations of monitors and to protect human health in the event of incidents by providing real-time information on gamma radiation, air emissions and surface and groundwater discharge. All monitoring information should be transparent and accessible to the public, along with comprehensive assessment of exposure risks.
2. The Commission should require Xcel Energy to provide comprehensive and improved monitoring of the thermal discharge from the Nuclear Plant and its impacts on various biota, including improving the number and accuracy of assessment points and providing real-time information on thermal impacts. This evaluation study should be coordinated with review of processes, including use of auxiliary air cooling tower and reducing open-cycle operations, to mitigate environmental impacts.
3. The Commission should require Xcel Energy to comply with industry standards for groundwater protection, evaluate radionuclide contamination, reduce tritium discharge and identify the sources of tritium contamination of existing wells.
4. The Commission should require Xcel Energy to provide funding to the Prairie Island Indian Community for testing of the health impacts of radioactive emissions from the Nuclear Plant on the Community. Prior health studies do not provide this information, and environmental justice concerns are unique.
5. The Commission should require Xcel Energy to investigate alternatives for the disposition of nuclear spent fuel after decommissioning of the Prairie Island Nuclear Plant and to develop a plan to ensure adequate maintenance, cask replacement, monitoring, funding and security for a period of at least 200 years.
6. The Commission should require Xcel Energy to provide funding to the City of Red Wing for an effective emergency response plan and appropriate response times.

DISCUSSION

A. THE CERTIFICATE OF NEED FOR THE CASK INCREASE AND CONTINUED OPERATION OF THE NUCLEAR PLANT SHOULD BE DENIED.

1. Applicant has not demonstrated that wind supported by repowering the Nuclear Plant with natural gas would be more expensive than the cask expansion and continued operation of the Nuclear Plant, as required by the renewable energy preference statute, Minn. Stat. §216B.243, subd. 3a.

Minnesota certificate of need law, enacted in 1991, creates a preference for the use of renewable energy:

> The commission may not issue a certificate of need under this section for a large energy facility that generates electric power by means of a nonrenewable energy source, or that transmits electric power generated by means of a nonrenewable energy source, unless the applicant for the certificate has demonstrated to the commission's satisfaction that it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source. For purposes of this subdivision, "renewable energy source" includes hydro, wind, solar, and geothermal energy and the use of trees or other vegetation as fuel. Minn. Stat. 216B.243, subd. 3a.

The Minnesota Public Utilities Commission ("Commission") in its March 17, 2009 Order Granting Certificate of Need with Conditions (Big Stone II Order), pp. 27-28, Docket No. E017 et al/CN-05-619, determined that an alternative combining renewable resources with non-renewable resources, such as wind generation supported by natural gas generation can qualify for consideration under the renewable preference statute.

Xcel Energy did not consider a wind/gas alternative to the Nuclear Plant life extension and cask increase. Tr. V 4, pp. 157-158 (Wishart). Xcel has not performed an analysis of the feasibility of repowering the Prairie Island Nuclear Plant to natural gas since it was ordered to do to in 2002, Ex. 57 (Xcel Conversion), and did not analyze the potential of repowering as an alternative to approval of continued operation of the Nuclear Plant in this proceeding. Tr. V 2, pp. 133-134 (Bomberger).

Xcel stated that benefits of continued operation of the Nuclear Plant include avoidance of construction on a greenfield site and use of existing transmission facilities. Ex. 100, p. 10-2 to 10-3 (CON Application). However, repowering the Nuclear Plant with natural gas would also allow the use of allow the use of a brownfield site and use of existing transmission corridors, Tr. V 4, pp.100, 102 (Engelking). If the Plant were repowered, the benefit provided by taxes would

also continue. *Id.*, p. 100. The Final Environmental Impact Statement ("FEIS") discussed the infrastructure benefits of a wind/gas alternative with repowering of the Nuclear Plant:

> If NGCC [natural gas combined cycle] plant was sited at Prairie Island, no new transmission facilities would be required. Ex. 64, Ch. 2, p. 58 (FEIS)
>
> A study commissioned by the Minnesota Legislature concluded that there is potential for locating 600 megawatts (MW) of dispersed renewable generation within Minnesota's existing transmission infrastructure. Thus, approximately half of the PINGP's generating capacity could be met with renewable resource technologies that do not require additional transmission. Depending on the transmission needs for the remainder of the renewable resource capacity required, environmental impacts from transmission lines for renewable resource technologies could be less than those for fossil fuel technologies. If renewable resource technologies were combined with a natural gas repowering of the PINGP, there could be no additional transmission required, i.e., the renewable resources could be dispersed across existing transmission infrastructure and the Prairie Island site has existing transmission infrastructure regardless of the energy source. *Id.*, pp. 62-63.

Repowering would also permit the reuse of some of the equipment and facilities of the Prairie Island nuclear plant, saving capital and installation costs of equipment, including the turbine generator. Tr. V 4, p. 101 (Engelking). The cost savings from the steam generator portion would be a little less than half of the $866 million capital cost of a natural gas combined-cycle plant. *Id.*, pp. 101-102, 111.

The life extension of the Prairie Island plant would involve $1.1 billion of additional capital investments, *Id.*, p. 109, and the uprate would cost an additional $322 million, *Id.*, p. 110. Slow growth and low gas prices would reduce the cost differential between nuclear power and natural gas, Ex. 132, Schedule 1, Revised Table 4-4 (Engelking Direct 510). Gas prices have dropped by half during the past eighteen months. Tr. V. 4, p. 73-74 (Engelking). Applicants have not demonstrated on this record that increased nuclear waste storage and continued reliance on the Nuclear Plant for another twenty years would less expensive than a wind/gas repowering alternative.

The cost comparison which the Applicant used to support continued reliance on the Prairie Island Nuclear Plant also failed to consider the unique economic burden imposed by nuclear power – the need for decommissioning and long-term storage of nuclear waste for hundreds, if not thousands of years. The calculations that Xcel used for the costs of the nuclear waste ISFSI were limited to construction, cask purchase, licensing and regulatory fees. Xcel's $155.7 million figure for ISFSI costs didn't include costs for cask maintenance, cask repair or replacement, or security at the ISFSI over time. Tr. V 4, p. 212 (Sampson).

In 2008 dollars, the current cost estimates for decommissioning are $1.026 billion for radiological removal, $83.7 million for site restoration and $404 million for ISFSI operations. Ex. 64, Ch. 2, p. 15 (FEIS). This cost, assessed to ratepayers based on the decommissioning fund docket Ex. 58, p. 1 (Staff Briefing Papers in Docket 08-1201), reflects only 40 years of costs after shut-down of the Prairie Island Nuclear Plant. Tr. V 5, pp. 217-218 (Rakow). No effort has been made to identify what the costs would be in the decommissioning process if it were necessary to operate or manage the Prairie Island ISFSI for a long-term indefinite period such as the 200 years identified in the FEIS. Tr. V 2, pp. 142-143 (Bomberger). If nuclear waste storage extended for more than 40 years, analysis simply assumed that Xcel could get additional funds from a variety of sources, including Xcel ratepayers. Tr. V 5, p. 222 (Rakow).

The Office of Energy Security ("OES") did not consider the cost of decommissioning in its analysis of whether nuclear power is more expensive, including environmental costs, than a renewable wind/natural gas alternative. The OES noted that from a present value financing perspective, if one assumes that decommissioning costs are fixed, any benefit of delaying decommissioning by operating the Prairie Island Nuclear Plant another twenty years would be in the tens of millions, "in essence, it would be a rounding error." Tr. V. 6, p. 79 (Rakow).

An economist might characterize the costs for decommissioning, radiological removal and long-term nuclear waste storage in large part as "sunk" costs. But, the additional cost to ratepayers from decommissioning and long-term waste storage are real. These costs are unique to nuclear power, may exceed the cost difference between continued operation of the Nuclear Plant and other feasible alternatives and, when counted in full, make the proposed cask expansion and continued operation of the Prairie Island Nuclear Plant more expensive than an alternative including renewable energy and repowering of the Plant with natural gas.

The human health, sociological and environmental costs pertaining to the cask increase and continued operation of the nuclear plant, described below in parts 3, 4 and 5 of this Section, make a combined wind/gas alternative less costly than Xcel's proposal. Xcel's comparison of costs did not consider emissions of tritium, neutron or gamma radiation. Tr. V 4, pp. 106-107 (Engelking). The comparison of costs by the OES concluded that the incremental impact to the public or to workers from the proposed cask expansion was not significant, Ex. 514, pp. 24-26 (Rakow Public Direct 510); that no accident at the ISFSI would result in radioactive release, *Id.*,

p. 27; and that the present value for even a severe accident risk at the Nuclear Plant was too small to impact cost analysis in a meaningful manner. *Id.*

As described in detail below, the proposed cask expansion and continued operation of the Nuclear Plant would increase lifetime cancer risks, discharge of radioactive tritium to ground and surface waters and, with potential failures of emergency response or long-term institutional control, create untenable risks of a severe incident. As explained by Dr. Gordon Thompson, a witness for the City of Red Wing, actual losses from a fire in a nuclear spent fuel pool could range as high as $1,520 billion. The present economic cost of this risk, taking into account the likelihood of occurrence, would be from $1.1 to $2.3 billion, more than the cost differential of Applicant's proposal and a wind/gas alternative. Tr. V 3, p. 46; Ex. 308, Table 2, GT-6 (Thompson Surrebuttal). Apart from the fact that losses from this type of severe incident would exceed any insurance available under the Price-Anderson Act, Tr. V 3, pp. 77-79 (Thompson), the potential environmental and socioeconomic costs may simply be too high to be borne, when there is a renewable/non-renewable energy alternative that carries no similar risks.

2. Applicant has not demonstrated that a renewable energy wind/natural gas alternative to continued operation of the Nuclear Plant is "not in the public interest" as required by Minn. Stat. § 216B.2422, subd. 4.

It is undisputed that states have the right to determine whether nuclear power and its continued or expanded use is in the best interests of citizens. Pacific Gas & Elec. Co. v State Energy Res. Conservation and Dev. Comm'n, 461 U.S. 190, 205 (1983). Minnesota law not only requires a determination that a renewable energy alternative is more expensive than a nonrenewable energy proposal under Minn. Stat. § 216B.243, subd. 3a discussed above, but also that an Applicant for a new or refurbished nonrenewable energy facility demonstrate that a renewable energy facility is not in the public interest:

> The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest. Minn. Stat. § 216B.2422, subd. 4.

This statute requires the Commission to evaluate the policy implications of refurbishing the Prairie Island Nuclear Plant as contrasted with the public interest of the State in fostering the development of renewable energy. Given declining demand for electricity and predicted low

growth (described in Section B, part 1 of this Advisory Brief in connection with the proposed power uprate), there is a trade-off between continued operation of the Nuclear Plant and developing additional wind resources, including community based and rural wind energy development favored under Minn. Stat. §216B.1612 and Minn. Stat. § 216C.39.

If Xcel were to retire the Prairie Island Nuclear Plant in 2013 and 2014 and chose to replace the energy it produced with renewable wind energy, it would require an additional 2,500 MW of wind. Tr. V 4, pp. 159-160 (Wishart). The wind/natural gas alternative to cask expansion modeled by the OES would add two additional wind units (100 MW each) every year between 2013 and 2017, totaling 1,000 MW of additional wind. Ex. 514, p. 18 (Rakow Public Direct 510).

The PINGP Study Group submits that Minnesota's public interest favors renewable energy not only to reduce the costs, including human health, socioeconomic and environmental costs, of continued operation and increased waste storage at the Prairie Island Nuclear Plant, but to provide for community-based ownership and rural economic development. Applicant has not demonstrated that increased development of wind energy, supported by repowering of the Nuclear Plant with natural gas, is not in the public interest of the State of Minnesota.

3. Certification of additional nuclear waste storage along with the continued operations of the Nuclear Plant will conflict with the policies, rules and regulations of other state and federal agencies, in violation of Minn. Stat. §216B.243, subd. 3(7) and Minn. R. 7855.0120D.

The certificate of need for additional spent fuel storage at the Prairie Island Nuclear Plant cannot be granted if the record shows that the design, construction, operation or retirement of either the spent fuel storage facility or the Nuclear Plant itself will conflict with policies, rules and regulations of other state and federal agencies. In assessing need, the Commission must consider the policies, rules and regulations of other states and federal agencies in certificate of need proceedings. Minn. Stat. § 216B. 243, subd. 3(7). Applicable rules clarify that a certificate of need should be granted if "it has not been demonstrated on the record that the design, construction, operation, or retirement of the proposed facility will fail to comply with those relevant policies, rules, and regulations of other state and federal agencies and local governments." Minn. R. 7855.0120D. This assessment pertains to operations of the nuclear plant and the spent

fuel storage facility under Minn. Stat. § 216B.243, subd. 3b(b) which provides, "Any certificate of need for additional storage of spent nuclear fuel for a facility seeking a license extension shall address the impacts of continued operations over the period for which approval is sought."

In determining whether there is compliance with Minn. R. 7855.0120D, the policies, rules and regulations of the Minnesota Pollution Control Agency, the Minnesota Department of Natural Resources and the Minnesota Department of Health should be considered. Tr. V 5, p. 245 (Rakow). The OES has acknowledged that denial of the certificate of need would be appropriate if Xcel's proposal would fail to comply with state rules, regulations or policies:

> A: If I were to be able to demonstrate that Xcel is going to – Xcel's proposed project is going to fail to comply with the Minnesota Pollution Control Agency health-related regulation, I would recommend that the Commission deny the certificate of need. . .
> Q: What if you were able to demonstrate or somebody was able to demonstrate that the proposal would fail to comply with the Minnesota Health Department policy, rule or regulation?
> A: That would be the same recommendation then. Tr. V 5, pp. 245-246 (Rakow)

The record demonstrates that Xcel's proposed cask expansion and extension of operations at the Nuclear Plant will fail to comply with state and federal rules, regulations and policies regarding acceptable lifetime cancer risk, environmental justice and maintenance of an adequate emergency response plan.

a. Lifetime Cancer Risk

The Final Environmental Impact Statement ("FEIS") demonstrates that radiation exposures from the extended operation and retirement of the Prairie Island Nuclear Plant would violate Minnesota Health Department rules pertaining to acceptable lifetime cancer risks.

As of June 10, 2009, Xcel Energy had 25 nuclear spent fuel storage casks at the Prairie Island ISFSI. Tr. V 4, p. 198 (Sampson). Xcel's proposed project will increase the authorized number of casks for continued operation of the Nuclear Plant from 29 to 64 casks of nuclear spent fuel to accommodate spent nuclear fuel generated after 2014. Ex. 100, pp. 1-5 (CON Application). If the Commission were to approve the 35 additional casks for twenty years of continued operation, it would result in 98 casks on site, by the time the Nuclear Plant is decommissioned. Tr. V 4, p. 203 (Sampson).

The FEIS notes that the additional lifetime cancer risk to the public resulting from "skyshine radiation"[1] from 64 casks at the PINGP ISFIS is 2.8 in 100,000. Ex. 64, Ch. 2, p. 26, Table 5A-2 (FEIS). This additional lifetime cancer risk increases more than ten-fold to 35 in 100,000 when the number of spent fuel storage casks reaches 98. *Id.*, Ch. 2, p. 37, Table 5A-2. The increased cancer risk from ISFSI expansion fails to comply with Minnesota Rules setting limits on cancer risk from emissions to which Minnesotans are involuntarily exposed.

The FEIS explains, "The acceptable level for additional lifetime carcinogenic risk from contaminants in these mediums is 1 in 100,000 (1 E-05)." Ex. 64, Ch. 1, p. 78 (FEIS). This acceptable level for cancer risk is not particular to radioactive emissions and is not designed to single out nuclear generation. The 1 in 100,000 acceptable level for additional lifetime cancer risk applies to discharge to groundwater or air from any Minnesota facility. Minn. R. 4717.7820, Subp. 4, Minn. R. 4717.8050, Subp. 3. These risks are considered in permit applications for industrial facilities, real estate developments and to determine the scope of voluntary actions to remediate pollution. They are cumulated where a proposed action will result in carcinogenic exposure through more than one medium or chemical. Minn. R. 4717.7890, Minn. R.4717.8550.

The FEIS also estimates the increased lifetime risk of cancer incidence to Prairie Island Nuclear Plant personnel resulting from expansion of cask storage at the ISFSI and from normal Plant operations continuing over the next 20 years. Under routine conditions, with no incidents or leaks, expansion of the ISFSI to 64 casks will result in additional lifetime cancer risk for PINGP personnel of 98 in 100,000. Ex. 64 Ch. 2, p. 27, Table 5A-2 (FEIS). This data is summarized below.

PERSONS EXPOSED	**Route of Exposure**	**Casks**	**Additional Cancer Risk per 100,000**
Acceptable Risk - Minnesota Rules	cumulative exposures	NA	1
CASK INCREASE			
PINGP PERSONNEL	"skyshine radiation"	64	98
GENERAL PUBLIC	"skyshine radiation"	64 98	2.8 35

[1] "Skyshine radiation" is the term used to describe gamma radiation emitted from spent nuclear fuel that is released to the atmosphere and bounced off a particle in the atmosphere to return to earth. This term assumes that exposure to direct gamma radiation, or "line of sight" radiation has been shielded. See Tr. V 6, p. 302 (Pickens).

Xcel does not dispute that radiation impacts to members of the public and Prairie Island Plant personnel from skyshine radiation alone would exceed Minnesota's 1 in 100,000 policy threshold for acceptable lifetime cancer risk. Xcel Initial Brief, p. 82. What Xcel argues is that Minnesota Health Department rules and policies do not apply to its Nuclear Plant or spent fuel ISFSI due to the qualifications in Minn. R. 4731.0200, Subp.1B.

Reliance on this Rule is misplaced. The cited Subpart pertains only to rules in Chapter 4713, Radiation Safety, for the regulation of radiation from radioactive materials, not to rules in Chapter 4717, pertaining to Environmental Health. There is no such exclusion in Chapter 4717.7810, setting health risk limits for water or Chapter 4717.8000 *et seq.* setting health risk values for air.

Xcel's proposed project would fail to comply with Minnesota Health Department health-related rules and policies. There is no evidence in this record that project modifications would reduce cancer risks from the ISFSI to acceptable levels, so the certificate of need for cask expansion should be denied. Minn. Stat. §216B.243, subd. 3(7); Minn. R. 7855.0120D.

b. Environmental Justice

Approximately 250 members of the Prairie Island Indian Community reside within three miles of the PINGP. There are numerous Community residences and other facilities located on the Community's lands immediately adjacent to the Plant, including playgrounds and ceremonial grounds. Ex. 64, Ch. 1, pp. 59, 65 (FEIS). The FEIS recognizes that "the Prairie Island Indian Community (PIIC) is a community of persons for whom there are environmental justice concerns." *Id.*, Ch. 2, p. 44.

The FEIS confirms that continued operations at the Prairie Island Nuclear Plant and increased cask storage at its ISFSI will result in disparate adverse impacts to the Prairie Island Indian Community:

> [Under normal operations] PIIC members will receive slightly higher exposure levels and doses than communities at a greater distance. These doses will create a small incremental risk that the PIIC will bear differentially from other communities.
>
> The likely larger uncertainty and incremental risk borne by the PIIC is the uncertainty related to an incident at the PINGP or Prairie Island ISFSI. As discussed in this section, the probabilities associated with such incidents are expected to be very low. . . Nonetheless, there is uncertainty. This uncertainty is borne by all communities surrounding Prairie Island, but likely most directly felt by those communities which could be impacted should an incident occur, e.g., PIIC, City of Red Wing. As discussed

> in Chapter 1, Section 4.5, this uncertainty may be associated with socio-psychological impacts. *Id.*, Ch. 2, p. 44.

Both federal and state environmental justice policies prohibit actions placing a disproportionate share of the negative consequences of industrial and commercial activities on low-income and minority groups, including Tribes. Federal environmental justice policy was initiated in 1994, with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* which states:

> To the greatest extent practicable and permitted by law. . .each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.

The United States Environmental Protection Agency ("U.S. EPA") policy implementing this Order states that Environmental Justice is the "fair treatment" of all people regardless of race, color, national origin or income and that "no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies." http://www.epa.gov/compliance/basics/ejbackground.html.

State policies also preclude placing a disproportionate share of involuntary exposures on the Community. The Minnesota Pollution Control Agency (MPCA) Environmental Justice policy states:

> MPCA will, within its authority, ensure fair and equitable treatment and meaningful involvement of all Minnesota citizens in the implementation of environmental laws, rules, programs, and policies to insure that minority and economically-disadvantaged communities in Minnesota:
> • Do not bear a disproportionate share of the involuntary risks and consequences of environmental pollution. http://www.pca.state.mn.us/publications/p-gen5-01.pdf

Minnesota Department of Transportation environmental justice policy similarly commits the State to administer and implement programs, policies, and activities that affect human health or the environment so as to avoid "disproportionately high and adverse" effects on minority and low-income populations. (http://dotapp7.dot.state.mn.us/edms/download?docId=614585)

Increasing the number of spent fuel casks at the Prairie Island ISFSI and continued

operation of the Nuclear Plant will create a disproportionate adverse impact of members of the Prairie Island Indian Community, which will conflict with both federal and state environmental justice policies. This disproportionate impact is more troubling because neither Xcel's proposal nor the FEIS considered any other alternative sites for these adverse impacts and because Community members live on and near Tribal land and cannot move without losing their cultural, historical and spiritual connection to the land and their Community.

Disproportionate risks to the Community will not be completely eliminated until all nuclear waste storage casks are removed and the ISFSI at Prairie Island ceases operation. Ex. 64, Ch. 2, p. 45 (FEIS). Until that time, as explained in the FEIS, "the only apparent means to mitigate environmental justice concerns related to the PIIC would be to discontinue operations at the PINGP and replace its energy generation with an alternative source." *Id.* The PINGP Study Group believes that this means of mitigation is required by environmental justice policies and certificate of need rules, Minn. R. 7855.0120D.

c. Inadequate Emergency Response Plan

Under Nuclear Regulatory Commission ("NRC") regulations, Xcel Energy is required to maintain an adequate emergency response capability. Specifically, 10 CFR §50.47 requires Xcel to have an emergency response plan in place at the Prairie Island Nuclear Plant and the Prairie Island ISFSI. Ex. 100, p. 7-37 (CON Application). As Xcel acknowledged, "The maintenance of emergency response capabilities is not an option for Xcel Energy, but necessary in order to comply with federal requirements enforced by the NRC." Xcel Initial Brief, p. 52.

Representatives from the City of Red Wing testified that, due to funding constraints, the City may not be able to continue to provide the critical and necessary public safety services to meet the requirements of the Emergency Response Plan. Tr. V 5, p. 143 (Hallock); Ex. 303, p. 12 (Hallock Direct). Xcel has self-reported to the NRC that it is out of compliance with respect to its emergency response plan and that it has instituted a corrective action plan. Tr. V 2, p. 12 (Bomberger). On this record, the OES is concerned that the City of Red Wing is unable to provide Xcel with the contracted level of emergency response services. Tr. V 5, pp. 194-195 (Rakow). The OES has concluded that Xcel has failed to comply with Minn. R. 7855.0120D due to failure to have an adequate Emergency Response Plan as required by the NRC. OES Initial Brief (Public 510), p. 69.

The inadequacy of an emergency response plan is not a technical violation. Xcel acknowledges that if there is a concern about the emergency response plan, the NRC will be concerned about the operation of a nuclear plant. Tr. V 2, p. 231 (Carlson). Dr. Thompson, a witness for the City of Red Wing, testified that, in the case of operation of a nuclear power plant, a release could begin very quickly, making emergency response critical:

> The Nuclear Regulatory commission guidance for these matters states that the release could occur as soon as 30 minutes after the initiation of the event and persons close by could therefore be exposed very quickly. And that means that effective emergency response, by way of evacuation, sheltering, respiratory protection, et cetera, needs to be implemented very quickly in order to be effective. Tr. V 3, p. 55 (Thompson).

Both the City of Red Wing and the OES suggest that action by Xcel to ensure adequate funding of an emergency response plan would permit compliance with federal regulations and the requirements of Minnesota Rules 7855.0120D. The PINGP Study Group believe that this violation of state regulations should be addressed by appropriate funding and supports the request of the City of Red Wing for conditions to ensure an adequate emergency response plan.

4. The Applicant has not demonstrated that the consequences of increasing cask storage of nuclear waste and continued operations of the Nuclear Plant are more favorable to society than denying the certificate, considering the effects of the proposed facility on the natural and socioeconomic environment, including human health pursuant to Minn. Stat. §216B.243, subd. 3(5); Minn. R. 7855.0120C.

The Commission must evaluate the effects of a proposal on environmental quality in assessing the need for a large energy facility. Minn. Stat. § 216B.243, subd. 3(5). A certificate of need can only be granted, under Minn. R. 7855.0120C if it is determined that:

> C. it has been demonstrated by a preponderance of the evidence on the record that the consequences of granting the certificate of need for the proposed facility, or a suitable modification thereof, are more favorable to society than the consequences of denying the certificate, considering:
> (1) the relationship of the proposed facility, or a suitable modification thereof, to overall state energy needs;
> (2) the effects of the proposed facility, or a suitable modification thereof, upon the natural and socioeconomic environments compared to the effects of not building the facility;
> (3) the effects of the proposed facility, or a suitable modification thereof, in inducing future development; and
> (4) the socially beneficial uses of the output of the proposed facility, or a suitable modification thereof, including its uses to protect or enhance environmental quality.

As noted *supra*, p. 9, any certificate of need for additional storage of spent nuclear fuel shall address the impacts of continued operations. Minn. Stat. 216B.243, subd. 3b(b). The parties agree that it is appropriate for the Commission to consider the risks of operation of the Prairie Island Nuclear Plant and to determine how the costs and risks of operation of the plant impact natural and socioeconomic environments, including human health. Tr. V 1, pp. 233-234 (Bomberger).

The PINGP Study Group believes that the evidence on this record is insufficient to establish that the consequences of granting the certificate of need for the spent fuel cask expansion are more favorable to society than the consequences of denying the certificate, given the effects of the proposed facility on the natural and socioeconomic environments, including human health. Critical issues in this analysis include human health risks of cancer along with insufficient monitoring of radioactive emissions to demonstrate safety, the likelihood that high-level waste will be indefinitely or permanently stranded at Prairie Island, which risk is increased with continued operations, and the risk of predictably severe and untenable socioeconomic, human health and environmental consequences with either the short-term failure of emergency response or the long-term failure of institutional control.

a. Cancer Risk from Radiation

It is undisputed that any exposure to radiation poses some health risk, including an increased risk of cancer and genetic abnormalities in the future generation, and that the risks increase as exposure increases in a linear manner with no threshold below which there is no effect. Tr. V 2, pp. 105-106 (Bomberger). It is broadly accepted that exposure to low doses of radiation, even doses below NRC exposure limits, can cause damage at genetic and molecular level. Ex. 406, p. 6 (Wilkinson Surrebuttal). According to Dr. Wilkinson, expert witness for the Community, "numerous peer-reviewed studies have reported elevated rates or risks of leukemia and cancers associated with low doses of ionizing radiation or operations at nuclear facilities." *Id.*, p. 4.

Xcel's expert witness, Dr. Hoel, suggested that a recent study regarding cancer occurrence in Goodhue County by the Minnesota Department of Health (MDH) concluded that people living near the Prairie Island Nuclear Plant did not have significant increased risk of

cancer, Ex. 139, pp. 4-5 (Hoel 509 Rebuttal), cited by OES Initial Brief (Public 510), p. 58. However, this assertion misstates the nature of the study conducted by the MDH and its conclusions. The inapplicability of the MDH study to determine if the Nuclear Plant increases nearby cancer risks is explained in the FEIS response to PINGP Study Group comments:

> These studies were not conducted to determine whether cancer risks were higher because of Minnesota's nuclear power plants. . .The use of a ten-county region to examine cancer risks would preclude identifying an increased cancer risk related to close proximity (as a surrogate for exposure) to nuclear power plants. A very different study design would be required and there would be an insufficient number of cases to conduct such a study in Minnesota. Ex. 64, Ch. 3, Response to Comment 16-24 (FEIS).

As described in the preceding subsection, when dosimeters have been used to measure gamma radiation from the Prairie Island ISFSI, significant increased lifetime cancer risks from the project have been found. *Supra*, p. 10; Ex. 64, FEIS, Ch. 2, Table 5A-2 (FEIS). The ring formation of gamma radiation monitoring is described in the FEIS:

> Offsite ambient gamma radiation is monitored at 34 locations, using thermoluminescent dosimeters (TLDs): 10 in an inner ring in the general area of the site boundary, 15 in the outer ring within a 4-5 mile radius, eight at special interest locations, and one control location, 11.1 miles distant from the plant. They are replaced and measured quarterly. Ambient gamma radiation is monitored at the Prairie Island ISFSI with 20 TLDs. Twelve dosimeters are located inside the earthen berm in direct line of sight from the storage casks and eight dosimeters are located outside of the earthen berm. Ex. 64, Ch. 1, p. 80 (FEIS).

It is undisputed that the accuracy of Xcel's measurements of radioactive effluents in total body and organ doses depends on the accuracy of the Prairie Island Nuclear Plant's monitoring protocol and monitoring equipment. Tr. V 2, p. 106 (Bomberger). Some of the equipment for monitoring of effluents at the Nuclear Plant dates from back to the 1970's. *Id.*, p. 85. Xcel recognizes that there is more sensitive monitoring equipment available than the equipment being used at the Prairie Island Nuclear Plant right now. *Id.*, p. 116.

The PINGP Study Group believes that there are flaws in the radiation monitoring protocols and equipment at the Prairie Island Nuclear Plant that undermine the accuracy of Xcel's representations that total body doses from radioactive emissions to air and water are within safe limits. *See e.g.* Ex. 62 (10 C.F.R. 50, Appendix I). Xcel's sampling program for radioactive airborne particulates goes back to the start-up of the Nuclear Plant in 1973 and may not have been updated since then. Tr. V 6, p. 308 (Pickens). Xcel has one control location for

air emissions near Prescott, Wisconsin and only four indicator locations for airborne radioactive particles. *Id.*, pp. 306-307. As suggested in a recent letter from Health Physicist James T. Voss,

> For emissions to air, best practice is to locate continuous air monitors in a ring around the perimeter of the plant and in an additional outer ring to provide information on the size, location and dispersion of any airborne plume. PINGP air emissions monitors are insufficient in number as well as insufficient to provide real-time information. Sufficiency in the number and location of monitors and correlation with weather (temperature, humidity, wind) information is necessary to assess as well as predict air emissions plumes and dispersion in the environment. Attachment A, p. 2, September 1, 2009 Letter of James T. Voss ("Voss Letter").

The inadequacy of Xcel's monitoring of discharge to surface water and groundwater similarly prevents accurate assessment of organ and total body doses from tritium and other radioactive contaminants. Although Xcel discharges radioactive liquid waste directly into the Mississippi River, as described in more detail in the next subsection of this Brief, Xcel samples only one downstream Mississippi river location for gamma-emitting isotopes and for tritium. Tr. V 6, p. 195 (Flowers). Water sampling and other monitoring off site are not coordinated with any planned releases from the Nuclear Plant. *Id.*, p. 271. Xcel's groundwater monitoring for tritium is insufficient to determine the source of elevated tritium levels in even its most contaminated wells, P-10 and MW-8. *Id.*, pp. 214-217. Mr. Voss advises,

> Sampling of surface and ground water, similarly, must be robust and appropriately located to identify the nature, location and dilution of any water-borne plume, as well as conducted in real time. Sampling of Mississippi River water for tritium at a single location is likely to be insufficient to identify any plume of radioactive materials from the PINGP. Tritium is relatively similar to hydrogen, which makes it readily bond with oxygen as tritiated water, which is easily ingested in food and water or absorbed through the skin.
>
> Monitoring of groundwater requires a geological survey to site wells so that they identify potential releases. Reviewing elevated tritium findings in wells identified in the PINGP 2008 REMP (particularly P-10 and MW-8 on page E-10), it should be noted that tritium has a half-life of 13 years. Ongoing elevation of tritium may be evidence of an ongoing, rather than a historic release, and elevated tritium levels at various locations may indicate multiple rather than a single release point. Additional assessment and monitoring would assist in identifying the source of tritium releases to groundwater. Attachment A, p. 2 (Voss Letter).

There is neither a health study nor adequate monitoring to demonstrate that the people living near the Prairie Island Nuclear Plant are not exposed to unsafe organ and body doses of radiation emitted and discharged from the Plant. Without improved monitoring, the finding required by Minn. R. 7855.0120C cannot be made.

b. Long-Term Stranding of Nuclear Waste

When the Prairie Island Nuclear Plant was built, Xcel never anticipated storing spent fuel at the facility except for a short term in the spent fuel pool. Tr. V2, p. 59 (Bomberger). Under the current situation, none of the parties can predict when the period of time for storage of spent fuel at the Nuclear Plant will end. Tr. V 1, p. 33 (Storm); Tr. V 2, pp. 59-60 (Bomberger).

What is known is that Private Fuel Storage in Utah has no plans at this time to construct or open a facility for spent fuel storage. Tr. V 2, p. 56 (Bomberger). Prospects for opening a federal spent fuel depository at Yucca Mountain within the next two decades have weakened with the new federal administration, and it is possible that the Yucca Mountain repository will not be available in the long term, i.e., that it will not be constructed or operate. Ex. 64, Ch. 2, p. 43 (FEIS). Even without a cask expansion to accommodate additional nuclear waste generated in 20 more years of Nuclear Plant operations, the most likely outcome for spent fuel storage may be continuing storage at the Prairie Island Nuclear Plant site. *See* Tr. V 3, p. 54 (Thompson).

However, the Nuclear Plant cask expansion and continued operation sought in this Application would increase the risk that spent nuclear fuel would be indefinitely stranded at the Prairie Island ISFSI. As explained by Xcel witness S. Lee Sampson, if the Yucca Mountain federal repository were built as authorized by the Nuclear Waste Policy Act of 1982, there would be insufficient capacity to dispose of the Prairie Island Nuclear Plant spent fuel through the period of the life extension requested in this docket. Tr. V 4, pp. 208-210 (Sampson). Another Xcel witness, Terry A. Pickens explained:

> The current legislatively-imposed limit at Yucca Mountain is 70,000 metric tons of heavy metal, of which 63,000 can be from commercial waste. Currently there's been approximately 50,000 metric tons of heavy metal produced by nuclear power plants in the United States. We will probably exceed that current 63,000 metric tons of heavy metal sometime before Monticello or Prairie Island enter their periods of renewed operation. Tr. V 6, p. 272 (Pickens).

Given the statutory limit on capacity at Yucca Mountain, even if the facility were built it is likely that there would be no capacity for spent fuel accumulated at the Nuclear Plant during the proposed period of cask expansion. The order in which nuclear spent fuel would be received at Yucca Mountain or a similar repository would be first generated, first in. Tr. V 4, p. 210 (Sampson). If additional casks were to be approved in this docket, it would require an

amendment of Congressional authorization to have any place at Yucca Mountain to which that waste could be transported. Tr. V 6, p. 274 (Pickens).

Given the uncertainty as to when and if a federal repository will ever be available to accept casks from the Prairie Island ISFSI, the FEIS assumes in its analysis that the spent fuel storage casks will be at the ISFSI for up to 200 years. Ex. 64, Ch. 2 p. 23 (FEIS). Given the legislatively-imposed limit on the capacity of commercial nuclear waste and Applicant's admission that an amendment of Congress would be needed to make a place at Yucca Mountain for additional spent fuel approved in this docket, the PINGP Study Group believes that the risks, costs and consequences of indefinite long-term storage of nuclear wastes at the Prairie Island ISFSI should be attributed, in whole or in part, to the cask expansion sought in this docket.

c. Inadequate Emergency Response and Failure of Long-Term Institutional Control

A fundamental aspect of protecting the health, safety of humans and the environment is to have an effective emergency response plan. Tr. V 4, p. 50 (Engelking). The FEIS emphasizes that its assumptions that risks of continued operation of the Prairie Island Nuclear Plant and its nuclear waste storage facility will be limited depend on the effectiveness of emergency response:

> Discussion of these phenomena assumes that emergency planning measures remain effective into the future. If emergency planning measures are not effective into the future, e.g. governmental entities with emergency responsibilities cannot adequately respond, the risk of radiological impacts increases and could be significant. Ex. 64, Ch. 2, p. 29 (FEIS) (Risks of man-made phenomena to the ISFSI, such as fire, explosion, mishandling of casks, terrorism, impact by airplane).
>
> If emergency response measures are not effective, doses to local residents and plant personnel would increase and could cause significant health impacts. *Id.*, Ch. 2, p. 33. (Risk of damage to casks, limited cask confinement failure)
>
> The above discussion of potential radiological impacts assumes that emergency response measures are effective. Such measures are necessary to reduce potential exposures and health impacts to the general public. If emergency response measures are not effective into the future, e.g., governmental entities with emergency responsibilities cannot adequately respond, the risk of radiological impacts from potential PINGP incidents increases and could be significant. *Id.*, Ch. 2, p. 35. (Risk of nuclear plant core damage accident, such as Three Mile Island incident, over 20 years of continued operation).

It is highly probable that the deficiencies in Xcel's current Emergency Response Plan can be remedied by conditions, such as the funding proposals made by the City of Red Wing. However, the risk of long-term indefinite storage of nuclear wastes at Prairie Island is posed not just by the inadequacy of the current emergency response plan, but by the inability to ensure

long-term social, commercial and political infrastructure to support the Prairie Island ISFSI. As the FEIS explains:

> The analysis of dry cask storage for up to 200 years at the Prairie Island ISFSI assumes that regular monitoring and maintenance continue as currently performed at the ISFSI. This monitoring and maintenance would ensure that the ISFSI and its components function as designed to protect public health. In order for this to occur, the social and political infrastructure that supports the Prairie Island plant and ISFSI must continue to function. This continuation of social, political, and economic functioning is commonly known as institutional control. Whether or not, in a country just over 230 years old, institutional control can be maintained for 200 years such that the dry cask storage at Prairie Island performs as designed is a relevant question and one that is challenging to answer. Ex. 64, Ch. 2, p. 38 (FEIS).

The unpredictability of institutional control over the next 200 years is particularly salient The unpredictability of institutional control over the next 200 years is particularly salient in a state barely 150 years old, with a corporate entity, Xcel Energy, formed in a merger merely 10 years ago. During the past 10 years alone, three corporate entities have managed the Prairie Island Nuclear Plant and ISFSI: Northern States Power, Nuclear Management Corporation and Xcel, which brought the operation in-house in 2008 when all the other owners dropped out of Nuclear Management Corporation. Tr. V 2, pp. 166-167 (Bomberger).

Particularly if the cask expansion is approved, the Prairie Island ISFSI will create demands for stability and financing that last longer than would be required by other forms of energy, with predictable and severe consequences of failure. As explained in the FEIS,

> What is not reflected in these discussions of cost and payment are those costs of institutional control that are indirectly tied to on-going operations of the Prairie Island ISFSI. That is, institutional control assumes not only a solvent and effective entity (e.g., Xcel Energy) responsible for maintaining proper functioning of the ISFSI, but also solvent and effective socio-political institutions that provide a stable societal framework for the ISFSI. For there to be institutional control of the Prairie Island ISFSI, the city of Red Wing, Goodhue County, the State of Minnesota, and the United States of America all have to exist as functioning political entities. There are myriad demands on these entities. In this respect, the Prairie Island ISFSI is just one more demand on the list. However, the ISFSI is unique in that its demands will last much longer than typical socio-political demands and the consequences for failing to meet these demands are predictable and severe. Ex. 64, Ch. 2, pp. 40-41 (FEIS).

Failure of institutional control during the decades or even centuries when nuclear waste is stored or stranded at the Prairie Island ISFSI would create a risk of untenable socioeconomic and environmental losses:

> If institutional control is not maintained, incident risks become greater. If the dry casks are not monitored and maintained they will likely deteriorate with time and their barriers to release will degrade. Under such circumstances, natural and man-made phenomena, previously resisted by the storage casks, could cause release of radionuclides.
> Ex. 64, Ch. 2, p 42 (FEIS).

It is undisputed that the Commission has responsibility for public health and safety in connection with Xcel's Application. In fact, the Commission may be the *only* entity with the authority and jurisdiction. There are no permits required by Minnesota state agencies for cask expansion and continued operation of the Prairie Island Nuclear Plant other than the certificate of need in these proceedings. Tr. V 5, p. 248 (Rakow). There is, thus, no other State agency with jurisdiction to evaluate public health concerns or compliance with State rules, regulations and policies in connection with the cask expansion.

In addition, the Prairie Island Indian Community, a participant in those proceedings, has stated that the NRC excluded from consideration in the Supplemental EIS for license renewal of the Prairie Island Nuclear Plant the following key issues: 1) human health effects from radiological impacts; 2) radiological monitoring. Community Initial Brief, p. 31, *citing* U.S. Nuclear Regulatory Commission, *Environmental Impact Scoping Process, Summary Report*, Prairie Island Nuclear Generating Plant, Units 1 & 2, Red Wing, Minnesota, May 2009.

Issues pertaining to radiological safety, radiological monitoring, cumulative impacts of the proposed expansion of the ISFSI and continued Nuclear Plant operations through 2034, along with potential groundwater, surface water and floodplain impacts were all explicitly included in the Environmental Impact Scoping process for these certificate of need proceedings before the Commission. Ex. 64, Appendix A, pp. 1-2, 5 (FEIS). This Commission has the jurisdiction, the authority and the information to determine both the compliance of the proposed cask expansion with applicable rules and policies and the costs to society due to radiological impacts on human health and the natural and socioeconomic environment. The buck stops here.

5. Applicant's radionuclide releases from cask storage and continued operation of the Nuclear Plant are likely to violate Minn. Stat. §§ 116C.83 and 116C.76. The provisions of the Minnesota Environmental Policy Act applicable under this law require selecting an alternative that avoids risks of untenable environmental harm.

Minnesota statutes authorizing additional dry cask storage at the Prairie Island Nuclear Plant contain several provisions designed to protect the environment, particularly water

resources. An ISFSI must comply with standards limiting radionuclide concentrations in groundwater. Minn. Stat. §116C.83, subd. 5; Minn. Stat. §116C.76. Prior to approving an environmental impact statement, the commissioner of the Department of Commerce must also find that the applicant has demonstrated that the facility will not contaminate groundwater with radionuclides in excess of these standards. Minn. Stat. §116C.83, subd. 6(b); Minn. Stat. §116C.76, subd. 1. Laws pertaining to dry cask storage of nuclear wastes also explicitly provide that the siting, construction, and operation of an ISFSI on the site of a nuclear plant is subject to the Minnesota Environmental Policy Act ("MEPA") and the Minnesota Rights Act ("MERA") among other statutes. Minn. Stat. § 116C.83, subd. 6(a).

Minnesota radionuclide release laws are based on U.S. EPA drinking water standards. Minnesota's limit of five picocuries per liter of radium-226 and radium-228 under Minn. Stat. §116C.76, subd. 1(1) are identical to the U.S. EPA drinking water maximum contaminant level for combined radium 226 and 228. http://www.epa.gov/radiation/tenorm/drinking-water.html

In these proceedings, neither the Applicant nor the Department of Commerce has affirmatively demonstrated that the cask expansion and continued operation of the Nuclear Plant will not violate the standards of Minn. Stat. § 216C.76. Minnesota Department of Health ("MDH") Environmental Monitoring Reports test water in only one well and at only one downstream location, the Lock and Dam No. 3 site a mile from the Nuclear Plant. The MDH Report suggests either that radium-226 is at 96 pCi/L at the downstream sampling site, or that that monitoring procedures are incapable of detecting radium-226 in water unless radium-226 exceeds this level, nearly twenty times the concentration allowable under applicable law. MDH Environmental Monitoring Report (Table 10) at http://www.health.state.mn.us/divs/eh/radiation/radioactive/environmental.pdf, *cited in* Prairie Island Indian Community Initial Brief, pp. 33-34.

The FEIS contains no discussion of whether the ISFSI and continued operations of the Prairie Island Nuclear Plant will comply with Minnesota statutes limiting radium-226 contamination or whether the combined concentrations of radionuclides that emit gamma radiation exceed statutory limits. Minn. Stat. § 116C.76, subd. 1(3). An explicit finding, based on multiple samples and adequate monitoring procedures, that cask expansion and continued operation of the Nuclear Plant would comply with radium and gamma radiation limits, should be required before

approval of the FEIS or issuance of the certificate of need in this proceeding. Minn. Stat. §116C.83, subd. 5, subd. 6(b).

The FEIS and the record contain more information about tritium contamination, another radionuclide release regulated under Minn. Stat. §116C.76, subd. 1(3) and under U.S. EPA drinking water rules. The FEIS states that standards limiting a whole body dose to 4 millirem per year from radionuclides emitting beta radiation corresponds to a tritium contamination limit of 20,000 pCi/L and that doses from the Nuclear Plant remain below this level. Ex. 64, Ch. 1, pp. 84-85 (FEIS).

The record demonstrates that significant levels of tritium continue to be detected in two groundwater wells on the Prairie Island Nuclear Plant property, wells P-10 and MW-8. The levels of tritium in these wells fluctuates widely, with concentrations going as high as 2,060 pCi/L at P-10 in 2008, 3,773 pCi/L at P-10 in 2006 and as high as 781 pCi/L at MW-8 in 2008. *See* Ex. 173, p. E-3 (2008 REMP); Community Initial Brief, p. 21. Background tritium levels range from the 20s to the 40s, Tr. V 6, p. 207 (Flowers), so contamination with tritium found by current monitoring is as much as a hundred times higher than background levels.

As explained previously in this Brief, *supra*, p. 17, current monitoring is insufficient to determine the source of the tritium and may not detect maximum concentrations in groundwater or exposures. Witnesses for Xcel have explained that the original groundwater monitoring program around tritium started in 1989 when tritium was detected in the Suter residential well, south and west of the Nuclear Plant. Tr. V 6, p. 145 (Flowers). When elevated tritium levels were found in on-site wells, Xcel personnel believed that the lion's share of the tritium was from a line that emptied into the head of the discharge canal, contaminating water in the discharge canal before it got to the river. The solution to this problem devised by Xcel was to build a new line that "runs all the way to the actual discharge to the river and then releases right straight to the river." *Id.*, p. 162. Xcel processes liquid waste to withdraw some of the radioactivity as solid waste. Tr. V 6, p. 259 (Pickens). "And then eventually whatever residual is left in that liquid waste is what is discharged through the liquid rad waste discharge line out into the river where it's then diluted." *Id.*, p. 260 (Pickens).

The level of radioactivity dumped into the Mississippi River by the liquid rad discharge line is not contained in the REMP report, but in radioactive effluent reports. *Id.* p. 276. The Site Permit Application summarizes the actual total average tritium releases over the past five years

from the Prairie Island Nuclear Plant. This annual average has been 626 Curies, with each Curie representing one trillion (1,000,000,000,000) picocuries of tritium. Ex. 3, p. 4-12, Table 4-1 (Site Permit Application).

With this magnitude of tritium contamination discharged by the Nuclear Plant on an average annual basis -- fifty million times the 20,000 picocurie concentration level prohibited in groundwater – it is possible that rigorous hydrology and robust monitoring would identify groundwater contamination in violation of State limits. Minn. Stat. §116C.76, subd. 1(3). It is also likely that radionuclide releases to groundwater from the Prairie Island Nuclear Plant are not as low as reasonably achievable. Minn. Stat. § 116C.76, subd. 3.

In addition to requiring compliance with laws limiting radionuclide releases, the statutes establishing procedures to review applications for additional dry cask storage explicitly require compliance with all environmental review and protection provisions of MEPA, chapter 116D and MERA, chapter 116B. Minn. Stat. § 116C.83, subd. 6(a). MEPA expresses the State's paramount interest in protecting the environment and prohibits state action impairing the environment when there is a feasible and prudent alternative:

> **Prohibitions.** No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct. Minn. Stat. § 116D.04, subd. 6.

MERA provides a private right of action for the protection of the environment, Minn. Stat. § 116B.03, and, once a *prima facie* showing of impairment of the environment has been made, places the burden of proof on the defendant to demonstrate "that there is no feasible and prudent alternative and the conduct at issue is consistent with and reasonably required for promotion of the public health, safety, and welfare in light of the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction." Minn. Stat. §116B.04.

In MEPA, economic considerations alone shall not justify state action or permits significantly affecting the environment, Minn. Stat. §116D.04, subd. 6, and in MERA, economic

considerations alone shall not constitute a defense to an action that impairs the environment. Minn. Stat. 116B.04.

With unambiguous legislative direction to apply the protections of MEPA and MERA in any proceeding to authorize additional dry cask storage, economic cost considerations alone should not justify cask expansion and continued operation of the Prairie Island Nuclear Plant in the face of an ample record of environmental contamination and human health risk. It is not disputed that the risk of nuclear power is unique; there is no other generation type where materials used in the production of energy need to be managed for hundreds or thousands of years after energy production ceases. Tr. V 4, p. 212 (Sampson). As discussed previously, *supra*, pp. 19-21, there is also no dispute that the lack of effective emergency response or the breakdown of institutional controls over time could result in a security incident with untenable and unmitigable health and environmental risks. The cost of avoiding this risk is selection of a feasible and prudent alternative under MEPA. As Xcel's witness, Betsy Engelking explained:

> Q: What would be the direct cost of avoiding a security incident?
> A: A direct cost of avoiding an incident might be the selection of an alternative facility, if you didn't think that you could adequately mitigate the cost of that. Tr. V. 4, p. 106 (Engelking).

Replacing the Prairie Island Nuclear Plant with an alternative of wind supported by repowering the Plant with natural gas could take several years. Recent declines in electric demand and forecasted growth, opportunities for purchased power and the increase in capacity that would result from repowering the Black Dog coal plant to natural gas increase the feasibility and prudence of selecting an alternative to the cask expansion and continued operation of the Nuclear Plant through 2034. These factors related to demand and supply of energy, each of which are discussed below in Section B of this Brief, create a unique opportunity to transition from Nuclear Power to a safer and more environmentally benign alternative while providing job and tax benefits.

B. THE CERTIFICATE OF NEED AND SITE PERMIT FOR THE EXTENDED POWER UPRATE FOR THE NUCLEAR PLANT SHOULD BE DENIED.

The PINGP Study Group believes that the certificate of need and site permit for the power uprate should become moot, since the record does not support issuance of a certificate of need for additional cask storage and continued operation of the Nuclear Plant for another twenty

years. Xcel is currently considering implementing the extended power uprate for Unit 1 in either 2012 or 2014 and for Unit 2 in 2015. Tr. V 2, pp. 99-100. (Bomberger). If the cask expansion were denied, plans would be made to decommission Unit 1 in 2013 and Unit 2 in 2014. There is no benefit in spending hundreds of millions of dollars on an extended power uprate for a nuclear plant scheduled for decommissioning or repowering with natural gas.

The following Section of this Brief addresses the power uprate irrespective of this conclusion. Applicants have not demonstrated that the 164 MW power uprate is needed for energy supply or that an alternative including renewable energy would be more expensive than the uprate and contrary to the public interest. Proceeding with the uprate would create cumulative violations of state and federal rules, regulations and policies regarding cancer risk, radionuclide discharge, environmental justice and emergency response planning. The uprate would also exacerbate concerns about safety of Prairie Island's aging nuclear reactor and untested casks, while increasing socioeconomic, human health and environmental impacts from radioactive and thermal emissions.

1. **Under current demand forecasts, Applicant cannot demonstrate the need for a power uprate at the Nuclear Plant under Minn. Stat. § 216B.243, subd. 3; Minn. R. 7849.0120A.**

The Applicant bears the burden of demonstrating need for a large energy facility. Minn. Stat. §216B.243, subd. 3. To demonstrate need, the Applicant must show that "the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states." Minn. R. 7849.0120A. Although Applicants have demonstrated that they would prefer to proceed with the extended power uprate irrespective of demand forecasts, they have demonstrated no effect upon energy reliability if the power uprate is denied.

Xcel's selection of the extended power uprate, from the beginning, was unrelated to any specific demand for energy. Xcel determined the size of the uprate based on maximizing thermal increase at the Nuclear Plan. Electric demand forecasts or demand deficits were not part of the analysis done by the project team. Tr. V 3, p. 143 (Carlson).

The demand forecast that Xcel filed in its May 16, 2008 Application projected demand growth of 1.1 percent each year, with 133 MW of annual growth in Xcel's service area. Ex. 100,

p. 1-6 (CON Application). Xcel's Supplemental Filing on March 20, 2009, based on Xcel's 2008 rate case, reduced this demand forecast, since energy sales and peak demand were not growing as previously forecasted. As compared with forecasts in the Application, the 2008 Rate Case/Supplemental Filing demand forecast was 374 MW lower in 2012 and 613 MW lower in 2023. Ex. 104, p. S3 of 10 (Supplemental Filing).

In response to an Information Request from the Community, Xcel released its "2010 Budget Forecast" on March 30, 2009, which contain on the right side of Attachment A the forecasts made in the Rate Case/Supplemental Filing. Ex. 146 (IR No. 40); Tr. V 4, p. 128 (Engelking). Based on these documents, compared to the demand forecast in the CON Application, Xcel's forecasted demand will be reduced by 803 MW in 2012. By 2023, forecasted demand will be reduced by 1,549 MW, more than the total 1,100 MW supplied by the Prairie Island Nuclear Plant. The forecasts and comparisons are summarized below

DEMAND FORECAST DATE **(Change Compared to Supplement)** **(Change Compared to Application)**	**Xcel Forecast Supplement** **2008 Rate Case** **Ex. 104**	**Xcel 2010 Budget Forecast** **March 30, 2009** **Ex. 146**
2008	9,567 MW	8,694 MW
(Change Compared to Supplement)	NA	(873 MW)
(Change Compared to Application)	unknown	unknown
2012	9,935 MW	**9,506 MW**
(Change Compared to Supplement)	NA	**(429 MW)**
(Change Compared to Application)	(374 MW)	**(803 MW)**
2015	10,236 MW	9,665 MW
(Change Compared to Supplement)	NA	(571 MW)
(Change Compared to Application)	unknown	unknown
2023	10,861 MW	**9,925 MW**
(Change Compared to Supplement)	NA	**(936 MW)**
(Change Compared to Application)	(613 MW)	**(1,549 MW)**

Xcel has made different resource choices and has deferred or delayed other projects as a result in the reduction of demand. Tr. V 4, p. 131 (Engelking). However, for Applicant to make these choices in the face of demand declines far larger than the 164 MW uprate proposal only establishes Applicant's preference, not the need for the project to ensure energy supply.

2. **The Applicant has not demonstrated that the Nuclear Plant uprate complies with Minnesota's renewable energy preference Minn. Stat. §216B.243, subd. 3a. An alternative of purchased power from hydro energy has not been explored.**

As stated previously in connection with the cask expansion, *supra*, p. 4, the Applicant for a power uprate at the Prairie Island Nuclear Plant bears the burden to demonstrate that "it has explored the possibility of generating power by means of renewable energy sources and has demonstrated that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source." Minn. Stat. § 216B.243, subd.3a. For purposes of this subdivision, hydro power as well as wind energy and biomass are considered a "renewable energy source."

Xcel dismissed wind as a feasible alternative to the power rate and did not consider an alternative of wind supported by natural gas. Although Xcel discussed the possibility of purchased power from coal, the Applicant did not explore the possibility of purchased power from hydro energy as an alternative to the nuclear power uprate. Ex. 100, pp. 1-11 (CON Application); Ex. 64, Ch. 1, p. 28 (FEIS). Xcel's witness Steven Wishart testified that Xcel did not undertake any process to determine the potential for long-term purchase of hydro as an alternative to the uprate. Mr. Wishart did not know why Xcel excluded hydro. Tr. V 4, pp. 149-151 (Wishart). Hydro does not have the environmental costs of emissions associated with purchased power from coal.

It is clear that there are power purchase opportunities available from Manitoba Hydro. Xcel's five-year action plan in its Resource Plan docket proposed purchase of 375 MW of intermediate and 350 MW of peaking resources from Manitoba Hydro by 2015. *In the Matter of Northern States Power Company d/b/a Xcel Energy's Application for Approval of its 2008-2022 Resource Plan*, MPUC Docket No. E-002/RP-07-1572, Staff Briefing Paper, p. 4, July 9, 2009. Xcel's current resources include power purchase agreements for hydropower. Ex. 100, p. 2-2 (CON Application).

Given the availability of a hydro purchase power alternative to the nuclear power uprate and Applicant's failure to demonstrate that this alternative has been explored and found to be more expensive, including environmental costs, approval of the uprate would conflict with the

renewable energy preference statute. Minn. Stat. §216B.243, subd. 3a.

3. The Applicant has not demonstrated that an alternative including wind and repowering of a coal plant to natural gas is "not in the public interest" as required by Minn. Stat. §216B.2422, subd. 4.

As discussed previously, in connection with the cask expansion for continued operation of the Prairie Island Nuclear Plant, *supra* p. 7, Minnesota statutes prohibit approval of a new of refurbished nonrenewable energy facility certificate of need "unless the utility has demonstrated that a renewable energy facility is not in the public interest." Minn. Stat. §216B.2422, subd. 4. An alternative combining wind and natural gas must be considered as a renewable energy alternative under the Commission's March 17, 2009 Order in the Big Stone II proceedings, *supra*, p. 4.

Xcel did not consider a wind/natural gas alternative. Tr. V 4, p. 156 (Wishart). The OES proposed a wind/non-renewable energy alternative to the nuclear power uprate that would add an additional 300 MW of wind generation. Ex. 510, p. 18 (Rakow Public Direct 509). The OES analysis concluded that a wind/non-renewable energy alternative to the uprate was more expensive, including externalities costs of increased emissions. *Id.*, pp. 19-21. Neither the Applicant nor the OES considered an alternative combining wind with repowering of a coal plant with natural gas.

It is undisputed that repowering a coal plant with natural gas decreases air emissions. Tr. V 1, p. 137 (Storm). Xcel's Metro Emissions Reduction Project, which repowered two Twin Cities coal plants with natural gas, resulted in substantial reduction of emissions, including sulfur dioxide (SO_2) and nitrogen oxides (NO_x) as well as mercury and carbon dioxide (CO_2) while increasing capacity. Tr. V 4, pp. 112-113 (Engelking). An alternative combining wind energy with repowering of a coal plant to natural gas to increase capacity would create environmental benefits rather than environmental costs.

Xcel has evaluated a proposal to repower Black Dog coal plant units 3 and 4, which currently have a total nameplate capacity rating of 278 MW. If Black Dog were repowered with natural gas, the total nameplate capacity rating would be 750 MW, an increase of 472 MW, while the summer peak capacity would be roughly 650 MW, an increase of more than 370 MW. Tr. V 4, p. 154 (Wishart); Tr. V 4, pp. 114-115 (Engelking). The increase in megawatts from repowering Black Dog significantly exceeds the 164 MW provided by the nuclear power uprate.

A determination of whether a wind/natural gas alternative to the nuclear power uprate is in the public interest should review not only costs if the cask expansion is approved, but the potential costs and benefits to the public of repowering the Black Dog plant as part of a strategy to retire and repower the Prairie Island Nuclear Plant.

Xcel has pointed out that repowering of the Nuclear Plant would require a way to provide approximately 1,000 MW of capacity during the transition to repowering. As explained above, the combination of decreased demand forecasts, continued development of renewable wind energy backed up with purchased hydro power and increased capacity from repowering of Black Dog units 3 and 4, would more than meet the needs of Xcel's customers during the transition period. Since this Application was filed, Xcel's forecasted 2012 demand has been reduced by 803 MW. Xcel has proposed that purchased power from Manitoba Hydro could exceed 700 MW by 2015. In addition to decreasing emissions, repowering Black Dog coal plant units 3 and 4 would provide an increase of 472 MW in nameplate capacity and over 370 MW in summer peak capacity. Recent declines in demand, along with these alternatives to provide energy and capacity, create a unique window of time for a transition away from nuclear power and nuclear waste storage. This transition, rather than a cask expansion and nuclear power uprate, are in the public interest.

4. A certificate of need and site permit for the uprate will conflict with the policies, rules and regulations of other state and federal agencies, in violation of Minn. Stat. § 216B.243, subd. 3(7); Minn. R. 7855.0120D and Minn. Stat. § 216E.03, subd. 7(d).

As explained in an earlier section of this Brief, *supra*, p. 8, Minnesota certificate of need statutes require the Commissioner to consider the policies, rules and regulations of other states and federal agencies in certificate of need proceedings. Minn. Stat. §216B.243, subd. 3(7). In language similar to Minn. R. 7855.0120D which was discussed previously, *supra,* pp. 8-14, in connection with the cask expansion, a certificate of need may be granted if "the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments." Minn. R. 7849.0120(D). The implication of this language, as Dr. Rakow testified, is clear; a certificate of need should be denied if a violation of relevant policies, rules or regulations is demonstrated. *Supra*, p. 9.

In addition to requiring a certificate of need, the power uprate for the Prairie Island Nuclear Plant requires a power plant site permit pursuant to Minn. Stat. § 216E.03. The statutory language applicable for a site permit is yet more unequivocal: "No site or route shall be designated which violates state agency rules." Minn. Stat. §216E.03, subd. 7(d).

The cumulative and incremental impacts of the nuclear power uprate on lifetime cancer risk, inadequate emergency response and disparate impacts on a community required to be protected from environmental injustice require denial of a certificate of need or site permit.

The Prairie Island Nuclear Plant power uprate would require a change in the type of nuclear fuel used and an increase in the amount of uranium to maintain the fuel cycle length. Tr. V 3, p. 96 (Carlson). The fuel would change to a "heavy bundle fuel," where each fuel rod is larger in diameter so that it can contain more uranium. *Id.*, pp. 96-97. Xcel projects that nuclear power uprate would increase use of surface and groundwater by 10 percent and increase the amount of liquid and radioactive waste by 10 percent. *Id.*, p. 127. The nuclear power uprate could also result in a 10 percent increase in direct gamma radiation due to the increase in the plant power level. *Id.* p. 153. Xcel has estimated that the nuclear power uprate adds 10 percent to the skyshine radiation from the spent fuel dry storage casks. Tr. V 4, pp. 218-219 (Sampson).

The cumulative and incremental impacts of the power uprate at the Prairie Island Nuclear Plant on skyshine gamma radiation exposure would conflict with Minnesota Health Department (MDH) rules limiting acceptable cancer risk from involuntary exposure to 1 in 100,000. Minn. R. 4717.7820, Subp. 4; Minn. R. 4717.8050, Subp. 3. The cumulative risk posed by the expansion to 64 casks and the ten percent increase resulting from the uprate would increase the lifetime cancer risk of 2.5 in 100,000 by 10 percent, resulting in a cumulative cancer risk of 3.1 in 100,000, exceeding acceptable lifetime risk under MDH rules.

Continued operation of the Nuclear Plant for 20 years would require 98 casks of spent fuel by the time of decommissioning, exposing members of the public to an increased lifetime cancer risk of 35 in 100,000. *Supra*, p. 10. The additional 10 percent added to skyshine radiation from the uprate would increase this lifetime cancer risk to 38.5 in 100,000. Not only is this cumulative lifetime cancer risk from the nuclear power uprate above acceptable levels, but the *incremental* involuntary risk to the public (3.5 in 100,000) posed by just the uprate exceeds the acceptable lifetime cancer risk under Minnesota agency rules.

As explained previously, failure to have an adequate emergency response plan violates

NRC regulations. *Supra*, p. 13. The inadequacy of Xcel's Emergency Response Plan, thus, would preclude certification of the proposed nuclear power uprate as well as the certificate of need for cask expansion. The OES has suggested that Xcel is currently out of compliance with Minn. R. 7849.0120D with respect to its emergency response plan. OES Initial Brief (Public 509), p. 64.The PINGP Study Group supports the City of Red Wing's request for funding to cure this violation.

The cumulative as well as the incremental impacts of the proposed power uprate at the Prairie Island Nuclear Plant, described in this and the next section of this Brief, would disproportionately impact the Prairie Island Indian Community. As explained previously with reference to the nuclear waste cask expansion, *supra*, pp. 11-13, state action creating disproportionate adverse impacts on an environmental justice community violates state and federal environmental justice policies. In this connection, it is particularly troubling that although Minnesota statutes require an Applicant for an electric generating plant site permit to propose at least two sites, Minn. Stat. § 216E.03, subd. 3, Xcel has proposed only the site adjacent to the Prairie Island Indian Community for both the expanded storage of nuclear wastes and the nuclear power plant uprate.

The only way to mitigate the cumulative and incremental environmental injustice resulting from the uprate is to deny the certificate of need and site permit for the proposed 10 percent increase in radioactive emissions and impacts.

5. The Applicant has not demonstrated that the consequences of the uprate are more favorable to society than denying the certificate, considering the effects of the proposed facility on the natural and socioeconomic environment, including human health pursuant to Minn. Stat. §216B.243, subd. 3(5); Minn. R. 7849.0120C.

Issuance of a certificate of need for the proposed nuclear plant uprate requires a determination, under Minn. R. 7849.0120C, that

> by a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health, considering:
> (1) the relationship of the proposed facility, or a suitable modification thereof, to overall state energy needs;
> (2) the effects of the proposed facility, or a suitable modification thereof, upon the natural and socioeconomic environments compared to the effects of not building the facility;
> (3) the effects of the proposed facility, or a suitable modification thereof, in inducing future development; and
> (4) the socially beneficial uses of the output of the proposed facility, or a suitable modification thereof, including its uses to protect or enhance environmental quality.

The PINGP Study Group believes that the benefits of the nuclear uprate in relationship to overall state energy needs are markedly diminished by the decline in forecasted demand since Xcel filed its initial Application. See discussion *supra*, pp. 27-28. Any economic benefits of taxes resulting from the uprate would be equally available if investment were made in other energy alternatives. The claimed benefits of the nuclear uprate must be weighed against its impacts on the natural and socioeconomic environments, including human health.

The PINGP Study Group believes that Xcel's application for the uprate is premature, since neither the cumulative risk of the Prairie Island Nuclear Plant uprate in an aging nuclear reactor, the safety of its enriched fuel or the safety of its proposed new casks have yet been evaluated by the NRC. Without such an evaluation, the Commission has insufficient record evidence to determine that the benefits of the uprate are greater than its adverse socioeconomic and environmental consequences, including risks to human health.

The nuclear power uprate would also result in cumulative and incremental radioactive releases. Monitoring of radioactive releases is inadequate both under normal operations and to detect impacts of an incident. The uprate would also increase water consumption and thermal discharge, which remain a concern for the Minnesota Department of Natural Resources ("MDNR"). Thermal monitoring is inadequate and no measures have been proposed to mitigate cumulative thermal discharge or respond to MDNR's concerns.

a. Cumulative Safety Risks Not Evaluated

The power uprate at the Prairie Island Nuclear Plant would operate the reactor at higher temperatures by using more uranium in the reactor core to maintain the same fuel cycle length. Ex. 64, Ch. 1, p. 2 (FEIS). The uprate would also cause an increase in steam pressure in the second loop of the reactor that converts energy into electricity. *Id.*, p. 4. Before proceeding with the extended power uprate for the Nuclear Plant, Xcel must obtain an amendment to its operating license from the NRC to operate at the higher power level and an amendment to use higher diameter fuel rods. Ex. 100, p. 2-8 (CON Application). As explained in the FEIS,

> The increased reactor coolant temperature results in the need to perform several analyses to demonstrate continued compliance with the design criteria for safe operation. The analyses must demonstrate that adequate margin to regulatory limits are maintained at the increased power level. These analyses will be reviewed and approved by the NRC as part of the operating license amendment process. Ex. 64, Ch. 1, p. 4 (FEIS).

Xcel hasn't even applied for an amendment to its operating license for the Plant, let alone had a positive evaluation of its compliance with design criteria for safe operation. The Company plans to file its application with the NRC in October 2010. Tr. V 2, p. 96 (Bomberger). According to Xcel's witness, Michael Carlson, a great deal of engineering work needs to be completed before the submission can be made. Tr. V 2, pp. 219-220 (Carlson). Xcel has had no experience with the new fuel design proposed for the uprate at the Prairie Island Nuclear Plant at any of its other nuclear plants. Tr. V 3, p. 99 (Carlson). Although the new fuel design was submitted to NRC last year, it is still in the review process and has not been approved. *Id.*, pp. 98-99.

There are operation and safety risks created by the higher temperatures and new fuel proposed for the nuclear power uprate. For example, Xcel will need a larger generator to take the additional mechanical force that will be generated by the uprate. Tr. V. 3, p. 104 (Carlson). In Xcel's initial assessment of the safety aspects of the uprate, Xcel identified some areas of concern, one of which was the capacity of the auxiliary feed water pumps, used for safety on start up and shut down of the plant. *Id.*, pp. 116-117. Xcel did not include its initial safety assessment as part of the Application for the power uprate. *Id.*, p. 115.

Increased operating temperatures and pressures may also pose a cumulative risk for components already under stress from the aging of the Prairie Island Nuclear Plant. Xcel recognizes that there can be an aging effect of cracking due to primary water stress corrosion cracking (PWSCC) of pressure boundary and structural components constructed of metal alloys and welds exposed to primary coolant. Xcel monitors the Prairie Island Nuclear Plant for through-wall cracks and reactor coolant leakage resulting from primary water stress corrosion cracking. Docket 08-510, Doc. No. 20098-41023-01 (Letter of Xcel to NRC dated March 27, 2009, Enc. 1, pp. 4-5, filed with FEIS comment).

As nuclear reactor components age, the reactor vessel may also be subject to embrittlement from neutron bombardment and operating temperatures. Ex. 128, p. 13 (Bomberger Direct 510); Tr. V 2, pp. 151-152 (Bomberger). In order to determine if the extended power uprate can be done safety, the NRC will need to look at whether the increasing operating temperatures of the extended power uprate affect embrittlement of the reactor vessel. *Id.*, pp. 152-153.

Cumulative impacts of the power uprate on the safety of operations at the Prairie Island Nuclear Plant come at a time when concerns have already been raised about problems at the Plant. Both Unit 1 and Unit 2 at the Prairie Island Nuclear Plant have been moved from the "Licensee Response" Column to the "Regulatory Response" Column within the past year. Ex. 314, pp. 1, 3 (NRC Matrix Summary). Unit 1 has been in the Regulatory Response Column since the fourth quarter of 2008 due to a finding in the Mitigating Systems Cornerstone involving failure of the auxiliary feedwater pump to operate after a valid start signal and a finding of problems in the Public Radiation Safety Cornerstone. *Id.* p. 3; Ex. 312, p. 1 (NRC 3/4/09 Letter). Unit 2 has been in the Regulatory Response Column since the first quarter of 2009 due to a finding of problems in the Public Radiation Safety Cornerstone. Ex. 314, pp. 1,3 (NRC Matrix Summary).

Xcel witness Charles Bomberger explained that it normally takes about four quarters to move from Regulatory Response Column to the Licensing Response Column. Tr. V 2, p. 37 (Bomberger). As far as the significance for a nuclear plant of being in the Regulatory Response Column, Mr. Bomberger testified, "that's a real wake-up call for improvement to find out what your problems are." *Id.*, pp. 181-182.

In addition to incrementally increasing risks of operation, the power uprate will impact risks from handling and storage of spent fuel. Although Xcel witnesses were unable to specify the temperature of spent fuel assemblies, Xcel acknowledged that if the power uprate were to be approved spent fuel would be slightly hotter, have higher enrichment and longer megawatt day burn-ups so that it would require more years in the spent fuel pool. Tr. V 4, pp. 213-214 (Sampson). Xcel would also use a different cask for the spent fuel than has been used previously at the Nuclear Plant. The TN-40HT cask has been proposed to accommodate a fuel that has "higher enrichment" and "higher burnup" than what has been used in the past. Tr. V 4, pp. 193-194 (Sampson).

The safety of the TN-40HT cask for enriched fuel resulting from the proposed nuclear power uprate has not been demonstrated. Xcel has not yet submitted an application for a change in license to the NRC for the TN-40T casks, Tr. V 2, p. 46 (Bomberger), let alone received a positive evaluation of the safety of the cask for indefinite long-term storage of fuel from the uprate. The TN-40HT nuclear spent fuel storage cask is not in use anywhere in the United States. Tr. V 4, p. 180 (Sampson). It is not in production, and testing has not been performed on the

cask. *Id.*, pp. 180-181. Although the manufacturer of the cask, Transnuclear, has built a model for the TN-40HT, *Id.*, pp. 187-188, the only physical test performed on the model was to drop it from a certain height to test impact resistance. *Id.*, p. 201.

When the TN-40HT is produced for the Prairie Island Nuclear Plant, Xcel anticipates that it will have only a 25-year design warranty. Tr. V 4, p. 187 (Sampson). No tests have been done to verify the integrity of the casks for a 200-year period of long-term "temporary" storage. Tr. V 1, p. 89 (Storm).

Since neither the safety of the uprate, the safety of the enriched fuel nor the safety of new casks required by the uprate have been determined by the NRC or demonstrated in prior experience or physical testing, the Commission has insufficient evidence from which to find that the consequences of granting the certificate of need for the uprate are more beneficial to society than its risks. Particularly with an aging nuclear reactor, which has an inadequate emergency response plan and has already been given a "wake-up call" from the NRC regarding safety problems, the risks of the uprate cannot be determined to outweigh its benefits. At best, the granting of a certificate of need would be premature.

b. Cumulative Radioactive Releases

In evaluating socioeconomic consequences of the power uprate, the cumulative and incremental health risks to Prairie Island Nuclear Plant personnel are significant. The lifetime cancer risk to plant personnel from gamma radiation at the Prairie Island ISFSI has been estimated at 98 in 100,000. Ex. 64, Ch. 2, Table 5A-2 (FEIS); *supra*, p. 10. The 10 percent cumulative increase in gamma radiation from the uprate would increase this lifetime cancer risk to 107.8 in 100,000. The *incremental* cancer risk to Plant personnel from the uprate alone would be 9.8 in 100,000, in excess of the 1 in 100,000 "acceptable" cancer risk under MDH rules.

As explained in the FEIS, under routine conditions, with no off-normal operations, incidents or leaks, the extended power uprate, along with continue operations of the Nuclear Plant for another 20 years would result in an additional cumulative lifetime cancer risk of 660 in 100,000 for Plant personnel, resulting in an estimated 6.1 additional cases of cancer and 3.1 additional cancer deaths. Ex. 64, Ch. 1, p. 86, Table 4-10 (FEIS). Estimating that 10 percent of this cancer risk is attributable to the uprate alone, the incremental lifetime cancer risk to personnel from the uprate alone is 60 in 100,000. The chart below summarizes the cumulative

and incremental lifetime cancer risks of the uprate to members of the public and to Prairie Island Nuclear Plant personnel based on the data described above.

PERSONS EXPOSED	Route of Exposure	Cumulative Cancer Risk UPRATE per 100,000	Incremental Cancer Risk UPRATE per 100,000
Acceptable Risk - Minnesota Rules	cumulative exposures	1	1
CASK INCREASE			
GENERAL PUBLIC (64 casks)	"skyshine radiation"	3.1	0.28
GENERAL PUBLIC (98 casks)		38.5	3.5
PLANT PERSONNEL (64 casks)	"skyshine radiation"	107.8	9.8
OPERATIONS (UPRATE)			
PLANT PERSONNEL	"plant operations and maintenance"	660	60

The nuclear power uprate would also significantly increase the level of radioactive waste discharged from the Prairie Island Nuclear Plant. The level of radioactive liquid waste discharged by the Nuclear Plant would increase from 626 Curies to 689 Curies. Ex. 3, p. 4-12, Table 4-1 (Site Permit Application); Tr. V 6, pp. 280-281 (Pickens). As noted previously, a Curie is equivalent to one trillion (1,000,000,000,000) picocuries, the level of radiation measured in water to determine human exposures. The total estimated annual radiological release from the Prairie Island Nuclear Plant if the extended power uprate were to be implemented would be 1,078 Curies per year. Ex. 64, Ch. 1, Table 4-11 (FEIS).

As discussed previously, *supra*, pp. 16-17, current monitoring of radioactive releases in air, surface water and groundwater is inadequate to determine the actual levels of human exposure and health risk resulting from Prairie Island Nuclear Plant radioactive releases, including cumulative and incremental releases resulting from the uprate. The lack of a sufficient numbers of air monitoring locations, the failure to base groundwater monitoring on a current and comprehensive study of hydrology and the reliance on a single location at Lock and Dam No. 3 to sample radioactive impacts on Mississippi River surface water result in monitoring that is inadequate to measure impacts of radioactive discharge.

As illustrated in Figure 4-9b of the FEIS, the single downstream surface water sampling site is a mile or more from the Nuclear Plant. Ex. 64, Ch. 1, Figure 4-9b; Ch. 2, p. 8 (FEIS). If radioactive waste discharge were to increase to 689 Curies per year as a result of the power

uprate, current surface water monitoring is inadequate to find that the adverse consequences of the uprate to human health and the environment would not outweigh the alleged benefits of the uprate. Surface water contamination from direct radioactive waste discharge to the Mississippi River could impact public health, since surface water is the drinking water source for many cities in the state. Ex. 64, Ch. 1, p. 81 (FEIS). There is a hydraulic connection between surface and groundwater, and some households both within and outside the reservation rely on the surficial aquifer for drinking water. Docket 08-509, Doc. No. 20095-37918-28, pp. 35-37 (U.S.G.S. Water Investigations Report 99-4069, pp. 29-31). Tritium in water may also enter the body through the skin. Attachment A, p. 2 (Voss Letter).

The lack of real time monitoring by Xcel of exposures to the public from gamma radiation, or releases to air or water of radioactive materials at the Prairie Island Nuclear Plant is of particular concern. Continued operations of an aging Nuclear Plant, indefinite long-term storage of nuclear waste in the ISFSI and cumulative and incremental risks of releases posed by the proposed uprate underscore the need for state-of-the-art real-time monitoring, not only to accurately evaluate lifetime cancer risks but to correct concerns about plant operations that lead to releases and to protect public health in the event of emergencies. Health Physicist Tom Voss recommends real-time monitoring of radiation emissions outside the Prairie Island Nuclear Plant and ISFSI, linked with computer monitors and on-line public access to information. Mr. Voss explains the need for real-time monitoring:

> Real-time monitoring of radiation emissions outside the plant is important to understand the extent, location and dispersion of releases both for regular operational releases and in the event of an incident. Real-time monitoring within the nuclear plant is likely to advise operators that a release has occurred, but will not provide information regarding the effects of that release outside the plant.
>
> In the case of an independent spent fuel storage installation (ISFSI), the absence of realtime radiation monitoring means that the plant is relying on pressure sensors as the sole method of detecting a leak in spent nuclear fuel storage cases. Attachment A, p. 2 (Voss Letter).

Xcel witness Charles Bomberger has testified that continuous real-time monitoring of groundwater might help identify in what ways reported spikes in tritium concentrations at the Nuclear Plant are related to plant operations. Tr. V 2, p. 123 (Bomberger). Knowing to which aspect of plant operations tritium releases are related is relevant in order to cure or correct any concerns about plant operations and releases. *Id.*, pp. 123-124.

Xcel witness Terry Pickens explains that although there is continuing monitoring within the Plant to inform Xcel if an operational issue might cause Xcel to move to an emergency response, there is no real-time monitoring of either direct radiation or air emissions from the Prairie Island Nuclear Plant. Tr. V 6, p. 268 (Pickens). If Xcel thought that there were releases above normal operation, they would send personnel out from the site to monitor. *Id.*, p. 269. None of Xcel's off-site radiation monitoring is linked to a computer network, and TLDs, which monitor gamma radiation exposures under normal operation of the Plant and ISFSI or in the event of an incident, do not provide real-time information back. *Id.*, p. 270. If an emergency situation were to take place, instead of drawing continuous monitoring information from monitors already sited and operational, Mr. Pickens explained Xcel's plan: "We would go out and send people out periodically. They would gather information at that monitoring station and bring it back." *Id.*, pp. 270-271.

This primitive level of monitoring is insufficient not only to evaluate the adverse socioeconomic and environmental impacts of the nuclear power uprate, but to mitigate the increased radiation health risks of cask expansion, continued operation and the proposed power uprate at the Prairie Island Nuclear Plant.

c. Increase in Water Utilization and Thermal Discharge

Xcel projects that the proposed power uprate at will increase use of surface and groundwater by the Prairie Island Nuclear Plant about 10 percent. Tr. V 3, p. 127 (Carlson). After the power uprate, the Nuclear Plant would withdraw and consume 228,415 million gallons of surface water per year from the Mississippi River. Tr. V 2, p. 213 (Carlson); Ex. 136, p. 15 (Carlson Direct 509).

The power uprate would also result in a 10 percent temperature increase, Tr. V 6, p. 191 (Flowers), which will increase waste heat discharged to the Mississippi River. Tr. V. 3, p. 146 (Carlson). Xcel predicts that the uprate would incrementally increase discharged water temperature by three degrees Fahrenheit at the inlet to the discharge canal. *Id.*, p. 128. Under some conditions, Xcel predicts that the incremental increase from the uprate could approach three degrees at both ends of the discharge canal. *Id.*, p. 136.

The thermal impact of the nuclear power uprate may be more significant than what has been described by Xcel. The Minnesota Department of Natural Resources ("MDNR") has noted

that Xcel did not provide any modeling demonstrating that there will be only a slight incremental temperature increase in the river as a result of the uprate, so that reviewers have had to "accept the conclusions" of Xcel rather than analyzing data. Attachment C, p. 1, MDNR Letter August 21, 2009, e-filed as Comment to FEIS ("MDNR Letter, Aug. 21, 2009").

In order to measure the change in thermal output from the uprate one would need to have an accurate assessment of existing conditions to serve as a baseline against which to measure future conditions. Tr. V 3, pp. 140-141 (Carlson). Xcel's thermal monitoring is primarily based on a University of Minnesota St. Anthony Falls Laboratory ("SAFL") study from the 1970s. Tr. V 6, pp. 137-138 (Flowers). Although some updates were conducted in 1993, the last time a comprehensive thermal study was done was in 1983 when the Nuclear Plant's intake system was modified. *Id.*, pp. 117, 139.

The only sensors for thermal impacts on the Mississippi River are at the pipes where Xcel's discharge goes into the river and on the piers at Lock and Dam No. 3, a mile away. Tr. V 6, pp. 173-174, 183 (Flowers). Although the Wisconsin Department of Natural Resources has expressed concern that the sensors on Lock and Dam No. 3 do not reflect the thermal plume passing the dam at this location, Xcel did not change the location of these monitoring points. Tr. V 6, pp. 181-183; Ex. 61 (Wisconsin DNR Letter). Xcel is proposing no changes to its monitoring system as a result of the proposed power uprate, Tr. V 3, p. 149 (Carlson), and does not believe that additional monitoring points will be added as part of NPDES permit renewal. Tr. V 6, p. 113 (Flowers).

Cumulative and incremental impacts of thermal discharge on the Mississippi River can be significant. Xcel has acknowledged that warmer temperatures in the summer reduce dissolved oxygen and that reduction in dissolved oxygen has an adverse effect on aquatic biota. Tr. V 6, p. 190 (Flowers). The Company has also acknowledged that the Minnesota Department of Natural Resources has concerns related to increased thermal discharge to the Mississippi River from the proposed power uprate, including loss of fish life from cold shock; increased stress to sensitive aquatic organisms during periods of low stream flow with conditions of high temperatures and humidity; and impacts on ice cover on Lake Pepin. Xcel Initial Brief, pp. 46-47; Ex. 60, (MDNR Letter, Oct. 7, 2008); Ex. 140 (MDNR Letter, May 8, 2009); Ex. 23 (MDNR Letter, Feb. 20, 2009). The MDNR noted that the Prairie Island Nuclear Plant experienced a minimum of nine cold shock events since 1985 resulting in fish loss. Ex. 60, p. 2 (MDNR Letter Oct. 7, 2008).

Within its existing permit, the Nuclear Plant has experienced instances of cold shock resulting in fish mortality. Tr. V 3, pp. 147-148 (Carlson).

Dr. Sotiropoulos, Director of the St. Anthony Falls Laboratory at the University of Minnesota ("SAFL") has summarized the potential adverse impacts of thermal discharge and the need for accurate studies and sufficient monitoring sampling sites to identify impacts:

> We would emphasize that thermal discharge can have significant impacts on an aquatic environment and can reduce dissolved oxygen that impacts aquatic species. Thermal impacts on ice cover can affect fish and other aquatic species as well as presenting a public safety hazard due to thin ice. As documented in correspondence from the MDNR, cold shock events can result in fish mortality and open cycle operation of the PINGP may increase risks to aquatic species. Monitoring must be designed based on current and accurate hydrology and with a sufficient number of sampling locations to accurately identify thermal discharge impacts. Attachment B, p.2, Letter of Fotis Sotiropoulos, Ph.D, Director, St. Anthony Falls Laboratory, Sept. 1, 2009 ("SAFL Letter").

Xcel has responded to concerns about thermal discharge raised by the MDNR and parties by stating that discharge temperatures can be maintained within the current NPDES/SDS permit limits by increasing the use of cooling towers or, "if necessary, by derating the Prairie Island Plant to meet permit requirements for water appropriations and thermal discharge." Xcel Energy's Initial Brief, p. 39, *citing* Ex. 64, Ch. 1, p. 69 (FEIS).

The PINGP Study Group would note that de-rating the Nuclear Plant to prevent permit violations would undermine the asserted energy production benefit of the nuclear power uprate. The MDNR has clearly found this response insufficient. As explained in the MDNR's comment letter to the FEIS, any proposal to "de-rate" the plant would only apply to summer conditions, not MDNR's concerns about thermal impacts during winter. "We find that with the facility uprate and 10% increase in the temperature of the cooling water discharge during the winter period, there are no measures proposed to mitigate the additional thermal loading." Attachment C, p. 1 (MDNR Letter, Aug. 21, 2009). The MDNR explained its unresolved concerns about thermal discharge from current operations at the Prairie Island Nuclear Plant and the cumulative and incremental effects of the proposed uprate:

> A principal concern for the Department of Natural Resources is the effect of the new thermal discharge regime on the ice cover conditions of Lake Pepin, and the fact that ice conditions are not regulated by or result from violations of the state water quality standards for temperature. The previously referenced thermal performance model did not include the December through March period. This is a period of open-cycle operation with no cooling towers in use and, with the uprate, an additional 3 degrees Fahrenheit

being discharged to the river. . . The data referenced by Xcel also does not represent the conditions associated with the thermal discharge of the extended power uprate.

The ice conditions on the upper 6 miles of Lake Pepin have been impaired since 1983 when modifications of the NPDES permit allowed discontinuation of cooling tower use during the winter. Popular fishing destinations downstream of this upper extent of lake, such as major points and bars, have also become hazardous locations. Lake Pepin ice conditions will be further degraded with the uprate unless a more balanced facility design is implemented. This will require partial winter cooling tower use to address the newly proposed increment of heat, and also to address a reasonable fraction of the additional thermal loading that has been characteristic of the discharge since 1983. This change in current operating procedures would need to be based on river and lake studies of temperature and ice conditions." Attachment 3, p. 2 (MDNR Letter, Aug. 21, 2009).

Xcel has not evaluated the use of an auxiliary dry cooling tower in the winter and has not estimated the costs of a dry cooling tower. Tr. V 3, pp. 146-147 (Carlson); Tr. V 6, pp. 172-173 (Flowers). Although the Nuclear Plant was initially set up to be a closed cycle facility, since the mid-1980s Xcel uses no cooling towers from November 1 to April 1. *Id.*, pp.168-170.

Thermal studies are out-of-date and thermal monitoring and sampling is insufficient to determine the impacts of thermal discharge, preventing a finding by the Commission that the consequences of the uprate outweigh its adverse socioeconomic and environmental impacts. Despite repeated expressions of concern from the Minnesota Department of Natural Resources, the Prairie Island Indian Community and members of the public, Xcel has no intention of improving the monitoring related to thermal discharge or of changing its procedures to mitigate the thermal impacts from continued operation and the power uprate proposed for the Prairie Island Nuclear Plant.

C. THE COMMISSION SHOULD IMPOSE CONDITIONS TO MITIGATE THE ADVERSE IMPACTS OF THE PRAIRIE ISLAND NUCLEAR PLANT.

It is undisputed that the Commission has the authority to grant or deny or place conditions on the granting of certificates of need. Tr. V 2, pp. 96-97 (Bomberger). The PINGP Study Group does not believe that mitigating conditions are sufficient to justify either granting a certificate of need for the cask expansion and continuing operation of the Prairie Island Nuclear Plant or a certificate of need and site permit for the nuclear power uprate. As explained in the preceding Sections of this Brief, we believe that many of the adverse impacts of cask expansion, continued operation and the proposed power uprate for the Nuclear Plant cannot be effectively

mitigated. However, if the Commission is considering the grant of either certificate of need or the site permit, mitigation of adverse impacts and use of improved monitoring and modeling studies is required under applicable statutes and rules.

Rules pertaining to certification of nuclear waste storage facilities require monitoring and mitigation. The Applicant must provide data regarding environmental monitoring, measures to "minimize the effects of spills or leaks on the environment," and measures to "reduce the effects of the facility on the environment." Minn. R. 7855.0660, Subparts F, H and I.

Statutes and rules for issuance of a site permit for a large power plant explicitly require consideration of state-of-the-art methods to study, model and minimize adverse impacts of discharge. Site permit statutes state that the Commission must be guided by evaluation of research relating to the effects on land, water and air resources and the effects of water and air discharges on public health and welfare, vegetation, animals, materials and aesthetic values, "including baseline studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment." Minn. Stat. §216E.03, subd. 7(b)(1). Site permit rules state that, in determining whether to issue a permit for a large electric power generating plant, the Commission shall consider design options that "mitigate adverse environmental effects." Minn. R. 7849.5910G.

The PINGP Study Group believes that the conditions requested here should be required by the Commission whether or not Xcel's permits are approved. There are five remaining years on Xcel's operating license for the Prairie Island Nuclear Plant, and an indefinite period of time during which the 29 casks of nuclear waste currently authorized under law will remain on-site at Prairie Island. The conditions requested here -- improved monitoring of radiological and thermal impacts, mitigation of thermal impacts, protection of groundwater, planning for removal or long-term management of on-site nuclear wastes and funding of an adequate emergency response plan — should be required by the Commission to protect human health and the environment, to reduce environmental injustice and to increase the likelihood of compliance with state and federal regulations, rules and policies.

1. **The Commission should require Xcel Energy to provide comprehensive and improved monitoring of the radioactive emissions from the Prairie Island Nuclear**

The Commission should require Xcel Energy to implement the proposed conditions described in the letter of Health Physicist Tom Voss regarding monitoring of air and water emissions and gamma radiation emitted by the Prairie Island Nuclear Plant and ISFSI. These conditions, which are consistent with the Radiation Monitoring conditions proposed by the Prairie Island Indian Community ("Community") in its Initial Brief, pp. 40-41, are summarized as follows:

> Air Emissions: Re-evaluate number and locations of PINGP control and indicator locations. Design and implement real-time air effluent monitoring with on-line communication of results. Identify indicator locations in a ring at the perimeter of PINGP and in an outer ring to provide information on dilution concentrations and direction of any airborne plume.
>
> Surface Water Effluent: Design monitoring of effluents in Mississippi River water based on hydrology, identifying multiple indicator locations (current indicator location is at Lock and Dam #2) as well as appropriate control sites. Sample on a daily basis using automatic samplers and send a composite to lab for monthly analysis.
>
> Ground Water Contamination: Review appropriateness of control and indicator ground water monitoring locations based on plant operations, geological survey, drinking water well sites. Design and implement a system that includes real-time monitoring for alpha, beta and gamma radiation and tritium and on-line information on results.
>
> Gamma Radiation: Design and implement real-time gamma radiation monitoring program using pressurized ion chamber technology with on-line communication of results and citizen assistance in checking equipment. Site indicator locations in a ring at the perimeter of ISFSI and in an outer ring, in addition to existing TLD monitors. Best practice is to co-locate the gamma radiation monitoring equipment with the air effluent monitoring equipment.
>
> General:
> - Implement a program sampling natural vegetation near the plant perimeter in addition to specific food samples.
> - Ensure that the emergency plan for PINGP includes air emissions monitoring for population centers as well as more proximate locations.
> - Evaluate need for additional shielding for ISFSI to reduce gamma radiation. Attachment A, pp. 3-4 (Voss Letter)

The PINGP Study Group also supports the Community's requests that monitoring include sampling of sediment on the shoreline of Sturgeon Lake and that more thorough investigation be done of contaminants found in water and milk near the Nuclear Plant. Community Initial Brief, pp. 40-41.

2. **The Commission should require Xcel Energy to provide improved monitoring of the thermal discharge from the Nuclear Plant and mitigation of its impacts in coordination with the University of Minnesota St. Anthony Falls Laboratory and the Minnesota Department of Natural Resources.**

The Commission should require Xcel Energy to implement conditions related to monitoring and mitigation of thermal discharge, consistent with the letter from SAFL Director, Dr. Sotiropoulos, the formal request made by the MDNR and the conditions proposed by the Prairie Island Indian Community. The MNDR has asked that the Commission require a thermal study be conducted to update historical studies conducted by the SAFL. Attachment C, p. 2 (MDNR Letter, Aug. 21, 2009). Among its proposed conditions, the Community has requested that the SAFL study, design and implement a thermal discharge monitoring program. Community Initial Brief, pp. 41-43. The SAFL has provided a summary scope of work, consistent with the Community's proposed conditions for thermal discharge monitoring and mitigation:

> Saint Anthony Falls Laboratory proposes to design and specify state-of-the-art technology to perform real-time monitoring and assessment of the following in connection with the PINGP summarized as follows:
> - Monitor and map the thermal discharge plume.
> - Monitor dissolved oxygen concentrations in the River and Lake Pepin and identify areas of concern.
> - Monitor the volume and temperature of river water withdrawn and discharged during open and closed cycle operations.
> - Design models to forecast the nature and locations of impacts from thermal discharges.
> - Provide data and assistance to MDNR and WDNR for timing and site selection for fish counts and other biological evaluation.
> - Monitor /warn of "cold shock" events.
> - Monitor and report Lake Pepin ice conditions as an aid in forecasting impacts on fish and other aquatic life and public safety.
> - Evaluate the impact of "open cycle" operation of the PINGP on the River environment. Attachment B. p. 2 (SAFL Letter).

The PINGP Study Group also supports conditions requiring Xcel to evaluate the use of an auxiliary dry cooling tower from late fall through early spring to address the concerns of the MDNR and conditions prohibiting open cycle operation unless closed cycle is not feasible consistent with plant safety and reliability as proposed by the Community. Attachment C, p. 2 (MDNR Letter, Aug. 21, 2009); Community Initial Brief, p. 42.

3. **The Commission should require Xcel Energy to comply with industry standards for groundwater protection, identify the sources of tritium contamination of existing wells, discontinue discharge of radioactive wastes on land and reduce tritium discharge to the Mississippi River.**

The Commission should require Xcel Energy to implement specific actions to protect ground water, including discontinuing discharge of radioactive waste on land, reducing the discharge of liquid radioactive waste to surface water, including the Mississippi River, identifying the sources of tritium contamination in the Nuclear Plant's monitoring wells and conducting a hydrological study to identify the relationship between groundwater and surface water impacted by the Nuclear Plant's radioactive discharge.

The PINGP Study Group also supports the request made by the Community in its Initial Brief, p. 39, that Xcel demonstrate that its operation of the Prairie Island Nuclear Plant is in compliance with industry standards for groundwater protection, such as the Nuclear Energy Institute Industry Ground Water Protection Initiative, Ex. 404. The Commission should require Xcel to make a compliance filing to that effect no later than April 30, 2010.

4. **The Commission should require Xcel Energy to provide funding to the Prairie Island Indian Community for genetic testing of the health impacts of radioactive emissions from the Nuclear Plant on the Community.**

The PINGP Study group supports the condition proposed by the Community for genetic testing based on the testimony of Dr. Wilkinson. Ex. 406, p. 2 (Wilkinson Surrebuttal). No research to date has assessed the health impacts of the Community from the Nuclear Plant, *supra*, p. 16. Assessment is particularly salient given environmental justice concerns of the Community, *supra*, pp. 12-14.

5. **The Commission should require Xcel Energy to investigate alternatives for the disposition of nuclear spent fuel after decommissioning of the Prairie Island Nuclear Plant and to develop a plan to ensure adequate maintenance, cask replacement, monitoring, funding and security for a period of at least 200 years.**

The Commission should require Xcel to investigate alternative sites for the disposition of nuclear spent fuel after decommissioning of the Nuclear Plant. Minn. Stat. §116C.771(e) provides that limits otherwise set for dry cask storage of nuclear waste can be exceeded when storage is needed for decommissioning: "This section does not prohibit a public utility from applying for or the Public Utilities Commission from granting a certificate of need for dry cask

storage to accommodate the decommissioning of a nuclear power plant within this state."

Statutes establishing procedures to allow additional dry cask storage "for the expansion or establishment of an independent spent-fuel storage facility at a nuclear generation facility in this state," Minn. Stat. § 116C.83, do not constrain approvals for decommissioning storage. Although the "authorization for storage capacity *pursuant to this section* is limited to the storage of spent nuclear fuel generated by a Minnesota nuclear generation facility and stored on the site of that facility," Minn. Stat. §116C.83, subd. 4(b)(emphasis added), the 116C.83 statute neither refers to decommissioning nor cross-references the 116C.771(e) statute.

In addition to being consistent with statutory language, it is also more consistent with environmental protection and environmental justice to evaluate alternative sites for dry cask storage of spent nuclear fuel. Once decommissioning removes the need for large volumes of cooling water and strong transmission connections, sites for nuclear waste that are not located on a flood plain and adjacent to the Prairie Island Indian Community should be investigated.

The Commission should also require Xcel to develop a plan to ensure adequate maintenance, monitoring, cask replacement and repair, funding, security and responsible management of spent nuclear fuel, whether at another site managed by Xcel or at the Prairie Island ISFSI, for at least the period of 200 years discussed in the FEIS. This plan must address issues of how to maintain long-term institutional control as well as more immediate concerns posed by the emergency response plan for the Prairie Island Nuclear Plant. So long as spent fuel is being held at the Prairie Island ISFSI, Xcel has the obligation to manage that fuel responsibly. Tr. V 2, p, 153 (Bomberger); *see also* Nuclear Waste Policy Act, 42 U.S.C. Ch.108, Subch. 1, Part A, §10131(a)(5).

6. The Commission should require Xcel Energy to provide funding to the City of Red Wing for an effective emergency response plan.

The Commission should require that Xcel provide funding to the City of Red Wing for an effective and timely emergency response plan. The PINGP Study Group has not analyzed Xcel's arguments regarding the sufficiency of local government aid or utility transition aid, since we do not believe that Xcel's responsibilities for an emergency response plan are delegable to taxpayers or to the Legislature. Our concerns pertain to response times and protection of human health and the environment.

Witnesses for the City of Red Wing testified that the adequacy of emergency response

funding is closely related to response times in the event of a serious incident. If Red Wing needed to call on a mutual aid organization, such as the Lake City fire department, to respond to a serious incident, response time would likely add 45 minutes or longer to the current response time of about 20 minutes from Red Wing. Tr. V. 5, p. 47 (Hand). On the other hand, funding of additional fire stations in Red Wing near the Nuclear Plant, and on tribal land near the casino, could cut response time in half so that emergency responders could reach the Nuclear Plant in eight to nine minutes. Tr. V 5, pp. 164-168 (Hallock); Ex. 151, p. 170 (Red Wing Report). The effect of response time in a nuclear plant incident was explained by the Emergency Management Director for the City of Red Wing:

> If you had a significant fire and that fire was releasing toxic clouds or something like that, then I think it's imperative you get people there as quickly as possible to do a couple of things. Contain the fire, for one, and begin the evacuation process that might be necessary as a result of that event. Tr. V 5, p. 47 (Hand).

With cumulative risks of cask expansion, twenty years of continued operation and a proposed power uprate at an aging nuclear plant, reducing rather than delaying emergency response would be appropriate to mitigate adverse impacts of an incident on human health and the environment.

CONCLUSION

The certificate of need for cask expansion and continued operation of the Prairie Island Nuclear Plant should be denied. The decline in forecasted energy demand and the potential for wind energy, renewable power purchase and capacity expansion from repowering the Black Dog coal plant provide a unique opportunity to repower the Nuclear Plant with natural gas and begin a transition away from nuclear power and increased generation of nuclear waste. Radioactive impacts of the cask increase and continued operation of the Plant, along with an inadequate emergency response plan, violate applicable laws, increase environmental injustice, and outweigh any benefits from continued reliance on nuclear power. The lack of a federal depository for additional nuclear waste over an indefinite period of time -- when institutional controls cannot be assured -- creates costs and risks of a scale and magnitude far beyond those of other sources of electric power.

The proposed nuclear power uprate becomes moot if the certificate of need for cask expansion and continued operation of the Nuclear Plant is denied. Considered on its own, the uprate should not be certified, given declining energy demand and Minnesota's renewable energy preference. The application is premature, since the safety of an uprate at Prairie Island's aging Nuclear Plant has not been determined. Radioactive and thermal impacts on human health and the environment would increase environmental justice, conflict with state and federal rules and policies and outweigh asserted benefits of the uprate.

In our view, the conditions requested by the PINGP Study Group in this Brief are not sufficient to support a grant of the certificates of need or the site permit requested in this proceeding. However, we believe they are the minimum action needed by the Commission to protect human health and the environment, to reduce environmental injustice and to increase the likelihood of compliance with state and federal regulations, rules and policies. The conditions requested by the PINGP Study Group -- improved monitoring of radiological and thermal impacts, mitigation of thermal impacts, protection of groundwater, planning for removal or long-term management of on-site nuclear wastes and funding of an adequate emergency response plan — should be required by the Commission.

The PINGP Study Group has appreciated the consideration given to our participation by the ALJ and the parties in this proceeding. We ask for the requested relief in compliance with applicable laws and to protect public and community interests.

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Respectfully submitted,

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