January 16, 2002

Mr. Mano Nazar
Site Vice President
Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 - OPPORTUNITY FOR COMMENT ON TIA 2001-04, "DESIGN BASIS RELIANCE ON NON-SEISMIC AND NON-SAFETY RELATED EQUIPMENT" (TAC NOS. MB1855 AND MB1856)

Dear Mr. Nazar:

The Nuclear Regulatory Commission (NRC) staff has completed its review of the subject Task Interface Agreement (TIA) request, dated April 26, 2001, from the NRC's Region III office. This TIA requested the Office of Nuclear Reactor Regulation (NRR) staff's assistance in resolving issues related to design-basis assumptions for the service water system operations at the Prairie Island Nuclear Generating Plant. The purpose of this letter is to provide you with the opportunity to respond to the NRR staff's preliminary conclusions made in the enclosed draft TIA response. In developing the enclosed TIA response, the NRR staff considered your letter dated September 17, 2001, as well as other relevant licensing basis documents.

Our internal procedures encourage the input of licensees or other external stakeholders in order to ensure all relevant information has been considered in responding to a TIA. While you are not required to respond to this letter, your staff has previously indicated a desire to review and comment on the staff's draft TIA response.

If you decide to respond to this letter, we request that your response be provided within 60 days of receipt of this letter. Please feel free to contact me at (301) 415-1392 if you have any questions.

Sincerely,

/RA/

Tae Kim, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure: Response to TIA 2001-04

cc w/encl: See next page

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Prairie Island Nuclear Generating Plant,
Units 1 and 2

cc:

J. E. Silberg, Esquire
Shaw, Pittman, Potts and Trowbridge
2300 N Street, N. W.
Washington, DC 20037

Site Licensing Manager
Prairie Island Nuclear Generating Plant
Nuclear Management Company, LLC
1717 Wakonade Drive East
Welch, MN 55089

Adonis A. Neblett
Assistant Attorney General
Office of the Attorney General
455 Minnesota Street
Suite 900
St. Paul, MN 55101-2127

U.S. Nuclear Regulatory Commission
Resident Inspector's Office
1719 Wakonade Drive East
Welch, MN 55089-9642

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-4351

Mr. Stephen Bloom, Administrator
Goodhue County Courthouse
Box 408
Red Wing, MN 55066-0408

Commissioner
Minnesota Department of Commerce
121 Seventh Place East
Suite 200
St. Paul, MN 55101-2145

Tribal Council
Prairie Island Indian Community
ATTN: Environmental Department
5636 Sturgeon Lake Road
Welch, MN 55089

Mr. Roy A. Anderson
Executive Vice President and
Chief Nuclear Officer
Nuclear Management Company, LLC
700 First Street
Hudson, WI 54016

Nuclear Asset Manager
Xcel Energy, Inc.
414 Nicollet Mall
Minneapolis, MN 55401

OFFICE OF NUCLEAR REACTOR REGULATION STAFF'S RESPONSE TO TASK INTERFACE AGREEMENT 2001-04, "DESIGN BASIS RELIANCE ON NON-SEISMIC AND NON-SAFETY RELATED EQUIPMENT"

1.0 BACKGROUND

By memorandum dated April 26, 2001, Region III requested that the Office of Nuclear Reactor Regulation (NRR) resolve two issues related to design-basis service water system operations at the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. The specific issues involve the Nuclear Management Company's (the licensee's) assumption that (1) only a single seismically qualified or adequate flow path is required to demonstrate ongoing operability of the cooling water line (CL) system and (2) nonsafety-related equipment (air-operated valve and associated air supply) may be relied upon to demonstrate operability of the CL system. The requested actions in Task Interface Agreement (TIA) 2001-04 are as follows:

Issue (1)

From a licensing basis perspective for system functional capability, is the Prairie Island Plant design required to include two independent, seismically adequate discharge flow pathways for the "preferred" service water system? Also, if the plant design is required to include two independent, seismically adequate discharge flow pathways, what criteria should the regional staff use to determine that the pathways are seismically adequate (e.g., SQUG, etc)?

Issue (2)

From a design and licensing basis perspective for system functional capability, may the licensee rely upon the post-accident, automatic closure of the spring-to-open, air-to-close non-safety related turbine building hydrogen cooler service water control valve to preclude the service water pumps from operating beyond the run-out region of the pump curve and to ensure adequate cooling of safety-related loads?

By letter dated September 17, 2001, the licensee submitted to NRC its response to the issues identified in TIA 2001-04. The NRR staff has reviewed TIA 2001-04 and the licensee's associated submittal. The NRR staff's safety assessment of TIA 2001-04 is below.

2.0 NRR STAFF'S RESPONSE TO ISSUE (1)

The design-basis requirements that were established for the PINGP service water system are discussed in the Final Safety Analysis Report (FSAR) that was in effect at the time of licensing of the plant. As discussed in FSAR Section 1.2.8, "Engineered Safety Features" (ESF), the cooling water system (a.k.a., service water system) is considered to be an ESF. The following criterion listed in FSAR Section 1.3, "Principal Design Criteria," is among those that apply to the cooling water system:

FSAR Section 1.3.1, "Overall Plant Requirements (GDC 1-GDC 5)"

> All systems and components of the facility are classified according to their importance. Those items vital to safe shutdown [among other things] are designated Class I. Class I systems and components are designed so that no loss of function will result from the Design Basis Earthquake (DBE).

Appendix B of the FSAR, "Special Design Procedures," Table B.2-1, "Classification of Structures, Systems, and Components," identifies the cooling water system as Class I up to the Class I system isolation valves, and classifies those areas of the Turbine Building that house cooling water system pipes as Class I. Section B.5, "Protection of Class I Items," states that Class I items are protected against damage from earthquakes by having the ability to sustain seismic accelerations without loss of function. Section B.7.2(a), "Design Criteria for Class I Vessels, Piping, and Supports," provides that in the case of the DBE, it is necessary to ensure that critical components do not lose the ability to perform their safety function (i.e., shut the plant down and maintain it in a safe condition). The FSAR also states that for the simultaneous occurrence of a DBE and a reactor coolant pipe rupture, the design of Class I piping and components (excluding the broken leg) is checked for no loss of function (i.e., the capability to contain fluid and allow fluid flow). Therefore, based on the FSAR design criteria, those elements of the cooling water system that are relied upon for accident mitigation, including discharge flow paths, should satisfy the Class I criteria as set forth in Appendix B of the FSAR. This does not preclude the licensee from crediting other flow paths in response to Generic Letter (GL) 87-02, "Verification of Seismic Adequacy of Mechanical and Electrical Equipment in Operating Reactors, Unresolved Safety Issue (USI) A-46," in addition to those that are required for accident mitigation.

GL 87-02 specified that licensees determine the systems, subsystems, components, instrumentation, and controls required during and following a design-basis seismic event using the following assumptions:

1. The seismic event does not cause a loss-of-coolant accident (LOCA), a steam-line-break accident (SLBA), or a high-energy line break (HELB). In addition, a LOCA, an SLBA, or an HELB does not occur simultaneously with or during a seismic event. However, the effects of transients that may result from ground shaking should be considered.

2. Offsite power may be lost during or following a seismic event.

3. The plant must be capable of being brought to a safe shutdown condition following a design-basis seismic event.

The equipment to be included is generally limited to active mechanical and electrical components and cable trays. Piping, tanks, and heat exchangers are not included except that those tanks and heat exchangers that are required to achieve and maintain safe shutdown must be reviewed for adequate anchorage.

Seismic system interaction is included in the scope of review to the extent that equipment within the scope must be protected from seismically induced physical interaction with all structures, piping, or equipment located nearby.

GL 87-02 also specified that each licensee must show practical means of staying at hot shutdown for a minimum of 72 hours. If maintaining safe shutdown is dependent on a single (not redundant) component whose failure (either due to seismic loads or random failure) would preclude decay heat removal by the identified means, the licensee must show that at least one practical alternative for achieving and maintaining safe shutdown exists that is not dependent on that component.

Based on the above, the licensee for PINGP was required, for the implementation of USI A-46, to ensure that the plant would be capable of being brought to a safe shutdown condition following a design-basis seismic event by verifying the seismic adequacy of a success path with the assumption of a failure of a single active component. Although piping is not included in the scope of USI A-46, piping functionality must be assured (to ensure the viability of the success path in order) for the licensee to demonstrate that PINGP can be shut down safely following a design-basis seismic event.

On pages 4 and 5 of NUREG-1211, the staff provided its rationale for excluding piping and piping supports within the accident-mitigation systems from the scope of the USI A-46 program. Central to the staff's position is that the seismic adequacy of safety-related piping and piping supports has been addressed within the scope of several IE bulletins (e.g., IE Bulletins 79-02, 79-07, and 79-14). It was never the staff's intent or position to endorse the acceptability of nonseismically designed piping within the safe shutdown system without an engineering evaluation to establish its seismic adequacy consistent with other seismically adequate in-line components within these systems. The staff, therefore, finds the licensee's arguments on pages 4 and 5 of its September 17, 2001, letter unacceptable for nonsafety-related piping within the CL system.

To satisfy the provisions of GL 87-02, the licensee should demonstrate the seismic adequacy of a chosen safe shutdown path with the assumption of a failure of a single active component. Since piping is part of the safe shutdown path, its functionality should be demonstrated during a safe-shutdown earthquake (SSE) event.

If the licensee has incorporated the Seismic Qualification Utility Group's (SQUG's) Generic Implementation Procedure (GIP), Revision 2 (GIP-2), in the FSAR, then a successful (seismically adequate) safe shutdown path (while considering the failure of a single active component) would be required in accordance with the GIP-2 provisions. If the discharge flow pathways are required to be seismically adequate, an acceptable approach may include:

(A) Use of SQUG GIP-2 to demonstrate the seismic adequacy of equipment.

(B) Use of either the licensing basis criteria to demonstrate the seismic adequacy of safety-related piping systems, or specific criteria to be proposed by the licensee and approved by the staff for demonstrating the seismic adequacy of piping in the CL system.

The staff notes that having a success flow pathway with the assumption of a failure of a single active component is not the same as having two independent flow pathways. In Supplement 4 to GL 88-20, “Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities," seismic adequacy stipulates the identification of two independent safe shutdown paths. However, IPEEE was established to address Severe Accident Vulnerabilities, which are beyond the licensing basis.

3.0 NRR STAFF’S RESPONSE TO ISSUE (2)

As stipulated in Section 1.3.1 of the FSAR, “All systems and components of the facility are classified according to their importance. Those items vital to safe shutdown and isolation of the reactor or whose failure might cause or increase the severity of an accident or result in an uncontrolled release of substantial amounts of radioactivity are designated Class I” (i.e., safety related). Reliance on non-Class I equipment in the manner described does not satisfy the plant design-basis requirements as set forth in the FSAR, and is therefore unacceptable. The licensee’s response of September 17, 2001, to the TIA request speculates that the NRC was aware that non-Class I equipment was being relied upon in the manner described. However, the staff has found no explicit recognition or acknowledgment of this during plant licensing by either the licensee or the NRC. It was the staff’s expectation during licensing, as it is the staff’s expectation now, that the licensee comply with the plant design-basis requirements.