



APR 29 2010

L-PI-10-041  
10 CFR 50.90

U S Nuclear Regulatory Commission  
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Prairie Island Nuclear Generating Plant Units 1 and 2  
Dockets 50-282 and 50-306  
License Nos. DPR-42 and DPR-60

Response to Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC NOS. ME2609 and ME2610)

References:

1. Xcel Energy Letter to US NRC, "License Amendment Request (LAR) to Adopt the Alternative Source Term Methodology," dated October 27, 2009 (ADAMS Accession No. ML093160583).
2. US NRC Letter to Xcel Energy, "Prairie Island Nuclear Generating Plant, Units 1 and 2 – Requests for Additional Information RE: License Amendment Request to Adopt the Alternative Source Term Methodology (TAC Nos. ME2609 and ME2610)," dated March 26, 2010 (ADAMS Accession No. ML100820298).

In Reference 1, the Northern States Power Company, a Minnesota corporation (NSPM), doing business as Xcel Energy, hereby requested an amendment to the Technical Specifications (TS) for Prairie Island Nuclear Generating Plant (PINGP). The proposed amendment requested to adopt the Alternative Source Term (AST) methodology, in addition to TS changes supported by the AST design basis accident radiological consequence analyses.

In Reference 2, the Nuclear Regulatory Commission (NRC) Staff requested additional information to support their review of Reference 1. Enclosure 1 to this letter provides responses to the NRC Staff requests for additional information (RAI), specifically, responses to RAIs from the Electrical Engineering Branch and from the Mechanical and Civil Engineering Branch. As discussed with the NRC, the RAIs from the Reactor Systems Branch will be responded to by May 28, 2010.

NSPM submits this supplement in accordance with the provisions of 10 CFR 50.90.

The supplemental information provided in this letter does not impact the conclusions of the Determination of No Significant Hazards Consideration and Environmental Assessment presented in the October 27, 2009 submittal.

In accordance with 10 CFR 50.91, NSPM is notifying the State of Minnesota of this LAR supplement by transmitting a copy of this letter to the designated State Official.

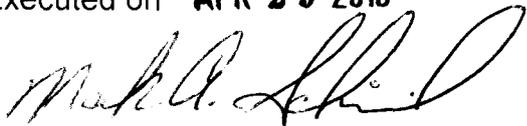
If there are any questions or if additional information is needed, please contact Ms. Amy Hazelhoff, at 269-370-7445.

Summary of Commitments

This submittal does not contain any new commitments and no revisions to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on **APR 29 2010**



Mark A. Schimmel  
Site Vice President, Prairie Island Nuclear Generating Plant  
Northern States Power Company - Minnesota

Enclosure

cc: Administrator, Region III, USNRC  
Project Manager, PINGP, USNRC  
Resident Inspector, PINGP, USNRC  
State of Minnesota

## Enclosure 1

### ***Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI)***

#### ***Electrical Engineering Branch (EEEB)***

##### ***EEEB RAI 1***

*Provide the changes in the emergency diesel generator (EDG) loading due to this LAR.*

*Provide the EDG loads for Units 1 and 2 pre- and post-AST, and confirm that adequate margin exists post-AST. Confirm that EDG testing envelopes the loading requirements due to this LAR.*

### **Northern States Power Company, a Minnesota corporation (NSPM) Response**

#### **EEEB RAI 1**

Changes to Emergency Diesel Generator (EDG) loading can result from changes in the automatic loading of the EDG or in subsequent manual loading in accordance with operating procedures. Changes in manual loading can occur as a result of changes to operating procedures. As described on page 13 of the enclosure to Reference 1 of the cover letter, there are no changes to the Auxiliary Building Special Ventilation System (ABSVS) or Shield Building Ventilation System that would change the automatic loading of the EDG. Furthermore, there are no other changes to the automatic operation of systems or components as a result of the Alternative Source Term (AST) analyses that could affect automatic loading of the EDG. As described on page 11 of the enclosure to Reference 1 of the cover letter, there are no new operator actions that are credited as part of the AST analyses. The AST analyses are based on the current operating procedures. Thus, there are no changes to EDG loading as a result of changes to operating procedures.

As there are no changes to EDG loading due to AST, the post-AST EDG loads are unchanged from the pre-AST EDG loads. Pre-AST EDG loads, in response to a loss of coolant accident (LOCA)/design basis accident (DBA), are shown in the Prairie Island Nuclear Generating Plant (PINGP) Updated Safety Analysis Report (USAR), Tables 8.4-1 (Unit 1) and 8.4-2 (Unit 2). As there are no changes to the pre-AST EDG loads, there are no changes necessary to the current EDG testing in Technical Specification (TS) 3.8.1, "AC Sources-Operating."

## ***NRC RAI - EEEB RAI 2***

*Confirm that no credit has been taken for non-safety related system(s) due to this LAR.*

*If yes, then a) describe the impact on the EDG loading due to these systems, b) describe how electrical and physical separation, and single failure criteria, have been met, and c) describe how the operators will be notified (e.g., control room annunciators) in the event that these systems become inoperable.*

## **NSPM Response - EEEB RAI 2**

As described on pages 9 and 10 of the enclosure to Reference 1 of the cover letter, credit is taken for non-safety related heating, ventilation and air conditioning (HVAC) dampers that are part of the Auxiliary Building Normal Ventilation System (ABNVS). Following a LOCA, these dampers close to help establish the Auxiliary Building Special Ventilation Zone (ABSVZ) by isolating the ABNVS air make-up and exhaust paths. The ABSVZ boundary contains those areas within the Auxiliary Building that have the potential for collecting significant leakage that could bypass the Shield Building and leakage from systems that could recirculate primary coolant during LOCA mitigation. The ABNVS make-up and exhaust air dampers close when either train of Auxiliary Building Special Ventilation System (ABSVS) is actuated. The ABSVS is a safety related system.

### a) Impacts on EDG loading

These non-safety related HVAC dampers have no impact on EDG loading. As described on page 9 of the enclosure to Reference 1 of the cover letter, the dampers are normally held open by air. The dampers close by spring action (motive force) when the air supply is isolated to the damper. The air supply is isolated by a solenoid valve closing. The de-energized state of the solenoid valve is closed, with vent open. Thus, electrical power is not required to cause the dampers to close, and there is no impact on EDG loading.

### b) Electrical and Physical Separation and Single Failure Criteria

The configuration and operation of the dampers is described on pages 9 and 10 of the Enclosure to Reference 1 of the cover letter. As described above, the make-up and exhaust dampers close by spring force when the air supply is isolated from the damper actuator. Assurance of proper operation of the dampers is provided by the following.

- The ABSVS fans automatically start on a safety injection (SI) signal or on a high radiation signal in the Auxiliary Building. The ABSVS fans and associated control circuitry are safety related. As such, separation of the control circuitry is described in Section 8.7.2 of the PINGP USAR. The

actuation of either Train A or Train B ABSVS fan secures all ABNVS make-up and exhaust air fans and closes the make-up and exhaust dampers. The signal to secure the ABNVS fans is redundant in that there are two starter contactors in series for the fan motor (42A and 42B). The 42A contactor is opened when Train A ABSVS fan is actuated, and the 42B contactor is opened when Train B ABSVS fan is actuated. The 42A and 42B contactors are also in series for the ABNVS make-up and exhaust damper solenoid valves. With this configuration, either the 42A or 42B contactor opening will de-energize the ABNVS fans and the make-up and exhaust damper solenoid valves. Therefore, the initiating signal and associated control circuitry for de-energizing the ABNVS fans and damper solenoid valves is redundant.

- There are two dampers in the ABNVS make-up air supply; located on either side (supply and discharge) of the ABNVS make-up air supply fan. The two independent supply damper design provides damper redundancy. Therefore, if one of the dampers should fail to close, a redundant damper is provided in the ABNVS make-up air supply line.
- The ABNVS exhaust dampers are single dampers. As described above, the exhaust dampers have two redundant electrical contacts from safety related circuits. The solenoid valves are a fail safe design. Each exhaust damper has a special dual air, dual spring fail safe design. The intent of this design is to provide redundancy in the motive force (spring action) for the damper to close. Although only a single exhaust damper is provided, the dual air, dual spring fail safe design assures that the exhaust dampers will close. Therefore, there is assurance that the exhaust dampers will close when called upon to function.
- Each train of damper actuation circuitry is tested each quarter. Testing of each train of the actuation circuitry verifies that all the dampers close. Thus, proper functioning of the dampers is verified at least two times each quarter as part of established surveillance procedures to satisfy TS. To satisfy TS Surveillance Requirements (SR), each quarter it is verified that each ABSVS train can produce a negative pressure within a specified time frame after initiation. One of the stated attributes of this TS SR is to verify that the associated ABNVS fans trip and dampers close. Applicable TS action statements are applied if a damper fails to properly actuate.

Given the redundancy in the electrical control circuitry, the redundancy in the damper and/or damper operating mechanism, and that the dampers close to a fail-safe de-energized position, sufficient redundancy exists to ensure that at least one damper will close in each of the ABNVS make-up and exhaust air flow paths.

c) Notification to Operators if System is Inoperable

Regarding the ABNVS fans and dampers, the operators are provided the following indications in the Control Room.

- Red and green lights are provided to indicate the status of the ABNVS make-up air and exhaust fans. A red light indicates that the associated fan is energized. A green light indicates that the associated fan is de-energized.
- White monitor lights are provided to indicate the status of the make-up fan discharge and exhaust air dampers. An illuminated white monitor light indicates that the associated damper is open. A non-illuminated white monitor light indicates that the associated damper is closed.

Thus, there is indication in the control room that the operators can use to determine system inoperability. These same light indications in the control room can be used by the operator to verify correct component alignment when ABSVS is actuated following a LOCA.

As described above, proper functioning of the dampers is verified at least two times each quarter as part of established surveillance procedures to satisfy TS. One of the stated attributes of this TS SR is to verify that the associated ABNVS fans trip and dampers close. As part of the surveillance procedure performed to satisfy the TS SR, proper light indication is verified along with confirming proper component operation locally.

### ***NRC RAI - EEEB RAI 3***

*Confirm that there are no changes to the environmental qualification (EQ) program due to this LAR.*

### **NSPM Response – EEEB RAI 3**

As described on pages 12 and 13 of the enclosure to Reference 1 of the cover letter, there are no changes to the environmental qualification (EQ) program due to this LAR. This is based on the following.

- No components are being added to the EQ program in support of the AST analysis.
- The analyses for AST do not result in a change to the post-accident temperature and pressure profiles in Containment, in the Auxiliary Building, or in the Turbine Building. No systems or components credited for heat removal are affected by this license amendment request.
- The analyses for AST do not result in a change to the chemical environmental parameters inside of containment currently used for EQ.
- The analyses for AST do not result in a change to the core power level currently used for EQ.
- Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," Regulatory Position 6, allows the licensee to use either the AST or TID-14884 assumptions for EQ analysis. For PINGP, qualification of safety related equipment from the radiation environment resulting from a design basis LOCA will continue to be based on the original TID-14844 based accident treatment resulting from a design basis accident.
- The maximum allowable value for containment leakage is being reduced as part of this license amendment. Using the reduced maximum allowable containment leakage has no adverse impact on the EQ doses inside of containment or in the Auxiliary Building.
- Credited charcoal filtering capability for the Shield Building Ventilation System (SBVS) is being eliminated as part of this license amendment. This reduction in credit for the charcoal filter can result in an increase in the elemental and organic iodine activity levels in the Shield Building. As described on page 13 of the enclosure to Reference 1 of the cover letter, this increase in iodine activity is more than off-set by the reduction in the elemental and organic iodine source term in the AST source term compared to the current licensing basis source term.

## **NRC RAI**

### **Mechanical and Civil Engineering Branch (EMCB)**

#### **EMCB RAI 1**

*Page 9 of the enclosure in Reference 1 indicates that credit will be taken for isolation dampers, which make up a portion of the Auxiliary Building Normal Ventilation System (ABNVS), as part of the proposed alternative source term (AST) implementation. Various justifications are provided for crediting these non-safety related dampers as part of the proposed implementation. However, no justification is provided regarding the structural and seismic ruggedness of this equipment. Appendix A to 10 CFR Part 100 requires that structures, systems, and components (SSCs) necessary to assure the capability of the plant to mitigate the consequences of accidents, which could result in exposures comparable to the guideline exposures provided in 10 CFR Part 100, be designed to remain functional during and after a safe shutdown earthquake (SSE).*

*Please discuss the methodologies used to demonstrate the seismic ruggedness and/or seismic qualification of the aforementioned dampers. Additionally, please provide the references which provide the regulatory acceptance bases of these methodologies.*

#### **NSPM Response – EMCB RAI 1**

As described on pages 9 and 10 of the enclosure to Reference 1 of the cover letter, credit is taken for non-safety related HVAC dampers that are part of the ABNVS. Following a LOCA, these dampers close to help establish the ABSVZ by isolating the ABNVS air make-up and exhaust paths. The ABSVZ boundary contains those areas within the Auxiliary Building that have the potential for collecting significant leakage that could bypass the Shield Building and leakage from systems that could recirculate primary coolant during LOCA mitigation. The make-up and exhaust air dampers close when either train of the ABSVS is actuated. As described on page 9 of the enclosure to Reference 1 of the cover letter, the dampers are normally held open by air. The dampers close by spring action (motive force) when the air supply is isolated to the damper. The air supply is isolated by a solenoid valve closing. The de-energized state of the solenoid valve is closed, with vent open.

These ABNVS dampers were either:

(1) seismically qualified by analysis consistent with the licensing basis for PINGP as described in the USAR Section 12.2. The total stresses were calculated based on the sum of the safe shutdown earthquake loads, the deadweight loads, and the pressure loads. The total calculated stresses were compared to the allowable stresses to confirm acceptability.

or

(2) evaluated to provide reasonable assurance that the dampers will remain functional during and after a seismic event per the guidance of EPRI Technical Report 1014608, "Seismic Evaluation Guidelines for HVAC Duct and Damper Systems," Revision to 1007896 Final Report, December 2006.