UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 20, 2010

Mr. Mark A. Schimmel
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power – Minnesota
1717 Wakonade Drive East
Welch, MN 55089

SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 – REQUESTS FOR ADDITIONAL INFORMATION (RAI) ASSOCIATED WITH ADOPTION OF THE ALTERNATIVE SOURCE TERM (AST) METHODOLOGY (TAC NOS. ME2609 AND ME2610)

Dear Mr. Schimmel:

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated October 27, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093160583), Northern States Power Company, a Minnesota corporation (NSPM) submitted a license amendment request for the Prairie Island Nuclear Generating Plant, Units 1 and 2. The proposed amendment would adopt the AST methodology, in addition to technical specification changes supported by the AST design basis accident radiological consequences analysis. The proposed amendment would also incorporate Technical Specification Task Force (TSTF)-490, "Deletion of E-Bar Definition and Revision to RCS Specific Activity Tech Spec," Revision 0.

On May 4, 2010, the NRC staff in the Accident Dose Branch provided draft RAIs to NSPM (ADAMS Accession No. 101250462). On May 12, 2010, these draft RAIs were discussed with Amy Hazelhoff and other members of your staff to ensure that the RAIs were clear and fully understood.

The finalized RAIs are being issued as an enclosure to this letter. As agreed upon with Ms. Hazelhoff, please respond to the RAIs no later than June 25, 2010.

If you have any questions, please contact me at (301) 415-3049.

Sincerely,

For

Terry A. Beltz, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure:
As stated

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REQUESTS FOR ADDITIONAL INFORMATION

LICENSE AMENDMENT REQUEST (LAR) REGARDING

ALTERNATIVE SOURCE TERM (AST)

PRAIRIE ISLAND NUCLEAR GENERATING PLANT (PINGP), UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

ACCIDENT DOSE BRANCH (AADB)

Please provide the following information for the Nuclear Regulatory Commission (NRC) staff to continue its review:

AADB 1. As stated in Section 7.2 of Calculation No. GEN-PI-079, Rev. 0, which is Attachment 6 to the Enclosure of the letter dated October 27, 2009, if the temperature of the leaked coolant is greater than 212° F, then the Constant Enthalpy equation cited by the licensee can be used to calculate the fraction of liquid coolant that flashes to vapor, in accordance with NRC Regulatory Guide (RG) 1.183, Appendix A, Section 5.4. However, if the calculated flashing fraction is less than 10 percent, then, in accordance with RG 1.183, Appendix A, Section 5.5, the amount of iodine that becomes airborne should be assumed to be 10 percent of the total iodine activity in the leaked coolant, unless a smaller amount can be justified based on the actual sump pH history and area ventilation rates.

RG 1.183, Appendix A, Section 5.5, recognizes that coolant composition can vary due to the various impurities and contaminants with which it will mix as it makes its way out of the reactor coolant system. As a result, the chemical properties of the coolant may be uncertain and its response to changes in temperature and pressure may no longer be readily predictable by calculations based on the enthalpy of pure water. In addition, ventilation rates of the rooms into which the coolant is leaked can affect the rate at which the liquid will flash to vapor, thus adding uncertainty to any calculated flashing fraction.

Therefore, please provide the justification requested by RG 1.183 that demonstrates the applicability of the Constant Enthalpy equation to a calculated flashing fraction for this inherently unpredictable coolant composition. Also, please verify the ability of the chosen methodology to account for other factors that may change the flashing fraction of the leaked coolant.

AADB 2. Typically, when multiple activity release locations characterize activity releases associated with a given accident, each is modeled independently in order to determine the resulting onsite and offsite dose consequences. Therefore, please provide verification that the methodology used to model multiple activity release locations by determining a weighted average (e.g., as shown in Table 3.6-3) will yield

the same result as modeling each release location and its associated atmospheric dispersion factors, independently.

AADB 3. The purpose of the limiting condition for operation (LCO) for Dose Equivalent I-131 (DEI) and Dose Equivalent XE-133 (DEX) is to satisfy Title 10 of the Code of Federal Regulations (10 CFR), Section 50.36, criterion 2, which establishes an operating restriction that is an initial condition of a design-basis accident (DBA). When surveillance of the reactor coolant system (RCS) radionuclides is performed, each acceptable set of dose conversion factors (DCFs) will yield a different DEI and DEX. As approved by the NRC staff, the intent of Technical Specification Task Force Traveler (TSTF)-490, Revision 0, "Deletion of E-Bar Definition and Revision to RCS Specific Activity Technical Specification" was to allow the licensee to select, from the acceptable list, one DCF reference for the calculation of DEI and one DCF reference for the calculation of DEX. In Attachment 3 to the Enclosure of the letter dated October 27, 2009, the proposed definitions for DEI and DEX are provided. The definition for DEI indicates one DCF reference for the calculation of DEI, which is consistent with TSTF-490. However, the definition for DEX indicates that DEX may be determined using several references for DCF.

Therefore, consistent with 10 CFR 50.36 and TSTF-490, please provide additional information justifying how the use of multiple DCFs maintain consistency with the specified LCO values and DBA analysis or provide revised definitions for DEI and DEX that specify one DCF reference.

AADB 4. In the October 27, 2009, submittal, the licensee proposed TS changes to revise Limiting LCO 3.4.17, "RCS Specific Activity," APPLICABILITY requirements to specify that the LCO is applicable in MODES 1, 2, 3, and 4. In accordance with this proposal, the licensee also proposed to add the NOTE that states, "Only required to be performed in MODE 1," to the surveillance requirements of the TS, thus removing the applicability of the surveillance requirements to other MODES.

The NRC staff has a concern about the proposed addition of the aforementioned NOTE. The proposed change revises the conditions for sampling, and may exclude sampling during the plant conditions where LCO 3.4.17 may be exceeded. After transient conditions (i.e. reactor trip, plant depressurization, shutdown or startup) that end in MODES 2, 3, or 4, the surveillance requirements is not required to be performed. Isotopic spiking and fuel failures are more likely during transient conditions than during steady state plant operations.

Because the limits in LCO 3.4.17 could potentially be exceeded after a plant transient or power changes, please provide a basis for why sampling is no longer needed while operating in MODES 2, 3, or 4. Additionally, justify how the LCO 3.4.17 remains consistent with the design bases analysis from which the LCO limits are derived (i.e. main steamline break, steam generator tube rupture, etc.). Furthermore, please justify why there is an apparent disparity between the modes of applicability (MODES 1, 2, 3, and 4) and the limited mode (MODE 1) under which the surveillance is required.

AADB 5. Page 21 of the enclosure to the letter dated October 27, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093160605) states that the normal intake for the control room and makeup air intake Technical Support Center (TSC) ventilation systems are used as the assumed receptors for unfiltered inleakage due to their respective locations and the potential release locations. Is the reference to the normal intake for the control room also designated as either the 121 CR vent intake or the 122 CR vent intake in other parts of the enclosure? With respect to Figure 3.1-1, where are the TSC boundaries relative to its intake and the normal intake(s) relative to the control room envelope boundaries and possible inleakage locations?

AADB 6. Please provide a more detailed description of the common area of the auxiliary building designated as release locations "E" and "F" on Figure 3.1-1. In each case, would the assumed line of sight width of a postulated release moving directly toward each control room intake be approximately 52 and 60 meters, respectively? What ensures that there would be homogenous effluent mixing within the common area of the auxiliary building and uniform release along the assumed lines of release?

AADB 7. Page 24 of the enclosure to the October 27, 2009, alternative source term license amendment request states that postulation of a loss of offsite power does not change the location of release points or receptor locations. Please confirm that the selection of the release point and receptor location pairs is also limiting with respect to other single failures.

AADB 8. The make up (MU) air intake louvers on the sides of the auxiliary building face away from the control room and were modeled as two-dimensional vertical diffuse sources. As noted on page 26, the NRC staff determined that this was acceptable for the LAR associated with Prairie Island Units 1 & 2, Amendment Nos. 191 and 180, respectively (ADAMS Accession No. ML091490611), since the source applied only to the control room inleakage part of the dose assessment. However, the associated safety evaluation stated that if the effluent from the MU air intake louvers is modeled to other receptors, assumptions regarding the specific case should be evaluated. While typically modeled to occur at a single point, control room inleakage could be assumed to occur at multiple undefined locations.

The current LAR has modeled postulated releases from the MU air intake louvers to each control room intake which is a single point where air is being forcefully drawn in. Therefore, please justify why it is appropriate to apply the vertical initial diffusion coefficient, σ_z, for potentially forced flow coming over the roofline from the side of the auxiliary building to a single receptor point.

AADB 9. Figures 3.1-2 and 3.1-3 provide an illustration of the arrangement of two sets of vents. In each case, what is the orientation of the vents and assumed line of sight width of a postulated release moving directly toward each intake receptor? Will all of the vents in one group release at the same time, with the same level of activity? If not, what is the horizontal distance to each receptor from the nearest or limiting vent in each group? The LAR analysis assumed a diffuse release based upon either a circle or triangle surrogate estimate. Are the horizontal distances to each receptor in those cases from the assumed center or closest point of each geometric figure?

AADB 10. Page 29 of the enclosure to the Prairie Island LAR provides a reason why Refueling Water Storage Tank leakage could not migrate to the atmosphere through the auxiliary building normal ventilation duct. Is the auxiliary building normal ventilation duct a release location to the atmosphere? If so, please confirm that any releases from the auxiliary building normal ventilation duct would result in χ/Q values that are lower than releases from the common area of the auxiliary building which was modeled as a diffuse release.

AADB 11. Page 20 of Attachment 4 notes that the 95 percentile wind speed is 16.5 miles per hour (mph) at the lower level and 22.3 mph at the upper level. How were these estimates derived?

If you have any questions, please contact me at (301) 415-3049.

Sincerely,

/RA/ Justin Poole for

Terry A. Beltz, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-282 and 50-306

Enclosure:
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