



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

March 20, 2012

Mr. Mark A. Schimmel
Site Vice President
Prairie Island Nuclear Generating Plant
Northern States Power Company - Minnesota
1717 Wakonade Drive East
Welch, MN 55089-9642

**SUBJECT: PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2 -
REQUEST FOR ADDITIONAL INFORMATION RELATED TO LICENSE
AMENDMENT REQUEST FOR SPENT FUEL POOL CRITICALITY CHANGES
(TAC NOS. ME6984 AND ME6985)**

Dear Mr. Schimmel:

By letter dated August 19, 2011, (Agencywide Documents Access and Management System Accession No. ML112360231), Northern States Power Company, a Minnesota corporation (NSPM, the licensee), doing business as Xcel Energy, requested approval from the Nuclear Regulatory Commission (NRC) for amendments to Technical Specifications (TS) 3.7.17, "Spent Fuel Pool Storage" and TS 4.3.1, "Fuel Storage Criticality," for the Prairie Island Nuclear Generating Plant, Units 1 and 2.

The NRC staff is reviewing your submittal and has determined that additional information is required to complete the review. The specific information requested is addressed in the enclosure to this letter. Your staff agreed that you would provide a response to this request within 60 days of the date of this letter.

The NRC staff considers that timely responses to requests for additional information help ensure sufficient time is available for staff review and contribute toward the NRC's goal of efficient and effective use of staff resources.

M. Schimmel

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If circumstances result in the need to revise the requested response date, please contact me at (301) 415-4037.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas J. Wengert". The signature is fluid and cursive, with a prominent loop at the end of the last name.

Thomas J. Wengert, 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:
Request for Additional Information

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REQUEST FOR ADDITIONAL INFORMATION (RAI)

PRAIRIE ISLAND NUCLEAR GENERATING PLANT, UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

By letter dated August 19, 2011, (Agencywide Documents Access and Management System Accession No. ML112360231), Northern States Power Company, a Minnesota corporation (NSPM, the licensee), doing business as Xcel Energy, requested approval from the Nuclear Regulatory Commission (NRC) for amendments to Technical Specifications (TS) 3.7.17, "Spent Fuel Pool Storage" and TS 4.3.1, "Fuel Storage Criticality," for the Prairie Island Nuclear Generating Plant (PINGP), Units 1 and 2. The NRC staff has reviewed this request and has determined that the following information is required to complete its review.

Reactor Systems Branch (SRXB) RAIs

- 1) Provide an analysis to show that modeling no gadolinia is conservative. The application references an analysis contained in NUREG/CR-6760 ("Study of the Effect of Integral Burnable Absorbers for PWR Burnup Credit"), which was based on a cask analysis with poison plates. These conclusions may or may not be applicable to the PINGP spent fuel pool analysis which assumed un-poisoned racks.
- 2) Show that the 422V+ fuel assembly design is the appropriate reference fuel assembly design to use for all proposed storage configurations.
- 3) Availability of information related to criticality analysis of configurations such as the consolidated fuel rod storage canister is limited. Address the following to allow the NRC staff to evaluate these fuel storage configurations.
 - a. Provide the details of the consolidated fuel rod storage canister analysis described on page 3-21 of WCAP-17400-P.
 - b. In addition to the base case results shown on page 4-17 of WCAP-17400-P, provide a sensitivity analysis varying the enrichment to 3.0 weight percent ²³⁵U.
 - c. Provide the details of the analysis described on page 4-21 of WCAP-17400-P to show the reactivity effects of the fuel assembly structural materials allowed to be placed in cells adjacent to the consolidated fuel rod storage canisters.
 - d. Provide the details of the Array A and F interface analysis described on page 4-21 of WCAP-17400-P.
 - e. Provide the burnup ranges of the actual fuel rods stored in the consolidated fuel rod storage canisters and the failed fuel bin baskets.

Enclosure

- f. Provide legible versions of Figure 3-2, "Failed Fuel Pin Basket," Figure 3-3, "Fuel Rod Storage Canister," and Figure 3-4, "Fuel Rod Storage Canister Cross Section," from WCAP-17400-P.
- 4) The application does not appear to discuss the use of axial blankets. Address the following related to axial blankets:
 - a. If both blanketed and non-blanked fuel assemblies are present in the pool, describe how the axial burnup profiles were modeled for both blanketed and non-blanked assemblies at PINGP.
 - b. Describe how the axial enrichment variation was modeled in the analysis for both blanketed and non-blanked assemblies.
 - c. Are annular pellets used for the blanketed regions? If so, describe and justify how the void was modeled.
 - 5) Address the following related to the selection of design axial burnup profiles:
 - a. Provide the analysis that determined how limiting shape assumptions were developed.
 - b. Provide the actual PINGP limiting relative burnup values at lower axial levels.
 - 6) Address the following related to rodded operation (Section 5.2 of WCAP-17400-P):
 - a. Provide the analysis performed to determine that up to 1 gigawatt-day per metric ton uranium (GWd/MTU) of rodded operation would be "bounded by the design basis assemblies used to develop the burnup requirements."
 - b. Clarify the latter part of the following statement regarding how the evaluation will be performed:

"If an assembly experiences more than 1 GWd/MTU of core average rodded operation, the assembly shall either be treated as Fuel Category I or evaluated to determine which Fuel Category is appropriate for safe storage of the assembly."
 - 7) Regarding criticality code validation, the Interim Staff Guidance (ISG) DSS-ISG-2010-1 states:

"An acceptable means of including isotopes that are not explicitly represented in the critical experiments used in the validation would be to increase the bias and bias uncertainty by an amount proportional to the reactivity worth of the isotopes not explicitly validated."

WCAP-17400-P addresses the effect of fission products. Justify the treatment used.

- 8) Confirm that PINGP has not used any reactivity control devices other than gadolinium and burnable poison rod assembly.
- 9) Provide the analysis results for the mis-loaded configurations (i.e., Arrays B, C, and E).
- 10) Provide a comparison of assemblies that use a range of expected burnable poison loading amounts (number of rods and weight percents) similar to Tables 3-3 and 3-5 of WCAP-17400-P.
- 11) Describe the surveillance program on the rod cluster control assemblies credited to ensure the required subcritical margin.
- 12) For several fuel categories (i.e., 3, 5, and 6), the same fuel category number is proposed for storing both "Cycles 1-4" and "> Cycle 4" fuel assemblies. What specific controls will be in place to prevent using the wrong loading curve?
- 13) Propose the TS language for the interface requirements, or provide justification/explanation for the removal of the interface requirements from the PINGP TSs.

Health Physics and Human Performance Branch (AHPB) RAIs

- 1) Describe the proposed procedure changes, additions, and deletions, including Procedure Title and Number.
- 2) Do any of the proposed procedure changes require changes, additions, or deletions to personnel actions, including cognitive "actions" such as monitoring, calculating, or interpreting?
- 3) Will changes, additions, or deletions to training be required?
- 4) What are the criteria/requirements for qualifying a Nuclear Engineer to be able to do the tasks involved in fuel movement?
- 5) Will the proposed LAR require changes to any personnel qualifications in support of this LAR?
- 6) Will any changes to human/system interfaces be required to support the proposed LAR, such as changes to boron concentration alarm setpoints?
- 7) Are there any surveillance requirements to visually verify on a periodic basis that a sample of ID Numbers/Contents and Locations are consistent with the ID Numbers/Contents and Locations in Shuffleworks?
- 8) Provide a detailed description of how the non-conservatisms in the current analysis were identified and describe the corrective and preventive actions being taken to correct and prevent non-conservatisms in the proposed and future analyses.

Identify completion dates in the response.

- 9) Provide detailed descriptions of any other corrective action items over the past five years that involve mis-positioning of items in the reactor core of the spent fuel pool. Include status and preventive actions taken, and proposed completion dates.

M. Schimmel

- 2 -

If circumstances result in the need to revise the requested response date, please contact me at (301) 415-4037.

Sincerely,

/RA/

Thomas J. Wengert, 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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