



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

May 4, 2011

Mr. Timothy J. O'Connor
Site Vice President
Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota (NSPM)
2807 West County Road 75
Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT - ISSUANCE OF AMENDMENT
RE: MINIMUM CRITICAL POWER RATIO SAFETY LIMIT (TAC NO. ME4790)

Dear Mr. O'Connor:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 165 to Renewed Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The amendment consists of changes to the Technical Specifications in response to your application dated September 17, 2010, as supplemented by letters dated February 8 and April 27, 2011.

The amendment revises the minimum critical power ratio safety limit in Technical Specification 2.1.1.2 from ≥ 1.10 to ≥ 1.15 for two recirculation loop operation, and from ≥ 1.12 to ≥ 1.15 for single recirculation loop operation.

A copy of our related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

A handwritten signature in black ink that reads "Peter S. Tam".

Peter S. Tam, Senior Project Manager
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-263

Enclosures:

1. Amendment No. 165 to DPR-22
2. Safety Evaluation

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

NORTHERN STATES POWER COMPANY

DOCKET NO. 50-263

MONTICELLO NUCLEAR GENERATING PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 165
License No. DPR-22

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Northern States Power Company (NSPM, the licensee), dated September 17, 2010, as supplemented by letters dated February 8 and April 27, 2011, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.2 of Renewed Facility Operating License No. DPR-22 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 165, are hereby incorporated in the license. NSPM shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented before startup from the Spring 2011 refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert J. Pascarelli, Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: May 4, 2011

ATTACHMENT TO LICENSE AMENDMENT NO. 165

RENEWED FACILITY OPERATING LICENSE NO. DPR-22

DOCKET NO. 50-263

Replace the following page of Renewed Facility Operating License DPR-22 with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

REMOVE

3

INSERT

3

Replace the following page of Appendix A, Technical Specifications, with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

REMOVE

2.0-1

INSERT

2.0-1

2. Pursuant to the Act and 10 CFR Part 70, NSPM to receive, possess, and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operations, as described in the Final Safety Analysis Report, as supplemented and amended, and the licensee's filings dated August 16, 1974 (those portions dealing with handling of reactor fuel) and August 17, 1977 (those portions dealing with fuel assembly storage capacity);
 3. Pursuant to the Act and 10 CFR Parts 30, 40 and 70, NSPM to receive, possess, and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
 4. Pursuant to the Act and 10 CFR Parts 30, 40 and 70, NSPM to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
 5. Pursuant to the Act and 10 CFR Parts 30 and 70, NSPM to possess, but not separate, such byproduct and special nuclear material as may be produced by operation of the facility.
- C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission, now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
1. Maximum Power Level
NSPM is authorized to operate the facility at steady state reactor core power levels not in excess of 1775 megawatts (thermal).
 2. Technical Specifications
The Technical Specifications contained in Appendix A, as revised through Amendment No. 165, are hereby incorporated in the license. NSPM shall operate the facility in accordance with the Technical Specifications.
 3. Physical Protection
NSPM shall implement and maintain in effect all provisions of the Commission-approved physical security, guard training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be \leq 25% RTP.

2.1.1.2 With the reactor steam dome pressure \geq 785 psig and core flow \geq 10% rated core flow:

MCPR shall be \geq 1.15 for two recirculation loop operation or \geq 1.15 for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be \leq 1332 psig.

2.2 SL VIOLATIONS

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.



UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 165 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

By application dated September 17, 2010 (Accession No. ML102650397), as supplemented by letters dated February 8 and April 27, 2011 (Accession Nos. ML110450242 and ML11123A019), Northern States Power Company (NSPM, the licensee), requested changes to the Technical Specifications (TSs) for the Monticello Nuclear Generating Plant, for Fuel Cycle 26 operation. The proposed amendment would revise the safety limit minimum critical power ratio (SLMCPR) in Technical Specifications 2.1.1.2 from ≥ 1.10 to ≥ 1.15 for two recirculation loop operation, and from ≥ 1.12 to ≥ 1.15 for single recirculation loop operation. The Fuel Cycle 26 core has 484 GE fuel assemblies, of which there are 148 fresh GE14 bundles, 164 once-burned GE14 bundles, 147 twice-burned GE14 bundles and 25 thrice-burned GE14 bundles.

The supplemental letters cited in the above paragraph contain clarifying information, do not change the scope of the application, and do not change the Nuclear Regulatory Commission (NRC) staff's initial proposed finding of no significant hazards consideration published in the *Federal Register* on November 2, 2010 (75 FR 67403).

2.0 REGULATORY EVALUATION

The purpose of the SLMCPR is to ensure that specified acceptable fuel design limits (SAFDLs) are not exceeded during steady-state operation and analyzed transients. The fuel cladding is one of the physical barriers that separate the radioactive materials from the environment. The integrity of this cladding barrier is related to its relative freedom from perforations or cracking. Fuel cladding perforations can result from thermal stresses, which can occur when reactor operation is significantly above design conditions. Since the parameters that result in fuel damage are not directly observable during reactor operation, the thermal and hydraulic conditions that result in the onset of transition boiling have been used to mark the beginning of the region in which fuel cladding damage could occur.

Criterion 10, "Reactor Design," of Appendix A, General Design Criteria [GDC] for Nuclear Power Plants, to Title 10 of the *Code of Federal Regulations* (10 CFR Part 50) states, in part, that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that SAFDLs are not exceeded.

NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," provides guidance on the acceptability of the reactivity control systems, and the reactor core and fuel system design. Specifically, Section 4.2, "Fuel System Design," specifies all fuel damage criteria for evaluation of whether fuel designs meet the SAFDLs. Section 4.4, "Thermal and Hydraulic Design," provides guidance on the review of thermal-hydraulic design in meeting the requirement of GDC-10 and the fuel design criteria established in Section 4.2.

3.0 TECHNICAL EVALUATION

The licensee requested to revise the Technical Specifications as follows:

3.1 Specification 2.1.1.2

The licensee proposed to revise the SLMCPR, changing the safety limits specified by TS Section 2.1.1.2 from ≥ 1.10 to ≥ 1.15 for two recirculation loop operation, and from ≥ 1.12 to ≥ 1.15 for single recirculation loop operation. These SLMCPR values apply when the reactor steam dome pressure is greater than or equal to 785 psig and core flow greater than or equal to 10 percent of rated core flow.

The licensee described the methodology used to calculate the new SLMCPR values. The Cycle 12 SLMCPR analysis was performed by Global Nuclear Fuel using the plant- and cycle-specific fuel and core parameters, NRC-approved methodologies including NEDE-24011-P-A-16 (GESTAR-II), NEDE-32505P-A, Revision 1 (R-Factor Calculation Method for GE11, GE12, and GE13 Fuel), NEDC-32601P-A (Methodology and Uncertainties for SLMCPR Evaluations), NEDC-32694P-A (Power Distribution Uncertainties for SLMCPR Evaluation), and NEDO-10958-A (General Electric BWR Thermal Analysis Basis: Data, Correlation, and Design Application). The licensee addressed the applicability of the above approved methodologies to the MNGP Cycle 26 SLMCPR calculation. The NRC staff reviewed the licensee's justification for the applicability of the above approved methodologies to Cycle 26 and concluded that the justification is acceptable because GE14 fuel meets the requirements as specified in limitations and conditions of the approved methodologies, including NEDC-33006P-A, "General Electric Boiling Water Reactor Maximum Extended Load Line Limit Analysis Plus [MELLLA+], Revision 3, June 2009".

The licensee also addressed: (1) the final core loading pattern selection for the Cycle 26 operation with respect to the combination of the input parameters such as cycle energy requirements, thermal limit margins, reactivity margins, discharge exposure limitations and other limits, desired control rod patterns, and channel distortion minimization; (2) the licensee's SLMCPR calculation process with respect to the increase of uncertainties associated with the R-Factor, the core flow rate and the local power range monitor update/calibration interval; (3) the bundle groupings for both the two-loop operation (TLO) and the single-loop operation (SLO) SLMCPR calculations, which applied adders to both TLO and SLO under MELLLA+ operation (only applicable to TLO); and (4) power/flow map for Cycle 26 operation (see the licensee's April 27, 2011, letter).

The NRC staff reviewed the information presented in the licensee's response (letters dated February 8 and April 27, 2011) to the NRC staff's request for additional information (RAI, located at ADAMS Accession No. ML103470004) and concluded that the licensee has provided sufficient data and description to address the concerns expressed in the RAI. Therefore, the NRC staff determines that the proposed TS changes to the SLMCPR values for Fuel Cycle 26 operation are acceptable because:

- (1) The licensee used approved methodologies, with acceptable justification for deviations and adjusted uncertainties relating to the R-Factor and traverse incore probe reading;
- (2) The licensee showed GE14 data points in the acceptable bound in the figure of relationship between the minimum critical power ratio importance parameter and the critical power ratio margin (see the April 27, 2011, letter);
- (3) The licensee provided qualitative descriptions of the final core loading pattern and critical power analysis;
- (4) The licensee identified mechanisms to push the SLMCPR increase into the higher range of expectations along with results of the imposed adders to the SLMCPR calculation under the MELLLA+ operating conditions; and
- (5) The licensee provided a core map and identified dominant fuel bundle locations based on the Cycle 26 SLMCPR calculation in terms of percent contribution to the number of rods subject to boiling transition.

The NRC staff has also reviewed the justification for the SLMCPR value of 1.15 for two recirculation loop operation and 1.15 for single loop operation (not in the MELLLA+ operating domain) using the approach stated in GESTAR-II, Revision 16. Based on its review of the application, as supplemented, the NRC staff has concluded that the SLMCPR analysis for Cycle 26 operation using the plant- and cycle-specific calculation in conjunction with approved methodologies is acceptable. The Cycle 26 SLMCPR will ensure that 99.9 percent of the fuel rods in the core will not experience boiling transition, thus satisfying the requirements of GDC 10 of Appendix A to 10 CFR Part 50. Therefore, the NRC staff has concluded that the licensee's analysis that led to the determination and justification for the SLMCPR value of 1.15 for two recirculation loop operation and 1.15 for single recirculation loop operation for Cycle 26 is acceptable for up to the MELLLA+ operating domain. The licensee has used approved methodologies in conjunction with assumption of a higher R-Factor uncertainty, has performed a bounding calculation at rated core power and minimum core flow, and has performed an analysis on power shape for Cycle 26 operation resulting in no fuel axial power shape penalty.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Minnesota State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to the use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the

amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding (75 FR 67403). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Tai Huang, NRR

Date: May 4, 2011

Mr. Timothy J. O'Connor
Site Vice President
Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota (NSPM)
2807 West County Road 75
Monticello, MN 55362-9637

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Sincerely,
/RA/

Peter S. Tam, Senior Project Manager
Plant Licensing Branch III-1
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Docket No. 50-263

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