

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

November 25, 2014

Karen D. Fili Site Vice President Monticello Nuclear Generating Plant Northern States Power Company - Minnesota 2807 West County Road 75 Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT - ISSUANCE OF AMENDMENT TO REDUCE THE REACTOR STEAM DOME PRESSURE SPECIFIED IN THE REACTOR CORE SAFETY LIMITS (TAC NO. MF1054)

Dear Mrs. Fili:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 185 to Renewed Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The amendment consists of a reduction in the reactor steam dome pressure value specified in technical specification (TS) 2.1.1, "Reactor Core SLs [Safety Limits]," in response to your application dated March 11, 2013, as supplemented on July 3, 2014. The change resolves a Title 10 *Code of Federal Regulations* Part 21 condition concerning a potential to momentarily violate the safety limit specified in TS 2.1.1.1 during a pressure regulator failure maximum demand (open) transient.

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,

Scatt? Wall (FOR)

Terry A. Beltz, 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. 185 to DPR-22
- 2. Safety Evaluation

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

NORTHERN STATES POWER COMPANY - MINNESOTA

DOCKET NO. 50-263

MONTICELLO NUCLEAR GENERATING PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 185 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 Minnesota (NSPM, the licensee), dated March 11, 2013, as supplemented on July 3, 2014, 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. 185, are hereby incorporated in the license. NSPM shall operate the facility in accordance with the Technical Specifications.

Enclosure 1

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David L. Pelton, Chief Plant Licensing Branch III-1 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Attachment: Changes to Renewed Facility Operating License No. DPR-22 and Technical Specifications

Date of Issuance: November 25, 2014

ATTACHMENT TO LICENSE AMENDMENT NO. 185

RENEWED FACILITY OPERATING LICENSE NO. DPR-22

DOCKET NO. 50-263

Replace the following page of Renewed Facility Operating License No. 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.

REMOVEINSERT33

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

<u>REMOVE</u>	INSERT
2.0-1	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);
- 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. <u>Maximum Power Level</u>

NSPM is authorized to operate the facility at steady state reactor core power levels not in excess of 2004 megawatts (thermal).

2. <u>Technical Specifications</u>

The Technical Specifications contained in Appendix A, as revised through Amendment No. 185, are hereby incorporated in the license. NSPM shall operate the facility in accordance with the Technical Specifications.

3. <u>Physical Protection</u>

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

> Renewed License No. DPR-22 Amendment No. 1 thru 185

2.0 SAFETY LIMITS (SLs)

2.1 SLs

- 2.1.1 <u>Reactor Core SLs</u>
 - 2.1.1.1 With the reactor steam dome pressure < 686 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 686 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:

2.0-1

- 2.2.1 Restore compliance with all SLs; and
- 2.2.2 Insert all insertable control rods.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 185 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY - MINNESOTA

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

By application dated March 11, 2013 (Reference 1), as supplemented by letter dated July 3, 2014 (Reference 2), Northern States Power Company – Minnesota (NSPM, the licensee), doing business as Xcel Energy, Inc., requested a change to reduce the reactor steam dome pressure value specified in technical specification (TS) 2.1.1, "Reactor Core SLs [Safety Limits]," for the Monticello Nuclear Generating Plant (MNGP). The change was submitted to resolve a Title 10 of the *Code of Federal Regulations* (10 CFR), Part 21, "Reporting of Defects and Noncompliance," condition concerning a potential to momentarily violate the safety limit specified in TS 2.1.1.1 during a pressure regulator failure maximum demand (open) (PRFO) transient.

In 2005, General Electric (GE) submitted a 10 CFR Part 21 notification, SC05-03, "Potential to Exceed Low Pressure Technical Specification Safety Limit," to the U.S. Nuclear Regulatory Commission (NRC) (Reference 3). The Part 21 notification identified that in applying newer computer analysis codes that, a PRFO transient could potentially result in a condition in which the reactor steam dome pressure could momentarily decrease below 785 pounds per square inch gauge (psig), while rated thermal power (RTP) was above the plant-specific thermal power limit specified in the TS 2.1.1.1 (25 percent (%) RTP). As such, this could result in a violation of the reactor core SL as specified in TS 2.1.1.1.

The Boiling Water Reactor Owners' Group (BWROG) initially attempted to resolve the Part 21 issue. On July 18, 2006, the Technical Specifications Task Force (TSTF) and BWROG submitted TSTF-495, Revision 0, "Bases Change to Address GE Part 21 SC05-03" (Reference 4), proposing a modification to the "Applicable Safety Analysis" portion of the Reactor Core Safety Limit TS Bases. The change would provide clarification that the SL was considered not to apply during momentary depressurization transients.

Enclosure 2

The NRC staff subsequently issued a denial letter and safety evaluation (SE) for TSTF-495 (Reference 5). The staff stated that although the technical arguments presented in TSTF-495 had merit, the proposed change was not acceptable because the TS Bases change would set a precedent which could lead to erosion of safety margins protected by the SLs. The staff indicated that the proposed change to the TS Bases was an attempt to relax, without changing, the TS SL. An exception to a stated TS SL must be made in the TSs and not the TS Bases. Consequently, in April 2012, the BWROG discontinued the effort to resolve the issue generically and recommended that plants lower their low pressure SL to meet the lower range of the critical power correlation on a plant-specific basis. As such, NSPM submitted a license amendment request for MNGP to address reducing the lower-bounding pressure.

Some advanced fuel designs have an NRC-approved critical power correlation with a lowerbound pressure significantly below the 785 psig reactor steam dome pressure specified in MNGP TSs 2.1.1.1 and 2.1.1.2. The licensee proposed to utilize this fact and reduce its reactor steam dome pressure consistent with the approved lower-bound pressure for the critical power correlation for the GE14 fuel currently comprising the MNGP reactor core. The GE14 fuel utilizes a GEXL14 critical power correlation with an approved pressure range of 700 pounds per square inch absolute (psia) to 1400 psia. NSPM stated that revising the reactor steam dome pressure value specified in MNGP TSs 2.1.1.1 and 2.1.1.2 from 785 psig to 686 psig would address this 10 CFR Part 21 condition concerning the potential SL violation during a PRFO transient.

The licensee proposes to reduce the reactor steam dome pressure specified in TS 2.1.1, "Reactor Core SLs," from 785 psig to 686 psig. The corresponding change would result in TSs 2.1.1.1 and 2.1.1.2 reading as follows:

2.1.1.1 With the reactor steam dome pressure < 686 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 686 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.

Finally, the licensee's supplemental letter dated July 3, 2014, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on June 11, 2013 (78 FR 35064).

2.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.36, "Technical specifications," provides regulatory requirements for the content of the TSs. Safety limits are defined in 10 CFR 50.36(c)(1)(i)(A), as follows:

Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity. If any safety limit is exceeded, the reactor must be shut down. The licensee shall notify the Commission, review the matter, and record the results of the review, including the cause of the condition and the basis for corrective action taken to preclude recurrence. Operation must not be resumed until authorized by the Commission.

Compliance with the fuel licensing criteria of Appendix A to 10 CFR Part 50, "General Design Criteria [GDC] for Nuclear Power Plants," GDC-10, "Reactor design," is achieved by preventing the violation of fuel design limits. As stated in GDC-10 that:

The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences.

Guidance is provided in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," for the acceptability of the reactivity control systems, the reactor core, and fuel system design. Specifically, Section 4.2, "Fuel System Design," specifies the fuel damage criteria to be used in evaluating whether a fuel design meets the specified acceptable fuel design limits. Section 4.4, "Thermal and Hydraulic Design," provides guidance for reviewing thermal-hydraulic design in meeting the requirement of GDC-10 and the fuel design criteria established in Section 4.2. Section 4.4 also states that the critical power ratio (CPR) is to be established such that at least 99.9 percent of fuel rods in the core would not be expected to experience departure from nucleate boiling or onset of transition boiling (OTB) during normal operation or any anticipated operational occurrence (AOO).

3.0 TECHNICAL EVALUATION

In Reference 1, the licensee states that GE14 fuel type is currently used in the MNGP reactor core. As discussed in Section 1.0 of this safety evaluation, GE14 fuel type has an approved pressure range from 700 psia to 1400 psia for its CPR correlations.

Each fuel vendor has developed correlations valid over specified pressure and flow ranges (mass flow rates) that are approved by the NRC. As advanced fuel designs continue to evolve, these critical power correlations have become increasingly fuel design dependent. This has resulted in an extension of the NRC-approved pressure range to lower pressures as additional test data became available to demonstrate the validity of revised or new correlation(s) for performance of critical power calculations. The critical power correlations for some advanced fuel designs have received NRC approval to a pressure lower than those previously approved. The lower bound of the extended pressure ranges for these advanced fuel designs can be used to establish a reduction in reactor steam dome pressure to less than the 785 psig value currently specified in MNGP TSs 2.1.1.1 and 2.1.1.2. NSPM relies on the approved pressure range of 700 psia to 1400 psia for critical power correlations used to analyze the GE14 fuel currently comprising the MNGP core. Therefore, a wider pressure range is available for transients to demonstrate compliance with minimum critical power ratio (MCPR) limits. Thus,

the proposed change offers a greater pressure margin for a PRFO transient than what is currently available.

In Reference 3, GE concluded that during the PRFO transient, the CPR increases during depressurization such that the initial CPR is the limiting CPR condition during the entire transient and that the conditions that exceed the low pressure TS SL exist for only a few seconds. As such, fuel cladding integrity is not threatened. Nevertheless, GE considered the PRFO to be a known AOO that could contribute to the exceeding of a SL. While this condition had been determined to not involve an actual safety hazard, the potential for violation of a reactor core SL had been identified and restoration to comply with the SL was required for the PRFO event. As a result, NSPM proposes to revise the reactor steam dome pressure TS SL consistent with the NRC-approved pressure range of critical power correlations for the current MNGP fuel design. The licensee states that lowering the reactor steam dome pressure value in this fashion provides sufficient margin to ensure the safety limit specified in TS 2.1.1.1 is not violated, and additionally addresses the 10 CFR Part 21 condition involving a potential to violate the low pressure TS SL during a PRFO transient.

The NRC staff reviewed the licensee's March 21, 2013, submittal (Reference 1), the supplemental information provided in response to the staff's requests for additional information (Reference 2), and related documentation (e.g., MNGP TSs; MNGP Updated Safety Analysis Report (USAR); TSTF-495; and SC05-03). The staff concludes that reactor depressurization transients, such as PRFO, are non-limiting for fuel cladding integrity. Although this condition does not involve an actual safety hazard, there is a potential to violate a TS SL as identified by the Part 21. To ensure continued compliance with the SL, the licensee submitted the proposed license amendment in order to address the 10 CFR Part 21 condition.

The NRC staff concludes that lowering the reactor steam dome pressure specified in MNGP TSs 2.1.1.1 and 2.1.1.2 from 785 psig to 686 psig resolves the reported 10 CFR Part 21 condition concerning the potential to violate the MNGP TS 2.1.1.1 reactor core SL during a PRFO transient. The TS SLs are specified to ensure that acceptable fuel design limits are not exceeded during steady-state operation, normal operational transients, and AOOs. The reactor core SLs are set such that, if the SL is not exceeded, fuel cladding integrity is maintained and no significant fuel damage is calculated to occur due to OTB.

The NRC staff confirmed that the GEXL14 critical power correlation which applies to GE14 fuel was approved (Reference 6). The pressure range over which the GEXL14 correlation is approved for performance of critical power calculations is from 700 psia to 1400 psia. The reactor steam dome pressure of 686 psig is established from the lower bound pressure (700.0 psia - 14.7 psia = 685.3 psig, which is approximately 686 psig). As a result, the staff concluded that the proposed change to the reactor core SL continues to ensure a valid CPR calculation is performed for the AOOs described in the USAR, including the PRFO transient, and that the proposed value for reactor steam dome pressure of 686 psig would not result in a violation of the MNGP TS 2.1.1.1 safety limit during a PRFO transient. Furthermore, the proposed change will continue to provide protection during startup conditions to ensure that operation at less than 686 psig, or less than 10% core flow while greater than 25% RTP, would not occur.

The licensee's approach is consistent with the methodology for establishing the reactor steam dome pressure, and valid CPR calculations will continue to be performed in accordance with approved methodologies described in TS 5.6.3, "Core Operating Limits Report (COLR)," to assure the underlying criteria of the SL is met consistent with GDC-10 and 10 CFR 50.36(c)(1)(i)(A). Therefore, the NRC staff considers the licensee's request to be a safe and appropriate method for addressing the 10 CFR Part 21, condition and, therefore, finds it acceptable.

If MNGP transitions to a different fuel design, NSPM should re-evaluate this Part 21 issue to determine any further change to the SL and whether NRC approval is required. As long as the lower bound of the reactor fuel CPR correlation is less than the reactor steam dome pressure specified in the TS 2.1.1, then no TS change is required. However, if the lower bound of the fuel design CPR correlation is not less than the TS specified value, a license amendment would be required.

Conclusion

The NRC staff evaluated the proposed change against the applicable regulatory requirements and acceptance criteria. The staff concludes that provided core pressure and flow values remain within the range of validity of the specified CPR correlation for MNGP, then the proposed reactor steam dome pressure change will continue to ensure that 99.9 percent of the fuel rods in the core are not expected to experience OTB. This TS change continues to satisfy the regulatory requirements regarding acceptable fuel design limits and continues to assure that the underlying criteria of the safety limit is met, consistent with GDC-10 and 10 CFR 50.36(c)(1)(i)(A). Therefore, the NRC staff finds considers the proposed amendment acceptable.

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 or changes surveillance requirements. 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 as published in the *Federal Register* on June 11, 2013 (78 FR 35064). 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 <u>CONCLUSION</u>

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.

7.0 <u>REFERENCES</u>

- 1. Letter from J. Grubb, NSPM, to the U.S. NRC Document Control Desk (DCD), "License Amendment Request: Reduce the Reactor Steam Dome Pressure Specified in the Reactor Core Safety Limits," dated March 11, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13074A811).
- Letter from K. Fili, NSPM, to the U.S. NRC DCD, "Response to Requests for Additional Information for the License Amendment Request to Reduce the Reactor Steam Dome Pressure Specified in the Reactor Core Safety Limits (TAC MF1054)," dated July 3, 2014 (ADAMS Accession No. ML14188A249).
- 3. Letter from J. Post, GE Energy-Nuclear, to the U.S. NRC DCD, "10CFR21 Reportable Condition Notification: Potential to Exceed Low Pressure Technical Specification Safety Limit," dated March 29, 2005 (ADAMS Accession No. ML050950428).
- 4. Letter from Technical Specifications Task Force (TSTF-06-20) to the U.S. NRC DCD, transmitting "TSTF-495, Revision 0, "Bases Change to Address GE Part 21 SC05-03," dated July 18, 2006 (ADAMS Accession No. ML061990227).
- Letter from T. Kobetz, U.S. NRC, to the Technical Specifications Task Force (TSTF), transmitting "Denial of TSTF-495, Revision 0, "Bases Change to Address GE Part 21 SC05-03." Docket No: PROJ0753 (TAC No. MD2672)," dated August 27, 2007 (ADAMS Accession No. ML072340113).
- Letter from H. Nieh, U.S. NRC, to A. Lingenfelter, Global Nuclear Fuel Americas, LLC, "Final Safety Evaluation for Global Nuclear Fuel (GNF) Topical Report (TR) NEDC-32851P, Revision 2, "GEXL14 Correlation for GE14 Fuel" (TAC No. MD5486)," dated August 3, 2007 (ADAMS Accession No. ML072080365) (Non-Proprietary).

Principal Contributor: M. Razzaque, NRR

Date of issuance:November 25, 2014

November 25, 2014

Karen D. Fili Site Vice President Monticello Nuclear Generating Plant Northern States Power Company - Minnesota 2807 West County Road 75 Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT - ISSUANCE OF AMENDMENT TO REDUCE THE REACTOR STEAM DOME PRESSURE SPECIFIED IN THE REACTOR CORE SAFETY LIMITS (TAC NO. MF1054)

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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,

/**RA**/

Terry A. Beltz, 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. 185 to DPR-22

2. Safety Evaluation

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ADAMS Accession No.: ML14281A318

* SE transmitted by memo dated September 25, 2014

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DATE	10/15/2014	10/23/2014	09/25/2014	10/28/2014	10/31/2014	11/21/2014	11/24/2014	11/25/2014