

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

January 11, 2012

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 CORE SPRAY PUMP FLOW RATE (TAC NO. ME5441)

Dear Mr. O'Connor:

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 167 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 February 7, 2011, as supplemented on December 22, 2011.

The amendment revises the Technical Specifications, Section 3.5.1, "ECCS [Emergency Core Cooling System] - Operating," to increase the minimum flow rate of the core spray pumps from \geq 2,800 gallons per minute (gpm) to \geq 2,835 gpm.

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,

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. 167 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. 167 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 February 7, 2011, as supplemented on December 22, 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. 167, 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 within 120 days of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

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Shawn Williams, Acting 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: January 11, 2012

ATTACHMENT TO LICENSE AMENDMENT NO. 167

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	INSERT
3	3

Replace the following pages of Appendix A, Technical Specifications, with the attached revised pages. The revised pages are identified by amendment number and contains a marginal line indicating the area of change.

REMOVE	INSERT
3.5.1-6	3.5.1-6
3.5.2-3	3.5.2-3

- 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. 167, 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 167

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SURVEILLANCE					FREQUENCY
SR 3.5.1.7	specified correspo	Verify the following ECCS pumps develop the specified flow rate against a system head corresponding to the specified reactor to containment pressure.			
	<u>System</u>	Flow Rate	No. of <u>Pumps</u>	System Head Corresponding to a Reactor to Containment <u>Pressure of</u>	
	Core Spray	≥ 2835 gpm	1	≥ 130 psi	
	LPCI	≥ 3870 gpm	1	≥ 20 psi	
SR 3.5.1.8	3.5.1.8NOTENOTENOTE				
Verify, with reactor steam dome pressure \leq 1025.3 psig and \geq 950 psig, the HPC1 pump can develop a flow rate \geq 2700 gpm against a system head corresponding to reactor pressure.					In accordance with the Inservice Testing Program
SR 3.5.1.9	NOTENOTE Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test.				
Verify, with reactor pressure \leq 165 psig, the HPCI pump can develop a flow rate \geq 2700 gpm against a system head corresponding to reactor pressure.				700 gpm against a	24 months

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SURVEILLANCE REQUIREMENTS (continued)

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SURVEILLANCE	REQUIREM	IENTS (contin	nued)		
SURVEILLANCE					FREQUENCY
SR 3.5.2.2	Verify, for each required ECCS injection/spray subsystem, the piping is filled with water from the pump discharge valve to the injection valve.				31 days
SR 3.5.2.3	Verify ea subsyste valve in t otherwise position.	31 days			
SR 3.5.2.4	Verify each required ECCS pump develops the specified flow rate against a system head corresponding to the specified reactor to containment pressure.				In accordance with the Inservice Testing Program
	<u>System</u>	<u>Flow Rate</u>	No. of <u>Pumps</u>	System Head Corresponding to a Reactor to Containment <u>Pressure of</u>	
	Core Spray	≥ 2835 gpm	1	≥ 130 psi	
	LPCI	≥ 3870 gpm	1	≥ 20 psi	
SR 3.5.2.5	SR 3.5.2.5NOTENOTENOTENOTE				
Verify each required ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.					24 months



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

* SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 167 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

In a letter dated February 7, 2011 (Accession No. ML110450258), as supplemented on December 22, 2011 (Accession No. ML113570176), Northern States Power Company – Minnesota, the licensee, requested an amendment to the operating license for Monticello Nuclear Generating Plant (MNGP). The proposed amendment would revise Technical Specifications Section 3.5.1, "ECCS [Emergency Core Cooling System] - Operating," Surveillance Requirement (SR) 3.5.1.7 and 3.5.2.4 to increase the flow rate for the core spray pumps from ≥2800 gallons per minute (gpm) to ≥2835 gpm (i.e., an increase of 35 gpm). SR 3.5.1.7 states "Verify the following ECCS pumps develop the specified flow rate against a system head corresponding to the specified reactor to containment pressure," and SR 3.5.2.4 states "Verify each required ECCS pump develops the specified flow rate against a system head corresponding to the specified reactor to containment pressure," and SR 3.5.2.4 states "Verify each required ECCS pump develops the specified flow rate against a system head corresponding to the specified reactor to containment pressure," and SR 3.5.2.4 states "Verify each required ECCS pump develops the specified flow rate against a system head corresponding to the specified reactor to containment pressure," and SR 3.5.2.4 states "Verify each required ECCS pump develops the specified flow rate against a system head corresponding to the specified reactor to containment pressure." The Nuclear Regulatory Commission (NRC) staff's review of the application follows.

The supplemental letter of December 22, 2011, cited in the above paragraph contains clarifying information, does not change the scope of the application, and does not change the NRC staff's initial proposed finding of no significant hazards consideration published in the *Federal Register* on April 19, 2011 (76 FR 21923).

2.0 REGULATORY EVALUATION

The Commission's regulatory requirements related to the contents of technical specifications, set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.36, require that the limiting conditions for operations are consistent with assumed values of the initial conditions in the licensee's safety analyses. Paragraph 10 CFR 50.36(c)(2)(i) states: "Limiting conditions for operation [LCOs] are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met." Provisions of 10 CFR 50.36 specify the regulatory requirements for the content required of the technical specifications, including SRs to assure that the LCOs are met.

MNGP was designed largely before the 10 CFR Appendix A General Design Criteria (GDC) were published by the Atomic Energy Commission; thus, MNGP was not licensed to

10 CFR Appendix A. Instead, MNGP was designed and constructed, and is operated, in accordance with the principal design criteria (PDC) set forth in Section 1.2 of the MNGP Updated Safety Analysis Report (USAR). Appendix E of the MNGP USAR compares the MNGP PDC to the GDC then under development by the Atomic Energy Commission; Appendix E concludes that MNGP was designed and constructed according to the intent of the GDC.

The licensee determined that the following PDCs apply to this amendment request:

• PDC 1.2.3 -- Reactor Core Cooling

Redundant heat removal systems are provided to preserve reactor core heat transfer geometry following various postulated design-basis loss-of-coolant accidents.

• PDC 1.2.11 -- Class I Equipment and Structures

Class I structures, systems, and components are those whose failure could cause significant release of radioactivity or which are vital to a safe shutdown of the plant under normal or accident conditions and to the removal of decay and sensible heat from the reactor.

The licensee stated that the MNGP ECCS analyses were performed by General Electric in accordance with the codes and methods discussed in the GESTAR licensing topical report and the following GDCs are applicable under that basis.

• GDC 35, Emergency Core Cooling.

A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented, and (2) clad metal-water reaction is limited to negligible amounts.

Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

• GDC 36, Inspection of Emergency Core Cooling System.

The emergency core cooling system shall be designed to permit appropriate periodic inspection of important components, such as spray rings in the reactor pressure vessel, water injection nozzles, and piping, to assure the integrity and capability of the system.

• GDC 37, Testing of Emergency Core Cooling System.

The emergency core cooling system shall be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leaktight integrity of its components, (2) the operability and performance of the active components of the system,

and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system.

NRC Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," dated December 29, 1998, covers the discovery of technical specifications that are insufficient to assure plant safety. The discovery of an improper or inadequate technical specification value or required action is considered a degraded or nonconforming condition as defined in Generic Letter 91-18. Imposing administrative controls in response to improper or inadequate technical specifications is considered an acceptable short-term corrective action. The NRC staff expects that, following the imposition of administrative controls, the licensee submits an application for amendment in a timely fashion. Once any amendment correcting the technical specification is approved, the licensee must update the USAR, as necessary, in accordance with 10 CFR 50.71(e).

3.0 TECHNICAL EVALUATION

3.1 Core Spray System Design

The MNGP ECCS uses two independent methods (flooding and spraying) to cool the core during a loss-of-coolant accident (LOCA). As such, the ECCS network consists of the High Pressure Coolant Injection System, the Core Spray System, the low pressure coolant injection (LPCI) mode of the Residual Heat Removal System, and the Automatic Depressurization System. The suppression pool provides the required source of water for the ECCS and, although not credited, the condensate storage tanks provide an additional source of water.

The Core Spray System is composed of two independent subsystems, with each subsystem consisting of a 100-percent-capacity centrifugal pump driven by an electric motor, a spray sparger in the core shroud above the core, piping within the reactor vessel annulus region between the core spray reactor vessels nozzles and the core shroud, and the piping and valves to convey water from the suppression pool to the vessel, and associated controls and instrumentation. The two 100-percent-capacity core spray lines separately enter the reactor vessel through two core spray nozzles 180 degrees apart. Each internal line (pipe) then divides into a semicircular header with a downcomer at each end, which enters through the core shroud above the core. A semicircular sparger is attached to each of the four outlets to make two practically complete circles within the core shroud, one above the other. Short elbow nozzles are spaced around the spargers to spray the water radially onto the tops of the fuel assemblies.

The design flow capacity of the pump in each loop is approximately 3020 gpm at a total developed pump head of 710 feet. This provides additional flow above the minimum required flow assumed by the MNGP safety analysis in Section 14.7.2 of the USAR.

3.2 The Proposed Change

The licensee proposed to change the flow rate for the Core Spray pumps specified by TS SR 3.5.1.7 and 3.5.2.4. The licensee has evaluated the LOCA in accordance with 10 CFR 50.46 and Appendix K to 10 CFR 50. The licensee's LOCA analysis demonstrates conformance with the ECCS acceptance criteria of 10 CFR 50.46 for the most limiting break size, break

location and single failure combination for MNGP. The licensee considered a complete spectrum of postulated break sizes and locations to evaluate ECCS performance, and used NRC-approved SAFER/GESTR-LOCA application methodology for the LOCA analysis. The MNGP ECCS performance evaluation for GE14 fuel supplements the ECCS-LOCA evaluation.

The licensee stated that the design flow rate of each of the two core spray subsystems is approximately 3020 gpm. A flow rate of 2700 gpm is assumed for each subsystem in the SAFER evaluation and reflects the core spray flow assumed to be actually delivered inside the core shroud. The current flow rate of 2800 gpm specified in the Technical Specifications is intended to conservatively account for postulated core spray pressure boundary leakage and low-pressure core injection (LPCI) jet pump slip joint leakage.

Core spray pipe cracking was first detected by the industry in 1978 and found to be more widespread in subsequent years. In response, the NRC issued Inspection and Enforcement Bulletin 80-13, "Cracking in Core Spray Spargers," dated May 12, 1980, requiring visual inspections of a better quality than those required by the American Society of Mechanical Engineers (ASME) Code. The licensee discovered a crack in the core spray header during refueling outage in 1993. As a result of the repairs of the crack, the licensee requested and was granted a license amendment (Amendment No. 93. Dated July 12, 1995) that increased the required core spray flow rate to 2,800 gpm from the previous 2,700 gpm.

The Boiling Water Reactor Vessel and Internals Project (BWRVIP) was formed in 1994 to address BWRVIP issues. The BWRVIP developed inspection and evaluation (I&E) guidelines for the core spray system, describing locations on the core spray piping/spargers for which inspection is needed, inspection needs for differing categories of plants, extent of inspection and reinspection for each location, and flaw evaluation procedures to determine allowable flaw sizes for each location or type of location. These I&E guidelines are followed by licensees in place of prior General Electric Service Information Letters and, when approved by the NRC, in the place of the requirements of NRC Bulletin 80-13. The I&E presents an approach for inspections at each plant on core spray components. The licensee used this guidance and determined assumptions for through-wall conditions and crack growth over time.

As a result, the licensee proposed new assumed leakage associated with the P5 and P6 welds in the core spray system header. The assumed leakage would be between the vessel and the core shroud, assumed not to go into the core, and therefore would not cool the core during a LOCA. The new assumed leakage that the licensee determined using the BWRVIP I&E guidance includes the original 100 gpm bypass leakage from the previous Amendment No. 93, as well as a new 32 gpm assumed leakage associated with the P5 and P6 welds along with 3 gpm margin. Thus, the licensee proposed an increase of 35 gpm (i.e., 32 + 3 gpm) from the current required core spray flow rate of 2,800 gpm.

The NRC staff reviewed the licensee's request for amendment, as well as NRC Inspection and Enforcement Bulletin No. 80-13, and finds that the proposed amendment is acceptable. As delineated above, the NRC staff notes that the licensee used conservative assumptions along with the guidance provided by the BWRVIP to evaluate the assumed leakage and bypass flow in the core spray system. The NRC staff concludes that the additional margin of 35 gpm will provide reasonable assurance that MNGP will continue to operate in conformance with the regulatory requirements and guidance set forth in Section 2.0 above.

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 a requirement 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 21923). 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: Joshua Miller, NRR Muhammad Razzaque, NRR

Date: January 11, 2012

Mr. Timothy J. O'Connor January 11, 2012 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 CORE SPRAY PUMP FLOW RATE (TAC NO. ME5441)

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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/

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. 167 to DPR-22
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DATE	12/30/11	12/30/11	10/19/11	01/19/12	01/03/12	01/11/12	01/11/12

*Safety evaluation transmitted by memo (Accession No. ML11278A194) of 10/19/2011. **w/comments