January 18, 2002

Mr. Jeffrey S. Forbes
Site Vice President
Monticello Nuclear Generating Plant
Nuclear Management Company, LLC
2807 West County Road 75
Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT - ISSUANCE OF AMENDMENT RE: ELIMINATION OF LOCAL SUPPRESSION POOL TEMPERATURE LIMITS (TAC NO. MB2064)

Dear Mr. Forbes:

The Commission has issued the enclosed Amendment No. 126 to Facility Operating License No. DPR-22 for the Monticello Nuclear Generating Plant. The amendment consists of changes to the licensing basis in response to your application dated May 30, 2001.

The amendment eliminates local suppression pool temperature limits from the Updated Safety Analysis Report as the basis for limiting suppression pool mechanical loads due to unstable steam condensation during safety relief valve actuations.

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/

Carl F. Lyon, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-263

Enclosures: 1. Amendment No. 126 to DPR-22
2. Safety Evaluation

cc w/encls: See next page

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PDIII-1 Reading	ACRS	RElliot
WReckley	WBeckner	
FLyon	GHill(2)	
RBouling	BBurgess, RGN-III	

*No significant changes to SE

OFFICE	PDIII-1/PM	PDIII-1/LA	SPLB/SC(A)*	OGC	PDIII-1/SC(A)
NAME	FLyon	RBouling	HWalker	AFerandez	WReckley
DATE	12/14/01	12/14/01	12/04/01	01/09/02	01/15/02

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OFFICIAL RECORD COPY

cc:

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NUCLEAR MANAGEMENT COMPANY, LLC

DOCKET NO. 50-263

MONTICELLO NUCLEAR GENERATING PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 126

License No. DPR-22

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Nuclear Management Company, LLC (the licensee) dated May 30, 2001, 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, paragraph 2.C.2 of 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. 126, are hereby incorporated in the license. The licensee 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 60 days. In addition, the licensee shall include the revised information in the Updated Safety Analysis Report submitted to the NRC, pursuant to 10 CFR 50.71(e), as was described in the licensee's application dated May 30, 2001, and evaluated in the staff's safety evaluation dated .

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

William D. Reckley, Acting Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Date of Issuance: January 18, 2002

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 126 TO FACILITY OPERATING LICENSE NO. DPR-22

NUCLEAR MANAGEMENT COMPANY, LLC

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

By application dated May 30, 2001, the Nuclear Management Company, LLC (the licensee), requested changes to the licensing basis for the Monticello Nuclear Generating Plant. The proposed amendment would eliminate local suppression pool temperature limits from the Monticello Updated Safety Analysis Report (USAR) as the basis for limiting suppression pool mechanical loads due to unstable steam condensation during safety relief valve (SRV) actuations. The licensee has only requested the change to the Monticello USAR requirement for determining the mechanical loads on containment structures caused by SRV discharges into the suppression pool. The licensee did not propose any changes in this amendment request to the suppression pool temperature limits contained in Section 3.7 of the Technical Specifications (TSs).

2.0 EVALUATION

2.1 Background

NUREG-0783, "Suppression Pool Temperature Limits for BWR Containments," dated November 1981, specified local suppression pool temperature limits to ensure smooth steam condensation without the imposition of significant loads on the containment. Subsequently, the Boiling Water Reactor Owners Group (BWROG) submitted General Electric Company (GE) Topical Reports NEDO-30832, "Elimination of Limit on BWR Suppression Pool Temperature for SRV Discharge with Quenchers," and NEDO-31695, "BWR Suppression Pool Temperature Technical Specification Limits," to the NRC by letters dated March 21, 1985, and May 9, 1989, respectively, for the NRC staff's review and approval. These two reports provided a technical basis for the elimination of local suppression pool temperature limits, and were approved by the NRC staff in the safety evaluation report (SER) dated August 29, 1994. The conclusion in the SER specifically stated that local suppression pool temperature limits could be eliminated for plants that meet the following criteria:

1) The plant has SRV discharges directed to the suppression pool through a "T" or "X" quencher device previously approved by the staff, and

2) The plant emergency safety features pump inlets are located below the elevation of the SRV quenchers.

The second criterion was cited in the SER because the NRC staff recognized the potential for the extended steam plume to be ingested into the emergency core cooling system (ECCS). This is particularly important for plants with ECCS strainer suction inlets above or at the same elevation of the SRV quenchers.

Monticello is equipped with SRVs to protect against reactor overpressurization during operating transients. Steam from an SRV discharge is directed to the suppression pool so that it can be condensed. In the event of an extended period of discharge through the SRVs, local temperatures near the SRV discharge location could lead to condensation instability or "condensation oscillation," which could result in extreme vibratory loadings on containment structures. The existing Monticello licensing basis includes T-quenchers at the discharge of the SRVs and restrictions on bulk pool temperature to avoid the condensation oscillation phenomenon. Section 5.2 of the Monticello USAR describes the analyses used to determine the local suppression pool temperature limit that must be met to avoid unstable condensation. These analyses assume an initial suppression pool temperature of 90 °F, consistent with Monticello's current TS limits. NUREG-0783 specifies that for all plant transients involving SRV operations during which the steam flux through the quencher perforations is less than 42 lb_m/ft^2-sec, the local suppression pool temperature shall be at least 20 °F subcooled, and in no case shall it exceed 210 °F for local pool temperature. For Monticello, the T-Quenchers have a submergence of 6.5 feet of water corresponding to a pressure of 17.4 psia. The saturation temperature at 17.4 psia is 220.6 °F. Thus, the limit for Monticello translates into a local suppression pool temperature limit of 200.6 °F. By maintaining the local pool temperature 20 °F lower than the saturation temperature of the pool during SRV discharge, condensation oscillations can be avoided.

Since the Monticello T-quenchers are located below the top elevation of the ECCS suction strainers, and at approximately the same elevation as the ECCS pump inlet connections to the strainers, they do not explicitly meet the second criteria for eliminating local suppression pool temperature limits. Accordingly, in order for the NRC staff to approve this amendment request, the licensee must demonstrate that steam ingestion is either precluded by the Monticello design, or that the effect of steam ingestion on the safety systems is small enough to be compensated for by available performance margins.

2.2 Evaluation

GE Topical Report NEDO-30832 presents a discussion of test data and an analysis which supports deletion of the requirement to maintain the local pool temperature below the saturation temperature of the pool during an SRV discharge. In the August 29, 1994, SER that approved GE Topical Report NEDO-30832, the NRC staff stated that the local suppression pool temperature limit may be eliminated if (1) suppression pool discharges are delivered to the suppression pool through a T-quencher or an X-quencher device, and (2) the ECCS suction piping is below the quencher elevation. The SER also stated that GE Topical Report NEDO-30832 was acceptable for reference in future licensing actions when the conditions for its applicability were met.

Monticello meets the first criterion for eliminating the local suppression pool temperature limits because their SRVs discharge to the suppression pool through T-quenchers. Since Monticello's ECCS inlets are at the same approximate level as the quenchers; however, the inlets do not explicitly meet the second criteria for eliminating the local pool temperature limits. As a result, the licensee performed an analysis that demonstrates that the Monticello plant configuration precludes the potential for steam ingestion into the ECCS suction piping. The basis for the licensee's conclusion is as follows:

1) The suppression pool conditions will not support the formation of a steam plume.

   A) During all transients, except station blackout (SBO), the residual heat removal pumps would be operated, providing mixing, and preventing localized saturation conditions.

   B) During an SBO event, there would be no forced flow in the suppression pool, but there would be no extended SRV discharges during the 4-hour coping period. The peak pool temperature during the coping period would be approximately 160.5 °F, which is well below saturation conditions.

2) The Monticello plant configuration will preclude steam ingestion.

   A) Brookhaven National Laboratory (BNL), the NRC staff's contractor supporting the review of NEDO-30832, estimated that "a conservative and reasonable estimate of the maximum lateral extent of any steam plume formed when saturated conditions exist in the vicinity of a quencher device will be no greater than 1.5 meters." The licensee states in their submittal that Monticello's ECCS strainers are more than 1.5 meters away from the T-quenchers.

   B) The licensee compared the strainer approach velocity to the vertical velocity (buoyancy) of a steam plume, and determined that the plume would be rising at a vertical velocity several orders of magnitude higher than the strainer approach velocity; and therefore, it is highly unlikely that the steam would be ingested into the ECCS.

The NRC staff independently assessed the potential for steam ingestion into the Monticello ECCS strainers. The NRC staff's calculations show that even at approximate maximum ECCS flow rates (e.g., all injection and spray pumps running) for Monticello (on the order of 25,000 gpm), the strainer approach velocity would only be approximately 0.09 feet per second or about 1.1 inches per second at the circumscribed surface of the strainers. This approach velocity would be significantly lower as the distance from the strainer increases. An approach velocity this low would be orders of magnitude lower than the vertical velocity of a steam plume rising to the suppression pool surface making ingestion of steam into the ECCS suction unlikely. On the basis of its independent calculations and review of the licensee's analysis, the NRC staff agrees with the conclusion that any steam plume exiting the SRV T-quenchers at Monticello is unlikely to be ingested into the ECCS.

2.3 Conclusion

On the basis of its review of May 30, 2001, application and the SER approving GE Topical Report NEDO-30832, the NRC staff concludes that the licensee has demonstrated that the information in the topical report is applicable to Monticello and is consistent with the NRC staff's conclusions in its August 29, 1994, SER. Accordingly, the NRC staff concludes that elimination of the suppression pool local temperature limits from the Monticello USAR as the basis for calculating the limiting mechanical loads due to unstable steam condensation during SRV actuations is acceptable.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 (66 FR 34286). 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.

5.0 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) 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: R. Elliot

Date: January 18, 2002