



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 91 TO FACILITY OPERATING LICENSE NO. DPR-22

NORTHERN STATES POWER COMPANY

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

By letter dated March 28, 1994, the Northern States Power Company, licensee for the Monticello Nuclear Generating Plant (Monticello), applied for an amendment to the facility Technical Specifications (TS). The proposed amendment would revise the reactor vessel water level instrument setpoint for initiation of secondary containment isolation and standby gas treatment system (SGTS) actuation. The setpoint would be changed from the "Low" value which is 10½ ft. above the top of active fuel (TAF) to the "Low-Low" value which is 6½ ft. TAF.

The purpose of the proposed amendment is to reduce the number of spurious secondary containment isolation initiation events, thereby, reducing the number of thermal transients imposed on reactor building equipment. The proposed setpoint modification is a recommendation of the nuclear steam system supplier vendor (Ref.: General Electric Co. Service Information Letter (SIL) SIL-131, "Containment Isolation Logic Change," dated March 31, 1975). The proposed amendment would also revise the Technical Specification bases to indicate a reduction in the allowable deviation.

Monticello is a 1670 Mwt boiling water reactor (BWR) BWR/4 facility having a Mark I primary containment. It is located 30 miles northwest of Minneapolis, MN.

2.0 EVALUATION

Secondary containment function: The Monticello primary containment is enclosed in a reactor building that serves as a secondary containment. The design basis event for the primary and secondary containment systems is a loss-of-coolant accident (LOCA) which instantaneously pressurizes the primary containment to the calculated peak accident pressure and also instantaneously releases fission products in accordance with a specified source term. The secondary containment system is designed to isolate by the automatic closure of ventilation dampers. Large openings in the secondary containment such as airlocks and truck/rail openings are normally kept closed. The isolated secondary containment confines leakage from the primary containment, except for that from certain sources which are separately accounted for, and provides holdup, mixing and delay of the effluent. The SGTS, which is part of the secondary containment system, is an air handling/filtration system which draws

air from the various secondary containment areas to establish and maintain a subatmospheric pressure. The air is processed by discharging it through high-efficiency particulate air filters and charcoal beds to the elevated release point (i.e., plant stack). The subatmospheric pressure limits the amount of primary containment leakage that might bypass the SGTS directly to the environs (exfiltration). By providing this secondary containment system, the radiological consequences (offsite dose) associated with a design-basis accident (DBA) are reduced considerably.

Isolation of the secondary containment and concurrent actuation of the SGTS is initiated by diverse, redundant safety-grade instrumentation. This instrumentation includes sensors for the following variables: (a) high drywell pressure, (b) low vessel level, (c) reactor building ventilation exhaust high radiation level, and (d) refueling floor high radiation level. The high drywell and low vessel level instruments serve primarily to provide diverse detection of a LOCA during periods when primary containment integrity is required. The radiation instruments serve primarily to detect accidents which might occur during modes of operation when the secondary containment is serving as the primary containment, such as during fuel handling. The reactor vessel water level instrumentation is not used in conjunction with the safety features that mitigate a fuel handling accident (i.e., the proposed TS changes do not affect the primary containment function of the secondary containment).

SIL-131: In SIL-131, GE recommended to its BWR customers that the reactor vessel water level setpoint for SGTS initiation be selected as the same as that for emergency core cooling systems (ECCS) pump initiation. The 1975 SIL noted that: (a) the recommendations required NRC approval, and (b) were being implemented in new generation BWR/4, 5 and 6 plants. The changes recommended by the SIL would reduce the number of inadvertent and unnecessary instances of secondary containment isolations and SGTS actuations.

Water Level Low-Low Setpoint: The low-low setpoint is $6\frac{1}{2}$ ft. above TAF and is indicated in the control room as -47 inches. The low-low setpoint instrumentation is currently used in conjunction with numerous other engineered safety features (ESF) such as primary containment isolation, automatic depressurization system, core spray, anticipated transient without scram, high pressure coolant injection system (HPCI), reactor core isolation cooling system (RCIC) and the low pressure coolant injection system. The low-low setpoint represents a point on the vessel water level scale where, when the level is decreasing, core cooling is threatened to the extent that high pressure emergency inventory makeup systems should be actuated, and low pressure ECCS should be readied. The reactor will have been previously scrammed at the higher "low" level.

Safety concern associated with the proposed amendment: In the analysis of fuel performance during postulated transients and accidents, the timing of ESF actuations is critical. Assumptions used in the thermal-hydraulic analyses establish analytical limits for the timing of functions such as diesel generator startup and ECCS injection flow. Similarly, in analyzing containment performance and in calculating radiological doses for the surrogate containment DBA, analytical limits are established for closure of isolation valves and dampers and the establishment of secondary containment

subatmospheric conditions. In such analyses, "time zero," the analytical beginning of the accident, is the point in time at which the primary containment is assumed to be instantaneously pressurized to its peak accident pressure and to begin leaking at its design leakage rate. At "time zero," primary and secondary containment isolation actuations are assumed to be initiated by high containment pressure. After a series of time delays due to instrument response, startup of diesel generators, sequencing of SGTS loads onto the electrical bus, closure of dampers and drawdown of the secondary containment to a negative pressure, the secondary containment is assumed to begin performing its fission product control function.

Unlike more recently designed facilities, Monticello is a relatively early BWR facility for which the radiological analyses do not assume a time delay for establishment of a post-accident subatmospheric pressure in the secondary containment. For Monticello, it is assumed that a subatmospheric pressure is maintained during normal operation and is not lost during the period when valves and dampers move to their accident positions and the SGTS starts (Ref.: Standard Review Plan Section 6.5.3 discussion on early BWRs). The licensee, therefore, does not have and did not provide an analytical basis supporting the proposed amendment. In the absence of a reanalysis supporting the setpoint change, the staff considered the generic criteria of the Standard Technical Specifications (STS), and the relative effect of the setpoint change for those events which would pressurize the primary containment and release a significant quantity of fission products inside the containment.

In the event of a LOCA, the drywell would become pressurized. A high containment pressure would be sensed by the containment pressure instruments. This would initiate primary and secondary containment isolation and SGTS actuation (in addition to other protective actions) in a timely manner. The vessel water level instrumentation would reach its setpoint after the drywell pressure instruments. The water level instrumentation thus serves as diverse, backup instrumentation. The BWR/4 STS state that the water level instrument secondary containment isolation function should be initiated coincident with HPCI and RCIC initiation. RCIC/HPCI initiation occurs at a time when core cooling is only being threatened but hasn't been lost (i.e., at the low-low level setpoint).

The licensee's proposed setpoint level reduction is consistent with the staff position defined in NUREG-1433, "Standard Technical Specifications, General Electric Plant, BWR/4," will not adversely affect secondary containment performance, and 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 amendments. 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 (59 FR 24750). 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 staff has determined that a reduction in reactor vessel level setpoint for the secondary containment/SGTS actuation is acceptable. This conclusion is based on: (a) conformance to the staff position that the setpoint should coincide with the HPCI/RCIC initiation setpoint, and (b) an understanding that the vessel water level variable is not the primary initiation variable for the secondary containment isolation function in a design-basis accident.

The staff 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.

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