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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 27 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 May 29, 1984 Northern States Power Company (the licensee) proposed to change the Technical Specifications for the Monticello Nuclear Generating Plant to add surveillance and operability requirements for intertie line valves, add limitations on the use of the intertie line, and delete Technical Specifications (TSs) pertaining to the crosstie line. These Technical Specification changes stem from changes in piping configuration during the current pipe replacement outage, in which an intertie line has been added and the crosstie line has been removed. Additional clarifying information was presented by the licensee by letter dated August 16, 1984. According to the licensee there have been incidents of waterhammer in the recirculation system when the system was operating during shutdown cooling. The General Electric Company conducted an analysis to determine the best method of preventing waterhammer and providing for warmup of an idle recirculation loop. The analysis indicated that a residual heat removal (RHR) intertie line as shown in Figure-1, was the best alternative. A four-inch intertie line was shown to provide sufficient flow to minimize collection of steam bubbles in the high points of the recirculation system piping and RHR suction and discharge pipes as long as the flow is circulated continuously during depressurization. This is a design enhancement intended to minimize the potential for waterhammer in the circulation system. Three motor operated valves, as shown in Figure-1, will be installed for isolation purposes. The two isolation valves which are normally closed during normal plant operation will receive a closure signal on low pressure coolant injection (LPCI) actuation to prevent a reduction in LPCI flow delivered to the reactor under accident conditions.

The new intertie line would be normally isolated during plant operation with MO-4085A and MO-4085B closed and MO-4086 open. The line would be used:

1. When the plant is proceeding to cold shutdown, the valves would be opened after the reactor is out of the run mode and prior to depressurizing the reactor.

2. To prevent a recirculation loop waterhammer in a hot isolated loop during primary system depressurization. In this case, MO-4985A and MO-4085B would be opened and MO-4086 would be either open or closed, depending on which loop is isolated.

2.0 EVALUATION

2.1 RHR Intertie Line

The RHR intertie line has been evaluated for potential adverse effects on plant safety. The evaluation, performed by the General Electric Company, is described in NEDO-30477, Rev. 1, June 1984.

The following potential adverse effects were identified:

1. An impact of the 10 CFR Part 50, Appendix K, analysis due to an increase in design basis accident (DBA) break area equal to a four-inch line (0.08 square feet).

2. An additional flow path between the broken and unbroken recirculation loops affects core flow and may cause early boiling transition during a loss of coolant accident (LOCA).

3. An increase in containment peak pressure and temperature due to the larger DBA break size.

4. An increase in containment suppression pool loads (Mark I Long Term Program considerations) due to the larger DBA break size.

5. When the intertie line is in use, measured recirculation drive flow will be slightly greater than drive flow delivered to the jet pumps. Flow biased scrams and rod blocks may be affected.

Since the intertie valves are assumed to be open at the time of a postulated accident, the effect of the intertie on the DBA break size was evaluated. NRC-approved evaluation models were used in the analysis. Assumptions and models used in the latest Monticello LOCA analysis (Ref. 1) were also used in the new analysis.

The intertie is a four-inch line with a flow area of 0.08 ft^2. If this flow area is added to the former maximum flow area, the new 100% DBA break size becomes 4.09 ft^2. The addition of the intertie flow area increases the maximum flow area by about 2%. The analysis performed for the new maximum flow area indicates that the difference in the time of core uncovery is less than one second. There is no change in the limiting break size (1.36 ft^2) with or without the intertie. There is no significant impact on the Appendix K analysis.

The open intertie line will split off some flow from the unbroken recirculation loop during a LOCA. Since use of the intertie line is prohibited during the run mode the reduced flow conditions is not a safety concern.

The licensee's analysis indicates that the effects of the increased DBA break size of 4.09 ft^2 on the peak containment pressure and temperature are slight increases of 0.9 psig and 1°F, respectively. The licensee's analysis also showed that the pool swell loads on the torus shell and internals would increase by less than 1% due to the increase in the drywell pressure.

The licensee stated that the new analyses are consistent with the previously established method in the Plant Unique Load Definition Report (PULDR). The PULDR methodology was reviewed by the staff as part of the Mark I long term program. We concluded that the review of the Monticello program has been completed with no outstanding issues.

The recent revisions were also performed in accordance with NUREG-0661. Therefore, we find the methodology acceptable.

Due to the inherent conservatism associated with the acceptance criteria reported in NUREG-0661, we find that a 1% increase in the pool swell load will not affect the capability of the Monticello containment to accommodate the DBA LOCA loads.

With respect to the adequacy of the containment design temperature and pressure, we find that the revised increases in the calculated maximum temperature and pressure values are small. They remain well below the design values. Therefore, we find the analyses acceptable.

Technical Specifications prohibit the use of intertie line with the reactor in the run mode. Therefore, since the flow-biased scram and rod blocks are not required to be operable in shutdown mode, there is no need to adjust the flow-biased scram and rod blocks.

The following Limiting Conditions and Surveillance Requirements are proposed for additions to the Technical Specifications:

1. Quarterly cycling of MO-4085A, MO-4085B and MO-4086. In addition, these valves will be included in the Monticello ASME Code, Section XI, Pump and Valve Testing Program.

2. Requirement for operability of MO-4085A and MO-4085B at all times. In the event of an inoperable valve, actions are specified to assure full LPCI flow.

3. Limitations on use of the intertie line. Flow will not be allowed in the line if the reactor is in the run mode.

The limiting conditions and surveillance requirements proposed by the licensee are acceptable to the staff.

2.2 Recirculation System Crosstie Line

The licensee amendment request also revises the Technical Specifications to reflect the removal of the recirculation loop crosstie line. The recirculation system crosstie line and associated valve are being removed as part of the recirculation piping replacement program. Because of emergency core cooling system (ECCS) break area considerations, use of this line was prohibited by the Technical Specifications. The requested changes delete restrictions related to this line.

The proposed change is acceptable to the staff.

3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes in surveillance requirements. 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this 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 this amendment.

4.0 CONCLUSIONS

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 REFERENCES

1. "LOCA Analysis Report for Monticello Nuclear Generating Plant," General Electric Company, NEDO-24050, Rev. 1, December 1980.

2. "Mark I Containment Program Plant Unique Load Definition, Monticello Nuclear Generating Plant," General Electric Company, NEDO-24576-1, October 1981.

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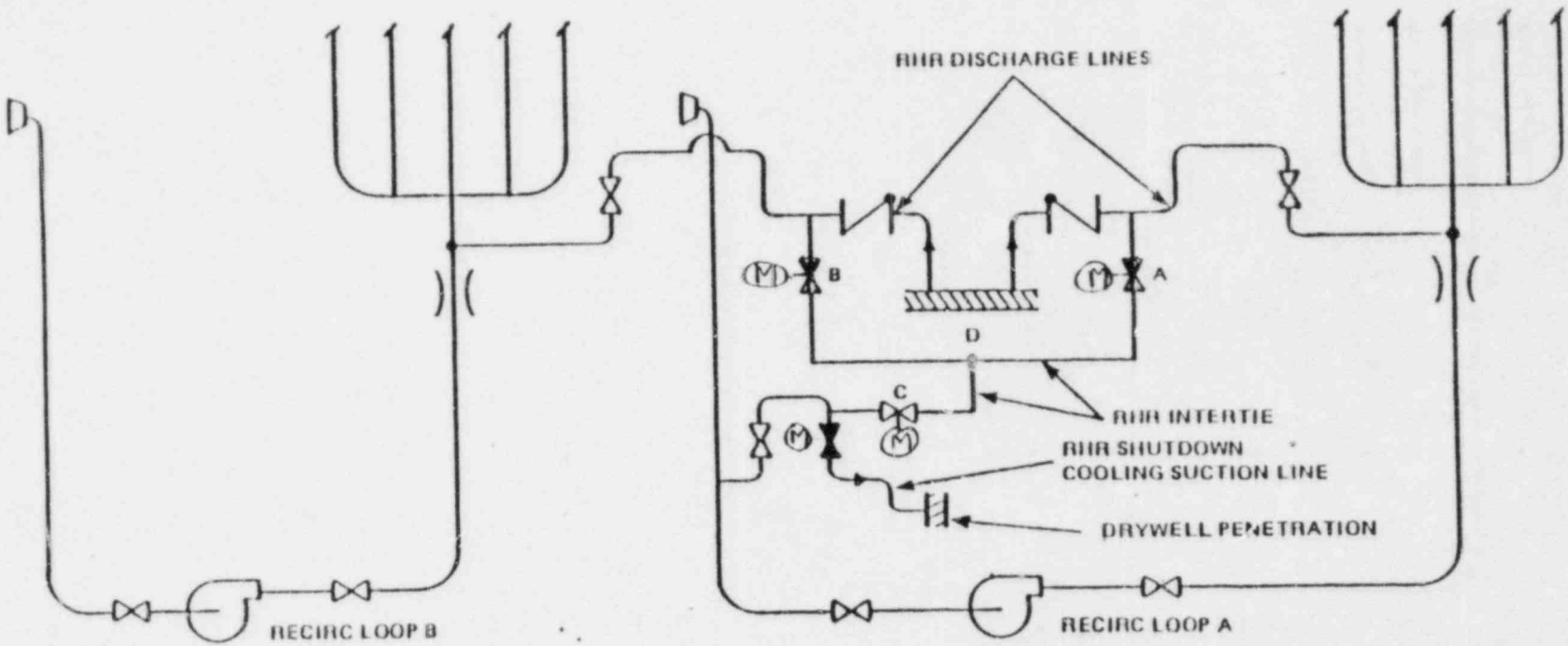
Dated: October 31, 1984



VALVE NUMBERS

A: MO – 4085A – NORMALLY CLOSED – CLOSE ON LOCA SIGNAL IF OPEN
B: MO – 4085B – NORMALLY CLOSED – CLOSE ON LOCA SIGNAL IF OPEN
C: MO – 4006 – NORMALLY OPEN

Figure 1 RHR Intertie Modification