



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 119 TO FACILITY OPERATING LICENSE NO. DPR-36

MAINE YANKEE ATOMIC POWER COMPANY

MAINE YANKEE ATOMIC POWER STATION

DOCKET NO. 50-309

1. INTRODUCTION

On October 3, 1990, the Maine Yankee Atomic Power Company (the licensee) requested a Temporary Waiver of Compliance (TWOC) from their Technical Specification 3.22, Feedwater Trip System. The TWOC was necessary because the licensee recently determined that this Technical Specification was not adequately revised following installation of a feedwater trip system modification. Specifically, when Amendment No. 76 to their license was approved by the NRC on May 23, 1984, the accompanying revision to the Technical Specifications did not specifically address operation of the as-modified feedwater trip system during startup and shutdown. (Figure 1 presents a simplified drawing of the feedwater system.)

The modified feedwater trip system was designed by the licensee to comply with NRC Bulletin 80-04. During development, it was noted that the proposed system design would be vulnerable to a specific (single) valve failure. This single failure vulnerability was evaluated by the licensee and reviewed by the NRC staff prior to approving Amendment No. 76. However, the plant Technical Specifications were not then revised specifically to address operation of the modified trip system during startup and shutdown.

By letter dated October 15, 1990, the licensee requested an amendment to their Facility Operating License (No. DPR-36). The proposed amendment would revise Technical Specification 3.22, Feedwater Trip System, by adding an Exception that specifically addresses operation and single failure vulnerability of the auxiliary/emergency feedwater system during plant startup and shutdown.

2. DISCUSSION

The auxiliary feedwater system consists of two motor-driven pumps and a steam driven pump. The two motor-driven auxiliary feedwater pumps also serve as emergency feedwater pumps. (The combined system is hereinafter referred to as the auxiliary/emergency feedwater system.) The emergency feedwater pumps are each supplied with 4160 volt a.c. power from separate emergency buses and are housed in a tornado-proof area adjacent to the containment.

During plant startup, but below 2% reactor power, the auxiliary/emergency feedwater system is cross-connected to the main feedwater system. A flow path is then established through the final (high pressure) stage feedwater heaters, through the main feedwater regulating bypass valve around each set of main feed regulating and isolation valves, and into each steam generator. This arrangement allows the auxiliary/emergency feedwater to be preheated, thus thermal stresses to the feedwater piping and spargers are reduced. However, this arrangement also allows continued flow of feedwater to a faulted steam generator, should any one of the regulating bypass valves fail to close on the resulting low steam generator pressure.

Prior to exceeding 2% reactor power, the feedwater flow path is realigned such that the main feed flow path is separated from the auxiliary/emergency feed flow path. This alignment provides two separate and different means to isolate feed flow to a faulted steam generator.

3. EVALUATION

With the auxiliary/emergency feedwater system cross-connected to the main feedwater system below 2% reactor power, the failure of a main feedwater regulating bypass valve to close during a steam line rupture event could result in the auxiliary/emergency feedwater pumps continuing to feed the faulted steam generator. The major concerns during this event are to ensure that continued auxiliary/emergency pump flow would not create a return-to-power condition, or result in containment overpressure. This event (main steam line break) was analyzed by the licensee as part of Engineering Design Change Request (EDCR) 83-29 to effect this modification to the feedwater trip system.

A return-to-power condition is not a concern for this event. Calculations conclude that the ensuing cooldown of the primary system (caused by the break and continuous auxiliary/emergency feedwater supply) is bounded by the cooldown from a main steam line break with a failed main feedwater regulating valve. No return to power will occur in either case.

Containment overpressure for this event will not exceed design pressure. Containment pressure sensitivity analyses were performed by the nuclear steam supply system vendor (Combustion Engineering). Evaluation of these sensitivity analyses indicates that the peak containment pressures are proportional to the total amount of feedwater delivered to the faulted steam generator. A main feedwater regulating valve failed in the open position will deliver more feedwater to the faulted steam generator than a failed open bypass valve. Therefore, the latter transient is bounded by the results of the former. (Containment overpressure is not a concern in either case.)

Accordingly, the substance of the license amendment request submitted by the licensee in their letter of October 15, 1990 to amend Technical Specification 3.22 to add Exception 2 is acceptable and is approved.

4. ENVIRONMENTAL CONSIDERATION

This amendment involves a change in 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 published a proposed finding that the 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.

5. CONCLUSION

The Commission made a proposed determination that the amendment involves no significant hazards consideration which was published in the Federal Register (55 FR 49454) on November 28, 1990 and consulted with the State of Maine. No public comments were received and the State of Maine had no comments on this amendment.

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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FIGURE 1
FEEDWATER SYSTEM
(SIMPLIFIED DIAGRAM)

