



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO REQUESTS FOR RELIEF FROM INSERVICE TESTING REQUIREMENTS

AUXILIARY FEEDWATER DISCHARGE CHECK VALVES

NORTHEAST NUCLEAR ENERGY COMPANY, ET AL.

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

DOCKET NO. 50-423

INTRODUCTION

Technical Specification 4.0.5a for the Millstone Nuclear Power Station, Unit No. 3 states that inservice testing (IST) of ASME Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of required ASME Boiler and Pressure Vessel Code (the Code) and applicable Addenda, as required by 10 CFR 50.55a(g). Title 10 CFR 50.55a(g)(6)(i) authorizes the Commission to grant relief from Code requirements and to impose such alternative requirements as it determines is authorized by law upon making the necessary findings.

By letter dated August 25, 1985, Northeast Nuclear Energy Company (licensee) requested relief from ASME Code requirements as these requirements related to IST of auxiliary feedwater (AFW) pump discharge check valves. The licensee proposed alternative inspections and surveillance for the check valves.

DISCUSSION AND EVALUATION

1. Relief Request

Pursuant to 10 CFR 50.55a(g)(5)(iii), relief was requested from performing the reverse flow verification in accordance with IWV-3522(a).

2. Code Requirement

Identified valves should have their reverse flow closure verified in accordance with IWV-3522(a) at least on a cold shutdown frequency.

3. Licensee's Basis For Requesting Relief

Valves 3FWA\*V3, 17, and 31 cannot be full stroke or part stroke exercised in the open to closed direction during operation. The discharge path from a single pump injects through two loop check valves in series and there is no practicable means to verify stroking of a single valve.

4. Licensee's Proposed Alternative

Valves 3FWA\*V3, 17, and 31 will be partially disassembled, inspected, and manually exercised on a staggered sampling basis each refueling outage. During each disassembly, the valve internals will be inspected

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for structural soundness (no loose or corroded parts). In the event that a valve's full-stroke capability is questionable, additional valves will be disassembled until 100% of the valves identified in this group have been disassembled and inspected.

#### 5. Staff Evaluation

Appendix C to the NRC staff's January 15, 1988 SE, on IST for Millstone Unit 3, concludes that, "The Licensee should identify the valve or valves in each of the auxiliary feedwater trains that perform the functions of preventing reverse flow through the associated auxiliary feedwater pump and preventing vapor binding of the auxiliary feedwater pump due to leakage of hot water from the feedwater header. The identified valves should have their reverse flow closure verified in accordance with IWV-3522(a) at least on a cold shutdown frequency, unless relief is requested and approved by the NRC for a less frequent testing interval."

On February 17, 1988, Generic Letter 88-03, "Steam Binding of Auxiliary Feedwater Pumps", was issued and requested all licensees of operating PWRs and holders of construction permits for PWRs to confirm that appropriate procedures are in place, and will be maintained, to minimize the occurrence of steam binding of the auxiliary feedwater (AFW) pumps. The procedures require monitoring fluid conditions within the AFW system each shift during times when the system is required to be operable, and recognizing steam binding and restoring the AFW system to operable status should steam binding occur. The licensee's response to Generic Letter 88-03 was dated May 23, 1988.

For Millstone Unit 3, each of three AFW pumps has a discharge temperature element with a computer alarm installed at the discharge of the pump. Procedure OP 3322, Section 7.8, "Auxiliary Feedwater System" requires the operator to take remedial actions in the event that elevated AFW temperatures occur\*. In addition the AFW pump casing temperatures are checked during routine inspection rounds (OPS Form 3670.2-1) to assure that no steam binding has occurred.

The NRC staff's letter dated June 29, 1988, which reviewed the licensee's May 23, 1988 response to Generic Letter 88-03 concluded that, "your response, dated May 23, 1988 confirmed that you have in place, and will maintain, the necessary procedures. Thus, your response to Generic Letter 88-03 is satisfactory and no further action is necessary."

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\*For elevated temperatures below 185°F, the procedure requires that the AFW be operated on recirculation flow to reduce pipe temperatures to ambient. Above 185°F, the AFW pump discharge valve must be closed, rendering the pump inoperable and entering a Technical Specification (TS) Action requirement (TS 3.7.1.2)



In the ITS program review and discussions with the licensee, the NRC staff expressed the concern that backleakage of feedwater, through the AFW check valves, could expose the AFW piping to temperatures in excess of their design specifications. This concern is based upon a January 1988 incident at Crystal River Unit 3 where backleakage of feedwater into the emergency feedwater system resulted in damage to a pipe restraint and adjacent concrete. In response to this concern, the licensee has agreed to routinely monitor accessible portions of the AFW piping between the AFW pumps and the containment penetrations. Should temperatures above pipe design specifications be detected, the licensee would take appropriate remedial measures. It should be noted that the staff has a generic concern regarding the impact on piping integrity that may result from leakages of certain safety-related valves including the AFW check valves, and has been evaluating the need for improved surveillance provisions that may be required to enhance the leak integrity of these valves. However, at this time, the staff finds that the combined installed temperature elements and the licensee's routine surveillance provide adequate actions to protect the AFW system piping.

By letters dated April 20, 1988, and August 25, 1988, NNECO provided its responses to the staff's SE on IST and proposed to include auxiliary feedwater check valves 3FWA\*V3, 3FWA\*V17, and 3FWA\*V31 in the Millstone Unit 3 IST program. The licensee also requested relief (R-30) from the exercising requirements (open to close position) of ASME Code, Section XI, Paragraph IWV-3520 and provided its supporting basis for requesting relief. Alternatively, the licensee proposed to disassemble, inspect, and manually exercise these valves on staggered basis at each refueling outage. During each disassembly, the valve internals will be inspected for structural soundness (no loose or corroded parts). In the event that a valve's full-stroke capability is questionable, additional valves will be disassembled until 100% of the valves identified in this group have been disassembled and inspected.

The staff agrees that the code requirement is impractical because of the design of the AFW system. With respect to the licensee's alternative, it is the staff's position that sample disassembly and inspection program can be used as a positive means of determining a valve's disk closure capability, as permitted by IWV-3522(a). However, it should be noted that the sampling technique requires that each valve in the group be the same design (manufacturer, size, model number, and material of construction) and have the same service conditions. In addition, during each refueling outage, the valve inspection sample should contain at least one valve of each design and service type.

#### CONCLUSION

The NRC staff concludes that the Code requirement is impractical because of the design of the AFW system and Code compliance would require redesign and replacement of the valves. Accordingly, pursuant to 10 CFR 50.55a(g)(6)(i) and 5.55a(a)(3), the relief requested is granted and the alternative

examination is authorized provided it is conducted consistent with the sampling technique described by the staff. The NRC staff concludes that the relief granted will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden that would result if the requirement were imposed.

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