UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM REQUESTS FOR RELIEF

NORTHEAST NUCLEAR ENERGY COMPANY

MILLSTONE NUCLEAR POWER STATION, UNIT NO.3

DOCKET NO. 50-423

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to the Code requirements determined acceptable to the staff without further NRC review. Implementation of the GL 89-04 positions is subject to inspection.

The Code of Federal Regulations, 10 CFR 50.55a, authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. The NRC staff's findings with respect to authorizing alternatives and granting or not granting the relief requested as part of the licensee's IST program are contained in this Safety Evaluation (SE).

Furthermore, in rulemaking to 10 CFR 50.55a effective September 8, 1992, (see 57 Federal Register 34666), the 1989 Edition of ASME Section XI was incorporated in 10 CFR 50.55a(b). The 1989 Edition provides that the rules for IST of pumps and valves shall meet the requirements set forth in ASME Operations and Maintenance Standards Part 6 (OM-6), "Inservice Testing of Pumps in Light-Water Reactor Power Plants," and Part 10 (OM-10), "Inservice Testing of Valves in Light-Water Reactor Power Plants." Pursuant to 10 CFR 50.55a(f)(4)(iv), portions of editions or addenda may be used provided that all related requirements of the respective editions or addenda are met, and subject to Commission approval. Because the alternatives meet later editions of the Code, relief is not required for those inservice tests that are conducted in accordance with OM-6 and OM-10, or portions thereof, provided all related requirements are met. Whether all related requirements are met is subject to NRC inspection.

The IST program evaluated in this SE covers the first ten-year IST interval for the Millstone Nuclear Power Station, Unit 3. The interval began April 26, 1986, and ends April 25, 1996. The first ten-year interval IST program is based on the requirements of the 1983 Edition, with Summer 1983 Addenda, of the ASME Section XI Code. The first interval program was reviewed by the NRC and a safety evaluation was issued January 15, 1988. In letters dated October 6, 1993, and December 6, 1993, Northeast Nuclear Energy Company (the licensee) submitted a revised Relief Request R-1 which is evaluated below.

2.0 EVALUATION OF REVISED RELIEF REQUEST R-1

Relief Request R-1 is applicable to high pressure safety injection to reactor coolant system hot leg check valves 3RCS*V26, V102, 3SIL*V27, 3SIH*V110, and V112. The valves are Code class 1 and have a safety function to open for injection and to close to isolate the reactor coolant system from the high pressure safety injection system (pressure isolation valves). Under the relief granted in the 1988 Safety Evaluation, these valves are partial-stroke exercised quarterly and full-stroke exercised during refueling outages. The licensee requests relief from IWV-3521, "Test Frequency," which requires that check valves be exercised at least once every 3 months, except as provided by IWV-3522, "Exercising Procedure." If check valves cannot be exercised to the position required to fulfill their function during plant operation, a part-stroke exercise during plant operation or a full-stroke exercise during cold shutdown may be performed. The licensee proposes to full-stroke exercise the valves during refueling outages, only, and to discontinue the partial-stroke exercise currently performed quarterly.

2.1 Licensee's Basis for Relief

The licensee states in Relief Request R-1:

> The source of flow to full-stroke exercise these valves is the safety injection pumps (3SIH*P1A and P1B). The shutoff head of these pumps (1,520 psig) is insufficient to stroke these valves against the normal reactor coolant system (RCS) pressure. Full stroking cannot be performed during cold shutdown because the required flow would risk overpressurization of the RCS. The basis for this change is that conformance to the code would cause unreasonable hardship without a compensating increase in safety. The only flow path available at power to test these valves is through a 3/4-inch leak test line. The lines are not designed to allow sufficient flow to perform a meaningful part-stroke test. The flow from the safety injection pump (4-inch line) is directed through a 3/4-inch line which means that the actual movement of the check valve disk is minimal. The valves are, per Technical Specification Table 3.4-1, RCS pressure isolation valves and, per Surveillance Requirement 4.4.6.2.2, are required to be demonstrated Operable by performing a leak test within 24 hours following valve actuation due to automatic or manual action or flow through the valve. Opening the check valves quarterly during

operation increases the likelihood that the check valves could fail to close and provide the required reactor coolant pressure boundary (RCPB) integrity. In addition, the B train safety injection pump must be declared inoperable during the performance of this test. The performance of these tests require that the B train be isolated from the cold leg injection line. The cold leg injection flow path is normally aligned to provide safety injection on an actuation signal. A partial-stroke test will prove that the check valves do open. However, this test does not verify whether at accident conditions the valves will open to allow adequate flow through the hot leg injection lines. The additional assurance that the valves are open is outweighed by the system being declared inoperable and the risk of losing RCPB integrity.

2.2 Alternative Testing

The licensee proposes to full-stroke exercise the valves during refueling outages when the reactor closure head is removed. Partial-stroke exercise will no longer be performed quarterly.

2.3 Evaluation

Relief to perform full-stroke exercising during refueling outages was granted in the 1988 Safety Evaluation for the Millstone Unit 3 first interval inservice testing program. The valves cannot be full-stroke exercised during power operations because there are no design features that provide a sufficiently large flowpath during operating conditions to pump design flow through the valves. The valves cannot be full-stroke or part-stroke exercised during cold shutdown because there is not an adequate expansion volume to inject into the reactor coolant system and because of low temperature/ overpressurization of the reactor coolant system that injection could cause. Therefore, the licensee performs a full-stroke exercise by injecting into the reactor coolant system during refueling outages when an adequate expansion volume exists to accommodate the flow required to exercise the valves.

In attempting to part-stroke exercise these valves during power operations, as in the previous revision of Relief Request R-1, the licensee has determined that the exercise is a hardship with little benefit to safety. The 3/4-inch leak test lines for the valves are used, providing only minimal flow to stroke the valve disks. The valves function as pressure isolation valves/reactor coolant pressure boundary isolation valves and the part-stroke exercise increases the possibility that, if the valve disk did not close, the integrity of the reactor coolant system could be challenged and a plant shutdown would ensue. Additionally, when the exercise is performed, one train of safety injection is isolated from the cold leg injection flow path and would not realign on an actuation signal. Following the part-stroke exercise, the Technical Specifications require a leak test to be performed to ensure that the disk has properly reseated and remains leak-tight, placing a further manpower and man-Rem burden on the licensee.

While part-stroke exercising a check valve quarterly provides a level of assurance that it will open (partially) when required to function in an accident condition, it does not verify that there is no blockage that prevents full opening. In this respect, the quarterly exercising does not provide a lot of information about the condition of the valve and its ability to open sufficiently to pass design-basis flow. Therefore, eliminating the quarterly part-stroke exercising would not decrease the level of quality and safety.

The provisions in the latest Code edition incorporated in 10 CFR 50.55a(b) (the 1989 Edition, with OM-10 stipulating the requirements for inservice testing of valves in nuclear power plants) allow that full-stroke exercising of check valves may be performed during refueling outages when it is impractical to perform a full-stroke, or a part-stroke, during power operations or cold shutdown conditions. These provisions were included in OM-10 in recognition that testing certain valves during power operations or cold shutdown may put the plant in a less safe condition.

The proposed alternative testing for the high pressure injection check valves is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) based on the fact that part-stroke exercising quarterly during power operations creates a hardship without a compensating increase in the level of quality and safety in that (1) one train of safety injection must be placed in an out-of-service condition to perform testing, (2) leak testing, which requires manpower and man-Rem exposure, must be performed each time flow is initiated through these valves, and (3) the information on the condition of the valves gained by the quarterly exercising is minimal and does not contribute to the quality and safety of the system to a level that compensates for placing the system in an inoperable condition and for necessitating a leak test following exercising of the valves.

3.0 CONCLUSION

The staff concludes that the requirements of the Code are impractical and that relief may be granted for Relief Request R-1. Pursuant to 50.55a(f)(6)(i) such relief is authorized by law and will not endanger life, property, or the common defense and security, and is otherwise in the public interest. Pursuant to 10 CFR 50.55a(a)(3)(i), the proposed alternative described in Relief Request R-1 may be authorized. This relief has been granted giving due consideration to the burden upon NNECO that could result if the requirements were imposed on the facility.

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