



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

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

UNION ELECTRIC COMPANY

CALLAWAY NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-483

**I. INTRODUCTION**

Title 10 of the Code of Federal Regulations (CFR), Section 50.55a(g), requires that inservice testing (IST) of certain ASME 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 specific written relief has been requested by the licensee and granted by the Commission pursuant to Subsections (a)(3)(i), (a)(3)(ii), or (g)(6)(i) of 10 CFR 50.55a. The licensee's relief request must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance results in hardship or unusual difficulties without a compensating increase in the level of quality and safety; or (3) conformance with certain requirements of the applicable Code edition and addenda is impractical for its facility.

These regulations authorize the Commission to grant relief from ASME Code requirements upon making the necessary findings. The NRC staff's findings with respect to granting or not granting the relief requested as part of the licensee's IST Program are contained in this Safety Evaluation (SE).

This SE covers revised relief requests #BB-1, #EP-2 and #BB-11 as described in Union Electric Company's letter dated May 24, 1991, which supersedes all previous submittals on this subject. The licensee's program is based on the requirements of Section XI of the ASME Code, 1980 Edition through the Winter of 1981 Addenda.

**II. EVALUATION**

**A. REVISED RELIEF REQUEST #BB-1**

The relief request was revised to allow the use of alternative nonintrusive testing employing acoustic monitoring techniques to demonstrate that check valves BB-8948 A, B, C, D stroke full open.

BASIS FOR RELIEF REVISION:

Generic Letter 89-04 allows alternatives to full flow testing methods to demonstrate check valves' full stroke open capability. The alternative use of acoustic testing allows all four valves to be full stroke open tested in a refueling outage and also can provide information of possible degradation, which is the intent of ASME Section XI component testing.

ALTERNATIVE TESTS:

The licensee's revision of the relief request would allow one of the following test methods:

- A) A different valve of this group will be disassembled, inspected, and manually stroked at each refueling, until the entire group has been tested. If the full-stroke capability of the disassembled valve is in question, the remainder of the valves in this group will be disassembled also, inspected, and manually full-stroked at the same outage.
- B) Each check valve in this group will be verified to stroke to its full open position by determining that the valve disc strikes its backseat using acoustic monitoring equipment. This will be performed on a refueling frequency.

STAFF EVALUATION:

These valves open on flow from the cold leg accumulators, safety injection pumps or residual heat removal pumps to provide flow to the reactor system cold legs. It is impractical to exercise these valves with full or part flow during power operation since the safety injection pump discharge pressure cannot overcome reactor coolant system pressure. Further, the valves cannot be full-stroke exercised during cold shutdown, since residual heat removal pumps cannot provide the required flow and flow from the accumulators would be needed. Accumulator injection is prohibited by concerns over low temperature overpressurization. Full-stroke exercising on a refueling cycle is the only practical method for inservice testing of these valves.

It would be impractical to require the licensee to meet testing requirements during power operation because of the inability to overcome system pressure, or during cold shutdown because of the possibility of low temperature overpressurization. It would also place an unrealistic burden on the licensee to modify the system to meet the Code requirements if the Code requirements were imposed.

Section XI, Paragraph IWV-3522 of the ASME Code requires that check valves be exercised to positions required to fulfill their safety function. Confirmation that the valve is exercised to the correct position is required. Confirmation is allowed by visual observation of the disk, by electrical signal initiated by a position indicating device, by full flow through the valve and by other positive means. The staff believes that other positive means include qualified non-intrusive methods.

The staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to testing. However, this method of verifying the open safety function of check valves is considered an

acceptable option only when no other means is available. The staff position on the use of disassembly and inspection in place of testing has been articulated in responses to questions 15, 16 and 17 contained in the "Minutes of the Public Meeting on Generic Letter 89-04," dated October 25, 1989.

CONCLUSION:

Relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i), based on (1) the impracticality of exercising these valves quarterly or during cold shutdowns, (2) the proposed alternative testing providing reasonable assurance of operational readiness using acoustic monitoring techniques, (3) consideration of the time involved to implement the acoustic monitoring alternative and discontinue the disassembly and inspection mode, and (4) the undue burden on the licensee if the Code requirements were imposed, provided the disassembly and inspection alternative is discontinued within one year.

B. REVISED RELIEF REQUEST #BB-11

The relief request was revised to include closure testing of check valves BB-V-0474, 476, 479 and 480. These new valves were added to the plant and IST Program to provide a close reverse flow function to isolate flow during a reactor coolant pump thermal barrier cooling coil rupture accident.

BASIS FOR REVISED RELIEF REQUEST:

Testing these valves in the safety-related closure direction isolates cooling water to the reactor coolant pumps' thermal barrier cooling coils and motor cooler. Loss of coolant during pump operation could damage the pump seal and motor. This test procedure requires isolation of all cooling water to the reactor coolant pump bearings and motor due to the system configuration. Testing cannot be performed until all four reactor coolant pumps are off. All four pumps are off only during a refueling outage.

ALTERNATIVE TESTS:

The licensee proposes to exercise these valves to demonstrate their safety-related closed position during reactor refueling outages.

STAFF EVALUATION:

This revision adds valves to the relief request that will be installed in the system upstream of existing valves already included in the relief request. The additional valves will duplicate the closed reverse flow safety function now performed by the existing valves.

Exercising these valves would isolate cooling water flow to the reactor coolant pump bearings and motor, since coolant is provided by a common header. Loss of coolant during pump operation could damage the pump seal and motor and result in a small break loss-of-coolant accident.

It is impractical to demonstrate the closed safety function of these valves during normal plant operation or cold shutdown because isolation of cooling water to the reactor cooling pumps could cause significant damage to the pump seal and motor. The system configuration limits testing to a time when all four pumps are out of service. The only time all four pumps are off is during a refueling outage. If the Code requirements were imposed, system modifications would be required. Modifying the system to meet the Code testing requirements would place an undue burden on the licensee because a major redesign and rework of the plant piping system would be needed.

Testing these valves during refueling outages provides reasonable assurance of operational readiness.

CONCLUSION:

Relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) based on (1) the impracticality of exercising these valves quarterly or during cold shutdowns when one or more reactor coolant pumps are operating, and (2) the proposed alternative providing reasonable assurance of operational readiness.

C. REVISED RELIEF REQUEST #EP-2

The relief request was revised to allow the use of alternative nonintrusive testing employing acoustic monitoring techniques to demonstrate that check valves EP-8956 A, B, C, and D stroke full open. These valves open on flow from the cold leg accumulators to provide flow to the reactor coolant system cold legs.

BAJIS FOR RELIEF REVISION:

Generic Letter 89-04 allows alternatives to full flow testing methods to demonstrate check valves' full-stroke open capability. The alternative use of acoustic testing allows all four valves to be full-stroke open tested in a refueling outage and can also provide information of possible degradation, which is the intent of ASME Section XI component testing.

ALTERNATIVE TESTS:

The licensee proposes alternative testing to allow one of the following test methods:

- a) A different valve of this group will be disassembled, inspected, and manually stroked at each refueling, until the entire group has been tested. If the full-stroke capability of the disassembled valves is in question, the remainder of the valves in this group will be disassembled also, inspected, and manually full-stroked at the same outage.
- b) Each check valve in this group will be verified to stroke to its full open position by determining that the valve disc strikes its backseat using acoustic monitoring equipment. This will be performed on a refueling frequency.

#### STAFF EVALUATION:

It is impractical to exercise these valves full or part stroke during power operation since cold leg accumulator pressure cannot overcome reactor system pressure. Cold shutdown exercising of these valves is prohibited by concerns over a low temperature overpressurization of the reactor coolant system. Full-stroke exercising on a refueling outage frequency is the only practical method for testing these valves.

It would be impractical to require the licensee to meet testing requirements during power operation because of the inability to overcome system pressure, or during cold shutdown because of the possibility of low temperature overpressurization. It would also place an unrealistic burden on the licensee to modify the system to meet the Code requirements if the Code requirements were imposed.

Section XI, Paragraph IWV-3522 of the ASME Code requires that check valves be exercised to the position required to fulfill their safety function. Confirmation that the valve is exercised to the correct position is required. Confirmation is allowed by visual observation of the disk, by electrical signal initiated by a position indicating device, by full flow through the valve and by other positive means. The staff believes that other positive means include qualified non-intrusive methods.

The staff considers valve disassembly and inspection to be a maintenance procedure that is not equivalent to testing. This method of verifying the open safety function of check valves is considered an acceptable option only when no other means is available. The staff position on the use of disassembly and inspection in place of testing has been articulated in responses to questions 15, 16, and 17 contained in the "Minutes of the Public Meeting on Generic Letter 89-04."

#### CONCLUSION:

Relief may be granted pursuant to 10 CFR 50.55a(g)(6)(i) based on (1) the impracticality of exercising these valves quarterly or during cold shutdowns, (2) the proposed alternative testing providing reasonable assurance of operational readiness using acoustic monitoring

techniques, (3) consideration of the time involved to implement the acoustic monitoring alternative and discontinue the disassembly and inspection mode, and (4) the undue burden on the licensee if Code requirements were imposed, provided the disassembly and inspection alternate is discontinued within one year.

### III. SUMMARY

Paragraph 10 CFR 50.55a(g)(3) (iii) requires that components (including supports) that are classified as ASME Code Class 1, 2, and 3 meet the requirements, except design and access provisions and preservice requirements, set forth in applicable editions of ASME Section XI to the extent practical within the limitations of design, geometry, and materials of construction of the components. Pursuant to 10 CFR 50.55a(g)(5)(iii), the licensee determined that conformance with certain Code requirements is impractical for his facility and submitted supporting information. The staff has reviewed the licensee's submittal and has concluded that relief can be granted as requested for revised relief request #BB-11. In the cases of revised relief requests #BB-1 and #EP-2, relief can be granted provided the disassembly and inspection alternates are discontinued within one year. Pursuant to 10 CFR 50.55a(g)(6)(i), the staff concludes that the requirements of the Code are impractical and relief may be granted for the subject relief requests, #BB-1, #BB-11, and #EP-2. Such relief is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest. This relief has been granted, giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

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