



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

COMMONWEALTH EDISON COMPANY

BRAIDWOOD STATION, UNITS 1 AND 2

DOCKET NOS. STN 50-456 AND STN 50-457

1.0 INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code) Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Code and applicable addenda, except where alternatives have been authorized or relief has been 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.

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).

2.0 DISCUSSION

NRC issued safety evaluations for the Braidwood Station Inservice Testing Program relief requests in letters dated October 15, 1991, September 10, 1992, and September 14, 1993, for the first ten-year interval of operation. The ten-year interval for Unit 1 began July 29, 1988, and for Unit 2 began October 17, 1988. The program was developed to the requirements of the ASME Code, Section XI, 1983 Edition, with addenda through the Summer 1983 Addenda, along with guidance provided in GL 89-04.

In the September 14, 1993 SE, eight anomalies were identified and the licensee was requested to take appropriate actions to address the concerns. The response to these eight items was provided to the NRC in the licensee's

letters of December 13, 1993, and March 10, 1994. Table 1 describes each of the anomalies, the actions taken by the licensee, and the current status of each item.

Revision 6 of the IST Program was included in the March 10, 1994, submittal. The revision revised certain relief requests in response to the anomalies. The revised relief request that requires additional NRC review is VR-2. New Relief Request VR-28 was also submitted. VR-28 implements Position 2 of GL 89-04 for a disassembly and inspection program. These two relief requests are evaluated below.

3.0 EVALUATION OF RELIEF REQUEST VR-2

Relief from the check valve exercising requirements of IWV-3522 is requested for Class 2 spray additive system check valves 1(2)CS-020A/B. An extension of the frequency for disassembly and inspection recommended in GL 89-04, Position 2, is proposed.

3.1 Licensee's Basis for Relief

The licensee states:

These check valves in the spray additive system (CS) cannot be stroked without introducing NaOH [sodium hydroxide] into the CS system, unless the piping between the NaOH storage tank and the injection isolation valves, 1/2CS021A/B, is drained into containers, which amounts to almost two 55 gallon drums of potentially (radioactive/toxic) mixed waste that requires either recycling or disposal. Then, primarily water is connected to the CS system and is used to flow test the line to ensure that the proper Technical Specification educator flow rate can be passed via special test connections.

The problem with disposal stems from the caustic being slightly contaminated, as well as having a high ph. Recycling (pouring the contents of the drums back into the NAOH tank) is not always a viable option either, considering the caustic has been contained in a stagnate line (up to five years) and may not meet chemistry requirements. Thus storage of hazardous mixed waste can become very costly. This is due to the non-existence of commercial disposal facilities for mixed waste, which means that any mixed waste generated would have to be stored on-site. Also, the draining and handling of this highly caustic material poses a significant hazard to personnel, and can result in loss of eye sight and/or chemical burns, if splashed or spilled.

If the disassembled valve is not capable of being manually full-stroke exercised or there is binding or failure of internals, the remaining valve on the affected unit will be evaluated for further action.

Full flow testing of these valves cannot be accomplished without posing a serious threat to the safety of equipment and personnel. It is impractical to either full or part-stroke exercise these valves since flow through them requires draining and flushing the piping to prevent the introduction of caustic effluent into the CS system. The problem of mixed waste disposal or recycling created by system draining of approximately two 55 gallon drums is considered an undue hardship, if the Code requirements are imposed.

The alternate test frequency (same frequency as the Technical Specification educator flow test of at least once every five years) is justifiable in that maintenance history and previous inspections of these valves at both Byron and Braidwood stations have shown no evidence of degradation or physical impairments (i.e., corrosion, chemical buildup, wear). This is to be expected since these valves see limited operation (flow in line during educator flow test only).

Industry experience, as documented in NPRDS, shows no history of problems with these valves. A company wide check valve evaluation addressing the "EPRI Application Guidelines for Check Valves in Nuclear Power Plants" revealed that the location, orientation and application of these valves are not conducive to the type of wear or degradation correlated with SOER 86-03 type failures.

The alternate test method, visual inspection of internals followed by the Technical Specification educator flow test, at least once every five years, is sufficient to ensure operability of these valves and is consistent with GL 89-04 guidelines. The hardship involved with the hazardous mixed waste disposal and handling caustic material with regards to personnel safety does not provide a compensated increase in safety of the CS system equipment.

3.2 Evaluation

The check valves, 1(2)CS020A and B, are required by the Code to be exercised quarterly or, if impractical, during cold shutdowns. This testing is an assessment of the valves' operational readiness and demonstrates that the obturators are capable of moving to their safety function positions. Exercising these valves quarterly during power operation is not practical because it would require removing the CS system from service, draining and flushing a section of piping between the spray additive tank and the educator, hooking up special primary water test connections, running the test, and restoring the system to operating conditions. This testing would involve operators working with mixed waste that is caustic, toxic, and possibly slightly radioactive. Approximately 100 gallons of this mixed waste would be generated during testing. Performing this testing during cold shutdowns is also not practical because waste would be generated and setting up, running the test, and restoring the system to operation is time consuming and could result in a delay in returning the plant to operation.

GL 89-04 states that the use of disassembly to verify full-stroke capability of check valves is an option only where full-stroke exercising can not be performed by flow or by other positive means. The technical specifications (TS) required educator flow test, performed every 5 years, should be used to exercise the valves. Supplementing the test with a disassembly and inspection program on a more frequent basis would provide useful information about the valves' condition such as erosion, corrosion, fouling, wear, binding, loose parts, and fatigue failure.

The licensee proposes to disassemble, inspect, and manually exercise at least one valve in each of the two groups every 5 years and to verify the TS educator flow rate through these valves following reassembly. Testing once every 5 years is a significant extension of Code allowed testing intervals. Such an extension can be allowed by GL 89-04, Position 2, but only in cases of extreme hardship where the extension is supported by industry and in-plant data. However, the argument presented by the licensee regarding problems with mixed waste disposal is questionable. NUREG/CR-5938, "National Profile on Commercially Generated Low-Level Radioactive Mixed Waste," identifies available treatment technologies for low-level mixed waste. The report also contains information on existing commercial waste treatment facilities. NaOH is commonly used in industry. Draining, neutralizing, and/or disposing the low level waste in question on a refueling outage interval should not involve extreme hardship.

3.3 Conclusion

Based on the determination that information presented by the licensee does not support relaxing the disassembly and inspection frequency of every refueling outage proposed, relief request VR-2 can not be granted as requested. However, the licensee's use of the VR-02 relief request as approved for the Byron Station by letter dated January 31, 1992, is consistent with Position 2 of GL 89-04 and is acceptable for use at Braidwood Station without obtaining additional authorization from the NRC. In order for Braidwood to utilize a relief similar to Byron Station, Braidwood must comply with the requirements outlined in the January 31, 1992, SE that includes, disassembly and inspection of one valve out of a group containing two valves, each refueling outage. If the disassembled valve is not capable of being full-stroke exercised or if there is binding or failure of valve internals, the remaining valve on the affected unit will be inspected.

4.0 EVALUATION OF RELIEF REQUEST VR-28

VR-28 relates to the implementation of a disassembly and inspection program in accordance with Position 2 of GL 89-04 for a pair of check valves 1(2)CS011A/B (two valves per unit) on the discharge of the chemical spray additive system educator. These valves open to allow flow from the discharge of the chemical spray pump and the spray additive tank back to the pump suction. The valves close to prevent backflow into the educator from the chemical spray pump suction side. The valves are partial-stroke exercised quarterly, but full-stroke exercising is not practical. Therefore, the valves are disassembled and inspected to verify full-stroke exercising.

The NRC identified a number of generic deficiencies that affect plant safety and have frequently appeared as IST programmatic weaknesses. These are addressed by GL 89-04. In that GL, the staff delineated positions that described deficiencies and explained alternatives to the ASME Code that the staff considers acceptable. If alternatives are implemented in accordance with the relevant position in the GL, the staff has determined that relief should be granted pursuant to 10 CFR 50.55a(g)(6)(i) [now (f)(6)(i) for IST] on the grounds that it is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest. In making this determination, the staff has considered the burden on the licensee that would result if the requirements were imposed.

For relief granted pursuant to GL 89-04 the staff has reviewed the information submitted by the licensee to determine whether the proposed alternative follows the relevant position in the GL. If an alternative conforms to a position of the GL, it is approved pursuant to GL 89-04. Relief Request VR-28 was submitted to the NRC in Revision 6 of the Braidwood Station IST Program. The staff has determined that the provisions of Position 2 of GL 89-04 have been included in the relief request and, therefore, the request is approved.

5.0 CONCLUSION

The alternative frequency proposed in revised Relief Request VR-2 was not approved as proposed by the licensee. The disassembly and inspection should be performed according to the provisions delineated in Position 2 of GL 89-04. The extension of the inspection to once every 5 years to coincide with the TS test of the educator is a significant departure from the Code and from the guidance of Position 2. However, the licensee's use of the VR-02 relief request as approved for the Byron Station by letter dated January 31, 1992, is consistent with Position 2 of GL 89-04 and is acceptable for the use at Braidwood Station without obtaining additional authorization from the NRC. The Operations and Maintenance (OM) Committee is currently working on recommendations and changes to the ASME OM Code which will consider extension of test frequency based on the past performance and condition of check valves. When such changes to the Code are completed, the licensee may be able to apply the approach to these spray additive check valves.

The staff has determined that approval of the revised relief requests pursuant to GL 89-04 is authorized by law and 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 upon the licensee that could result if the requirements were imposed on the facility.

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Table 1
Braidwood Station, Units 1 and 2
Inservice Testing Program Anomalies

Anomaly Number and Description	Licensee's Actions	Current Status
<p>1. The anomaly indicated that the safety evaluation does not include verification that all pumps and valves within the scope of 10 CFR 50.55a were included in the program. The licensee was requested to describe the process for developing and maintaining the inservice testing (IST) program and include a discussion in the IST program.</p>	<p>In its letter of December 13, 1993, the licensee discussed a current review being performed for both the Braidwood and Byron Stations in preparation for ten-year updates to the 1989 Edition of ASME Section XI. The reviews are intended to define the scope. No information related to maintaining the program was included in the response to this anomaly.</p>	<p>The licensee should ensure that the IST program documents describe how the program is to be maintained. The maintenance of the program is subject to NRC inspection. No further NRC action is required.</p>
<p>2. Relief Request PR-05 related to the calibrated range and accuracy of digital, ultrasonic flowmeters. The proposed alternative was authorized provided the licensee demonstrate accuracy and repeatability in accordance with the requirements of OM-6 for digital instruments or account for the additional inaccuracies over that allowed by the Code.</p>	<p>The relief request has been deleted from the program. Special wet flow calibrations are performed for the ultrasonic flowmeters. Accuracies are within the requirements of OM-6 for digital instruments by assuring $\pm 2\%$ of the measured flow.</p>	<p>Actions are complete.</p>
<p>3. The use of nonintrusive techniques for verifying check valve closure capability was recommended. A number of relief requests indicated that the only practical method of verifying closure for a number of check valves was by leak testing.</p>	<p>Nonintrusive testing techniques are employed at the station. A description of the application of these techniques was included in the March 10, 1994, letter. Where these techniques can be used to verify closure of check valves, such methods may be used; however, leak testing is considered a better and more practical method for the valves in the subject relief requests. The licensee follows the efforts of the Nuclear Industry Check Valve Group in this area.</p>	<p>Actions are complete.</p>
<p>4. Relief Request VR-20 concerned relief from corrective action requirements for valves tested on a cold shutdown frequency. Specifically, when such valves exhibit increasing stroke times, the Code requires that the cause of the increase be corrected prior to startup. The implementation of stroke time monitoring in accordance with the requirements of OM-10 were recommended.</p>	<p>The response to this item in the licensee's December 13, 1993, letter indicates that the requirements of OM-10 for stroke time monitoring will be implemented for valves that can be tested only during cold shutdown or refueling outages. The actions are scheduled to be completed by the end of the Fall 1994 outage for Unit 2.</p>	<p>Revised Relief Request VR-20 was submitted in the licensee's letter dated March 10, 1994, incorporating the applicable requirements. Actions are complete. Alternative authorized in 9/14/93 safety evaluation.</p>

Anomaly Number and Description	Licensee's Actions	Current Status
<p>5. Relief Request VR-2 requested extension of the disassembly and inspection of check valves in the line between the spray additive tank and the spray additive educator. The proposed frequency of once every 5 years was not authorized.</p>	<p>Additional information was included in the December 13, 1993, letter. Revised Relief Request VR-2 was submitted in the March 10, 1994, letter.</p>	<p>See Section 3.0 of the current safety evaluation. Relief is denied as requested. Byron SE, 01/31/92, can be applied.</p>
<p>6. Relief Request VR-5, deferral of full-stroke exercising of the accumulator discharge check valves and combined injection header check valves, was approved; however, it was requested that the licensee part-stroke these valves during cold shutdown or provide the basis as to why such exercising would be impractical.</p>	<p>VR-5 was revised and submitted in the March 10, 1994, letter. The combined injection header check valves will be partial-stroke exercised during cold shutdowns. Revised VR-5 includes additional justification as to the impracticalities of testing the accumulator discharge check valves during cold shutdown outages. Later plans are to implement a sampling nonintrusive test when final NUREG-1482 is issued.</p>	<p>Actions are complete.</p>
<p>7. The licensee has proposed a sampling program for testing the auxiliary feedwater pump suction check valves using acoustic techniques every other refueling (one valve tested every refueling outage on a sampling basis). Information in Relief Request VR-19 was not adequate to justify not testing both valves each refueling outage.</p>	<p>VR-19 was revised to specify that both of the auxiliary feedwater (AFW) pump suction check valves (2 per unit) will be acoustically monitoring during the AFW pump full-flow test.</p>	<p>Actions are complete. Alternative authorized in 9/14/93 safety evaluation.</p>
<p>8. There appeared to be a discrepancy between the list of valves in Relief Request VR-15 and the IST program valve table for valves 1(2)S18818A-D.</p>	<p>These valves were removed from the list in VR-15. Note 9 of the valve table now indicates that both the open and close directions of the valves will be tested during cold shutdowns.</p>	<p>Actions are complete.</p>