



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

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 INTRODUCTION

Title 10 of the Code of Federal Regulations (10 CFR), Section 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. Alternatives that conform with the guidance in GL 89-04 may be implemented without additional NRC approval. Section 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 BACKGROUND

In its letter of February 21, 1995, Duke Power Company (DPC), the licensee for the Oconee Nuclear Station, Units 1, 2, and 3, responded to an NRC SE dated November 23, 1994. The November 1994 SE addressed Revision 21 of the IST program which included changes made as a result of a previous NRC SE dated July 23, 1993. The SEs relate to the third 10-year intervals for all three units which run concurrently from July 1, 1992, to June 30, 2002. While the licensee has maintained the 1986 Edition of Section XI of the ASME Code for IST of pumps, the latest revision amends the valve IST to comply with the 1989 Edition of Section XI which, by reference, incorporates Part 10, "Inservice Testing of Valves in Light-Water Reactor Power Plants," of the ASME Operations and Maintenance Standard OMa-1988. The licensee requested review of the revisions to the relief requests in consequence of the recommendations in the November 1994 SE and of the requirements of Part 10. A subsequent revision to the IST program was submitted in DPC's letter of March 9, 1995. No new or revised relief requests were included in the revision; however, Section 4.4.1

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was added stating that "relief valves that are not credited for assisting in mitigating the consequences of an accident and are only installed for over-pressure protection are considered." The licensee is cautioned that considering these valves "passive" does not exclude them from set pressure testing in accord with Part 10 and Part 1 of OMa-1988 if they are within the scope for testing otherwise.

The staff has reviewed the revised relief requests and determined if the bases of the previously granted relief requests or approved alternatives have changed. The results of the review follow.

### 3.0 VALVE RELIEF REQUESTS

Three generic valve relief requests and four specific valve relief requests were rewritten to reference Part 10 requirements versus the requirements of the 1986 Edition of Section XI, Subsection IWV. Each of these seven relief requests has been reconsidered in light of the changes.

- 3.1 Generic Relief Request-VLV-03 concerns the method for demonstrating the fail-safe capability of valves upon the removal of actuator power. The request was granted in the November 23, 1994, SE pursuant to 10 CFR 50.55a(f)(6)(i). Because the test requirements of Part 10 and IWV are consistent and the basis for relief is the same, the granting of relief remains valid.
- 3.2 Generic Relief Request-VLV-08 concerns the application of the IST requirements for the low pressure injection system and whether the licensing basis for the Oconee Nuclear Station credits the system for achieving "safe" shutdown and accident mitigation. The approval of the alternative was authorized in the July 1993 SE (relief request number was "GVR-h") pursuant to 10 CFR 50.55a(a)(3)(i) and remains valid.
- 3.3 Generic Relief Request-VLV-10 concerns pressure relief devices; specifically, the approach used in determining the group of valves and the number of additional valves that require testing when tested valves fail the acceptance criteria. The licensee's proposed alternative to group valves by type, service, and manufacturer was approved in the November 1994 SE and such approval remains valid. GRR-VLV-10 references OM-1-1981 for specifying the test requirements. OM-1-1981 is the correct edition for the 1986 Edition of Section XI for set pressure testing of pressure relief devices. However, for OMa-1988, Part 10, the correct reference for pressure relief device testing is OM-1-1987. Therefore, the relief request should be revised to reference the correct edition of Part 1 of the OM Standard. The approval of the alternative will not be affected by changing the reference.
- 3.4 Relief Request-VLV-10 applies to the core flood tanks discharge check valves. The previous revision of the request included application of provisions of Part 10 for leak testing the valves. That portion of the request has been deleted because the testing is now in compliance with Part 10. The remaining portions of the request are consistent with the request approved in the November 1994 SE pursuant to GL 89-04 and 10 CFR 50.55a(a)(3)(i) and the approval remains valid.

3.5 Relief Request-VLV-11 discusses the loop A and loop B borated water storage tank suction line to the reactor building spray pumps check valves which are partial-stroke exercised quarterly and are being replaced prior to the end of 1996 (schedule for replacement dependent on refueling outage schedule for each unit) to allow for disassembly and inspection as an alternative to full-stroke exercising. The design does not accommodate full flow through the valves and the currently installed valves are of the split-body design and are welded, rather than being flanged and bolted, into the piping. The "interim" request was denied in the July 1993 SE. The November 1994 SE recognized that the replacement will allow disassembly and inspection to be performed in accord with GL 89-04, but recommended that the licensee evaluate nonintrusive testing methods for the interim period until replacement occurs. The licensee indicates that they have not implemented a nonintrusive test program at the Oconee Nuclear Station. Therefore, the licensee requests to credit the partial-stroke exercise as the acceptable test for the interim period until the valves are replaced and the disassembly and inspection program begins.

### 3.5.1 Licensee's Basis for Relief

The licensee states the following basis for the interim relief:

These valves cannot be full-stroke exercised because the present piping size configuration prevents recirculation flow from equaling design spray flow. Normal recirculation flow is approximately 1250 gpm [gallons per minute] and full [accident] flow for this system is 1500 gpm. The current valve configuration does not allow the valve to be disassembled without cutting the pipe.

### 3.5.2 Alternative Testing

The licensee proposes the following alternative testing:

These valves will be partial-stroke tested quarterly. Disassembly at refueling will begin as the current check valves are replaced. This will be completed on the following schedule:

Unit 1 End of Cycle 16  
Unit 2 End of Cycle 15  
Unit 3 End of Cycle 15

The present check valves cannot be disassembled because this would require cutting the valve out of the line and re-welding [it] back in place. The current check valves are of a split-body design and are welded in the piping as opposed to being flanged and bolted; so in order to disassemble and inspect the valves, they would have to be cut out of the line. . . . The new valves will be flanged to facilitate removal and inspection.

### 3.5.3 Evaluation

The test flow rate is 1250 gpm, or 88% of 1500 gpm (the design accident flow rate). That is, the accident flow rate is 250 gpm above the flow rate currently achieved during partial-stroke exercising each quarter. A test at 88% of the accident flow rate gives a high degree of assurance that the valves will open and pass 100% of the accident flow rate; therefore, the current testing is acceptable during an interim period of time until the valves are replaced with ones that enable disassembly and inspection on a periodic basis as an alternative to full-flow testing. The licensee has not proposed to qualify the test at 88% of the required flow as an acceptable alternative, though such an option in combination with periodic nonintrusive testing could potentially verify that the valve disc fully strokes during the reduced flow test. The licensee was not required by the NRC to replace these valves, but has apparently determined that replacement is preferred over using some type of nonintrusive test method and maintaining the valves currently installed. According to the dates in the previous revision of the request, the replacement valves will be installed during 1995 and 1996 (Unit 1 - 12/95, Unit 2 - 5/96, and Unit 3 - 7/95).

Testing in full compliance with the Code and the NRC's position in GL 89-04 for flow testing check valves (Position 1) is impractical due to the design of the system. Disassembly and inspection is also impractical due to the design of the installed valves. Requiring immediate compliance would create a considerable burden on the licensee, resulting in unit shutdowns to expedite valve replacement or development and implementation of another test method in the interim period.

### 3.5.4 Conclusion

The valve testing currently performed is acceptable for the interim period. Accordingly, the interim request is approved pursuant to 10 CFR 50.55a (f)(6)(i) based on the impracticality of the design of the system and the valves and in consideration of the burden on the licensee if the requirements were immediately imposed. Following valve replacement, the licensee's program for disassembly and inspection must be documented in the IST program in accord with the guidance in GL 89-04 or in accord with Paragraph 4.3.2.4(c) of OM Part 10.

3.6 Relief Request-VLV-17 for the core flood tanks discharge check valves and safety injection to the reactor coolant system check valves was approved in the November 1994 SE. Portions of the request have been deleted and the request indicates that the valves will be disassembled and inspected to verify the full-stroke capability of the valves. The portions of the request that have not been deleted relate to post-maintenance testing and full-stroke exercising prior to returning the valves to service following corrective action. Both of these requirements were noted as approved in the November 1994 SE because of the relation to the use of disassembly and inspection in accord with GL 89-04, Position 2. The approval remains valid. A partial-stroke exercise is performed during unit startup following disassembly, consistent with guidance in Position 2.

3.7 Relief Request-VLV-24 applies to the reactor vessel internal vent valves and indicates that the testing will be in accord with Final Safety Analysis Report (FSAR) Section 4.5.4.2.6 during refueling outages. The July 1993 SE noted that the testing described in FSAR Section 4.5.4.2.6 meets the guidance in GL 89-04, Position 2, and approved the request. The approval remains valid.

### 3.8 Additional Discussion on Valve Testing

#### *Calculational Methods for Verifying Full-Stroke Capability of Check Valves:*

For Relief Requests VLV-10 and VLV-17 (discussed above), the licensee was cautioned that a calculational method for determining the full stroke of the valves based on the flow coefficient (calculated versus design) does not alone meet the requirements for "other positive means" allowed by the Code. Though the licensee responded to Action Item 4.8 from the SE as if this testing would be continued, the requests indicate that disassembly and inspection will be used to verify the full-stroke capability of the applicable check valves. The previous revision also discussed disassembly and inspection. Though the portion of the request discussing the calculational method has been deleted, if the licensee is continuing to rely on such a method or plans to use the method in the future, it should refer to an Oak Ridge National Laboratory report issued for similar testing at the Fort Calhoun Station and observe the recommendations in the report (i.e., higher accuracy test instrumentation, high degree of precision for the readability of the strip charts, and maximization of the time increment for analysis). The report is attached to a letter addressed to Terry L. Patterson, Docket No. 50-285, dated October 1, 1993. If similar testing is performed at the Oconee Nuclear Station, the NRC considers that the testing is an acceptable method for verifying the capability of the check valves to pass accident flow. Plants using the method have typically verified the adequacy of the testing with nonintrusive techniques and plan a periodic reverification. Because the testing does not meet the Code as "other positive means," approval from the NRC is required prior to implementing such testing.

*Changed Relief Requests to Test Deferrals:* With the incorporation of the requirements of Part 10 for valve IST, a number of relief requests have been changed to test deferral justifications. Part 10 includes provisions for extending testing to refueling outages when it is impractical to perform full-stroke exercising during power operations and during cold shutdown conditions. In all, the program now includes 30 cold shutdown justifications and 27 refueling outage justifications, resulting in the elimination of 28 relief requests. Test deferrals are not evaluated in this Safety Evaluation.

*Deletion of Valve Relief Requests:* The licensee reviewed relief requests that had previously been denied, assessed recommendations in the SEs, updated to the requirements of Part 10, or modified the plant in a manner that negates the need for certain relief requests. Consequently, a number of valve relief requests have been deleted from the IST program. Specifically, the following relief requests have been eliminated: GNR-VLV-11, GNR-VLV-07, RR-VLV-12, RR-VLV-18, RR-VLV-32, GNR-VLV-2, GNR-VLV-04, GNR-VLV-05, GNR-VLV-06, GNR-VLV-09, and GNR-VLV-01.

#### 4.0 PUMP RELIEF REQUESTS

The licensee has not changed the basis for previous approval and therefore the approval remains valid for the pump relief requests that have been revised. Several pump relief requests have been deleted for various reasons. RR-PMP-01 was deleted as instrumentation modifications have ensured compliance with the Code vibration instrumentation requirements. GNR-PMP-03 was deleted as recommended in the SE as the request was redundant to RR-PMP-02. RR-PMP-02 now references GNR-PMP-05 for vibration instrument accuracy and range requirements (both relief requests were approved in the November 1994 SE). The licensee notes that GNR-PMP-05 is now considered an "interim" relief until August 1, 1995, when all vibration monitoring equipment will meet the Code requirements. RR-PMP-02 was also revised to delete discussion regarding alternate acceptance criteria. GNR-PMP-04 was deleted as relief is not required to comply with IWP-3210 for establishing allowable ranges of the test parameters. GNR-PMP-02 was revised to include only positive displacement pumps so that it will agree with provisions of approval in the November 1994 SE (monitoring only discharge pressure in accord with OM Part 6). Non-Code class pump relief request RR-PMP-03 was deleted.

#### 5.0 CONCLUSION

The actions taken by the licensee adequately address the staff's recommendations in the previous SEs. The "interim" relief granted pursuant to 10 CFR 50.55a(f)(6)(i) in Paragraph 3.5 above is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest. The granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for the relief request. In granting the relief, the staff considered the burden that would result if the Code requirements were immediately imposed.

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