



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO INSERVICE TESTING PROGRAM, THIRD TEN-YEAR INTERVAL

FACILITY OPERATING LICENSE NO. DPR-51

ENTERGY OPERATIONS, INC.

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

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 are performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (the 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.

Section 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).

The Arkansas Nuclear One, Unit 1 (ANO-1) IST Program is based on the requirements in the 1989 Edition of the Code, Section XI, Subsections IWP and IWV, which provide that the rules for IST of pumps and valves will meet the requirements set forth in the 1988 Addenda to the 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." The ANO-1 IST program covers the third ten-year IST interval.

ENCLOSURE

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## 2.0 EVALUATION

The NRC staff, with technical assistance from Brookhaven National Laboratory (BNL), has reviewed the information concerning IST program requests for relief submitted for the third ten-year intervals for ANO-1, in a Entergy Operations, Inc. (the licensee) letter dated December 1, 1997. The staff adopts the evaluations and recommendations for granting relief or authorizing alternatives contained in the Technical Evaluation Report (TER), included as Attachment 2 to this SE, prepared by BNL. Attachment 1 to this SE lists each relief request and the status of approval. The test deferrals of valves, as allowed by OM-10, were also reviewed. Results of this review are provided in Section 4.0 of the TER with recommendations for further review by the licensee for specific deferrals.

For the ANO-1 IST Program, relief is granted from, or alternatives are authorized to, the testing requirements which have been determined to be impractical to perform, where an alternative provides an acceptable level of quality and safety, or where compliance would result in a hardship or unusual difficulty without a compensating increase in quality or safety. Relief Request Number 12 was denied because the licensee's request for generic relief from the Code requirements related to certification of relief valve correlations was determined to be inappropriate. Three relief requests were granted with provisions: Relief Request Numbers 2 and 5 were granted provided that the licensee evaluate partial stroke exercising the check valves as specified in GL 89-04, Position 2; and Relief Request Number 8 was authorized provided that there are no owner-established acceptance criteria for these relief valves, based on system and valve design basis or technical specifications, more stringent than  $\pm 2\%$  of the nameplate set pressure.

BNL, using the ANO-1 Updated Final Safety Analysis Report, conducted a scope review for the following systems against the requirements of Section XI and the regulations: emergency feedwater; intermediate cooling; service water; and makeup and purification systems. The review revealed five items that did not appear to be in compliance with the Code requirements (see Section 5.0 of the TER). The licensee should review these items, as well as other systems that might contain similar problems, and revise their program as appropriate.

The IST program relief requests which are granted or authorized are acceptable for implementation provided the action items identified in Section 6.0 of the TER are addressed within one year of the date of the SE or by the end of the next refueling outage, whichever is later. Additionally, the granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the alternatives proposed. Program changes involving new or revised relief requests must be submitted to NRC for review. New or revised relief requests that meet the positions stated in GL 89-04, Attachment 1, should be submitted to the NRC but may be implemented provided the guidance in GL 89-04, Section D, is followed. Program changes that add or delete components from the IST program should also be periodically provided to the NRC.

A discussion of the start date and length of the third ten-year interval for Unit 1 is included in Sections 1.0 and 6.1 of BNL's TER. The NRC staff authorized, in its letter and safety evaluation dated August 2, 1994, an extension to the second ten-year interval and stated that the licensee had the flexibility to choose which subsequent interval to shorten. The licensee

requested that the third ten-year interval begin December 2, 1997 and end on December 2, 1997, and end on December 2, 2007. Contrary to the finding in the TER, the staff finds this interval to be acceptable and consistent with the previous authorization which would allow the licensee to shorten the fourth interval or a subsequent interval if the plant lifetime is extended.

### 3.0 CONCLUSION

The ANO-1 IST program requests for relief from the Code requirements have been reviewed by the staff with the assistance of its contractor, BNL. The TER provides BNL's evaluation of these relief requests. The staff has reviewed the TER and concurs with the evaluations and recommendations for granting relief or authorizing alternatives. A summary of the relief request determinations is presented in Attachment 1. The authorizing of alternatives or granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the alternatives proposed. For any 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 generic letter. The implementation of IST program and relief requests is subject to inspection by the NRC.

The licensee should refer to the TER, Section 6.0, for a discussion of recommendations identified during the review. The licensee should address each recommendation in accordance with the guidance therein. The IST program relief requests are acceptable for implementation provided the action items identified in Section 6.0 of the TER are addressed within one year of the date of this SE or by the end of the next refueling outage, whichever is later, unless otherwise specified in the TER. Contrary to the TER, the staff finds that the proposed beginning of the third ten-year interval on December 2, 1997, and ending of the interval on December 2, 2007, is acceptable.

The staff concludes that the relief requests approved herein will provide reasonable assurance of the operational readiness of the pumps and valves to perform their safety-related functions. The staff has determined that granting relief pursuant to 10 CFR 50.55a (f)(6)(i) and authorizing alternatives pursuant to 10 CFR 50.55a (a)(3)(i) or (a)(3)(ii) are authorized by law and 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 impracticality of performing the required testing and the burden on the licensee if the requirements were imposed. The reliefs which have been granted and alternatives which have been authorized in this SE are valid for the remainder of the ANO-1 third ten-year IST program interval.

#### Attachments:

1. Summary of Pump and Valve Relief Requests - ANO Unit 1
2. Technical Evaluation Report (TER), Brookhaven National Laboratory, June 30, 1998
3. TER Appendix A, Evaluation of ANO-1's Valve Testing Deferral Justifications

Principal Contributor: Joseph Colaccino, DE/EMEB

**Attachment 1-Summary of Pump and Valve Relief Requests-ANO Unit 1**

| Relief Request No. | TER Section | Code Requirement                                      | Equipment Identification   | Proposed Alternate Method of Testing  | NRC Action   |
|--------------------|-------------|---|--|---|--|
| 1                  | 3.2.1       | Part 10, ¶4.2.2.3(c), Valve seat leakage requirements | DH-13A, 13B, 17, 18; Decay heat removal system pressure isolation valves                     | Leak test valve group.  | No relief is required.   |
| 2                  | 3.3.1       | Part 10, ¶4.3.2, Exercise frequency                   | BS-4A and B, Reactor building spray pump's discharge to headers check valves                 | Sample disassembly and inspection program.  | Relief granted in accordance with 10CFR50.55a(f)(6)(i), with provisions.       |
| 3                  | 3.3.2       | Part 10, ¶4.3.2, Exercise frequency                   | MS-271, 272; Main steam to EFW pump turbine check valves                                     | Verify closure each refueling cycle using non-intrusives. Full stroke exercise quarterly.   | Alternative approved in accordance with 10CFR50.55a(a)(3)(i).                  |
| 4                  | 3.3.3       | Part 10, ¶4.3.2, Exercise frequency                   | CS-293 and 294, CST to EFW pump suction check valves   | Full-stroke exercise at least once each refueling cycle using non-intrusives. Partial stroke exercise quarterly.  | Alternative approved in accordance with 10CFR50.55a(a)(3)(i).                  |
| 5                  | 3.3.4       | Part 10, ¶4.3.2, Exercise frequency                   | CA-61 and 62, Sodium Hydroxide Storage tank to reactor building spray pump stop check valves | Sample disassembly and inspection program. Partial stroke exercise quarterly.   | Relief granted in accordance with 10CFR50.55a(f)(6)(i), with provisions.       |
| 6                  | 2.1         | Part 6, ¶5.2, test reference values                   | P-4A, B, and C, Service Water Pumps  | Use reference pump curve.   | Relief granted in accordance with 10CFR50.55a(f)(6)(i).                        |
| 7                  | 2.2         | Part 6, ¶5.2, Measurement of flowrate                 | P-36A, B, and C, High Pressure Injection Pumps   | Test quarterly without measurement of a portion of the flow through the mini-flow path. During cold shutdowns, isolate mini-flow path and measure total flow through pumps. | Relief granted in accordance with 10CFR50.55a(f)(6)(i).                        |
| 8                  | 3.1.1       | Part 1, ¶1.4.1.2, Set pressure measurement accuracy   | PSV-1412, 1617, Relief valves on the BWST and Sodium Hydroxide Storage Tank                  | Establish accuracy to limit actual set pressure to 2% above the stamped set pressure.   | Alternative approved in accordance with 10CFR50.55a(a)(3)(i), with provisions. |

**Attachment 1-Summary of Pump and Valve Relief Requests-ANO Unit 1**

| Relief Request No. | TER Section | Code Requirement   | Equipment Identification  | Proposed Alternate Method of Testing   | NRC Action  |
|--------------------|-------------|--|---|--|---|
| 9                  | 3.1.2       | Part 1, ¶8.2, seat tightness testing                               | PSV-1412, 1617, Relief valves on the BWST and Sodium Hydroxide Storage Tank | None.  | Alternative approved in accordance with 10CFR50.55a(a)(3)(ii).  |
| 10                 | 3.1.3       | Part 1, ¶8.1.2.2, Test accumulator volume requirements             | Various SRVs  | Use accumulator requirements in 1994 Addenda of OM Code.   | Alternative approved in accordance with 10CFR50.55a(a)(3)(i).   |
| 11                 | 3.1.4       | Part 1, ¶8.1.2.4 and 8.1.3.4, Thermal equilibrium                  | Various SRVs  | For valves tested under ambient conditions using a medium at ambient conditions, test temperature will be recorded, however, no verification of thermal equilibrium will be performed. | No approval required to use the clarification in the 1994 Addenda of the OM Code. The licensee's basis for defining ambient as under 150 deg. F is subject to NRC inspection. |
| 12                 | 3.1.5       | Part 1, ¶8.1.2.5 and 8.1.3.5; Use of alternate media (temperature) | Various SRVs  | Test at ambient temperatures using the cold differential test pressure provided by manufacturer or cognizant engineer, without a correlation.  | Relief denied.  |