



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

**ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 – APPROVAL OF REQUEST FOR  
ALTERNATIVE FROM CERTAIN REQUIREMENTS OF THE AMERICAN SOCIETY OF  
MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE  
(EPID L-2020-LLR-0076)**

**LICENSEE INFORMATION**

**Licensee:** Entergy Operations, Inc.

**Licensee Address:** ANO Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
N-TSB-58  
1448 S.R. 333  
Russellville, AR 72802

**Plant Name and Units:** Arkansas Nuclear One (ANO), Units 1 and 2

**Docket Nos.:** 50-313 and 50-368

**APPLICATION INFORMATION**

**Submittal Date:** May 27, 2020

**Submittal Agencywide Documents Access and Management System (ADAMS) Accession No.:** ML20148M343

**Supplement Date:** November 17, 2020

**Supplement ADAMS Accession No.:** ML20322A141

**Licensee Proposed Alternative No. or Identifier:** EN-20-RR-001, Revision 1

**Applicable Inservice Inspection (ISI) Program Interval and Interval End Date:** ANO, Unit 1 is in its fifth 10-year ISI interval, which is scheduled to end May 30, 2027. ANO, Unit 2 is also currently in its fifth 10-year ISI interval, which is scheduled to end March 25, 2030.

**Alternative Provision:** Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(z)(1), "Acceptable level of quality and safety."

**ISI Code Requirements:** Subsection IWA of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, provides requirements for repair/replacement activities of code class components. These rules include classification of

components (IWA-1320, IWA-1400(a)), arrangements with an Authorized Inspection Agency (IWA-1400(f)), written programs and plans (IWA-1400(j)), Quality Assurance Program (IWA-1400(n)), requirements for performing repair/replacement activities (IWA-4000), reporting responsibilities (IWA-6210(d) and IWA-6210(e)), and record retention (IWA-6350).

**ASME Code Components Affected:** ASME Code Class 2 and 3 components and their supports except Class CC<sup>1</sup> and MC<sup>2</sup> items, greater than Nominal Pipe Size (NPS) 4 piping within the break exclusion region, and greater than NPS 4 feedwater system piping from the steam generator, including the steam generator, to the outer containment isolation valve.

**Applicable Code Edition and Addenda:** ASME Code, Section XI, 2007 Edition through 2008 Addenda.

**Brief Description of the Proposed Alternative:** Entergy Operations, Inc. (Entergy, the licensee) proposed to implement Code Case N-752, "Risk-Informed Categorization and Treatment for Repair/Replacement Activities in Class 2 and 3 Systems Section XI, Division 1," in lieu of the code requirements listed above. Code Case N-752 provides alternative rules for repair/replacement of certain Class 2 and 3 components and their supports. Code Case N-752 provides for risk-informed categorization as high safety significance (HSS) or low safety significance (LSS). LSS components are exempted from the code requirements listed above; in lieu of these requirements, Code Case N-752, paragraph -1420, requires the Owner to define alternative treatment requirements, which will confirm with reasonable confidence that each LSS item remains capable of performing its safety-related function. These treatment requirements must cover items such as design control, procurement, installation, configuration control, and corrective actions. During the previous 10-year interval, the U.S. Nuclear Regulatory Commission (NRC) staff authorized the ANO licensee to utilize Request for Alternative ANO2-R&R-004, Revision 1 (ADAMS Accession No. ML071150108) for determining the risk-informed categorization and for implementing alternative treatment for repair/replacement activities on moderate and high energy Class 2 and 3 items at ANO, Unit 2. By letter dated April 22, 2009 (ADAMS Accession No. ML090930246), the NRC staff authorized the alternative. The Code Case N-752 methodology is based on, and very similar to, the methodology described in ANO2-R&R-004.

For additional details on the licensee's submittal, please refer to the documents located at the ADAMS Accession Nos. identified above.

## REGULATORY EVALUATION

**Regulatory Basis:** 10 CFR 50.55a(z)(1)

Adherence to Section XI of the ASME Code is mandated by 10 CFR 50.55a(g)(4), "Inservice inspection standards requirement for operating plants," which states, in part, that ASME Code Class 1, 2, and 3 components will meet the requirements, except the design and access

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<sup>1</sup> Class CC items are concrete containment items for which the requirements are in ASME Code, Subsection IWL of Section XI defined by Section III, Division 2, Article CC-1000.

<sup>2</sup> Class MC items are metal containment or liners of concrete containments for which the requirements are in ASME Code, Subsection IWE of Section XI described in Section III, Subsection NE, Article NE-1110.

provisions and the preservice examination requirements, set forth in the ASME Code, Section XI.

Section 50.55a(z), "Alternative to codes and standards requirements," of 10 CFR states, in part, that alternatives to the requirements of 10 CFR 50.55a(b) through (h) may be used, when authorized by the Director, Office of Nuclear Reactor Regulation, if (1) the proposed alternatives would provide an acceptable level of quality and safety or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The licensee has submitted this request on the basis that a proposed alternative would provide an acceptable level of quality and safety.

### **TECHNICAL EVALUATION**

The NRC staff has evaluated proposed Alternative EN-20-RR-001, Revision 1, pursuant to 10 CFR 50.55a(z)(1). Specifically, the NRC staff has reviewed the risk categorization, alternate treatment, probabilistic risk assessment (PRA) quality, and the feedback/adjustment process requirements of Code Case N-752 to determine if they will provide an acceptable level of quality and safety.

In evaluating the risk categorization, the NRC staff compared the licensee's prior request, proposed Alternative ANO2-R&R-004, to the requirements of Code Case N-752. The ANO2-R&R-004 request was based on ASME Code Case N-660, "Risk-Informed Safety Classification for Use in Risk-Informed Repair/Replacement Activities, Section XI, Division 1," with several substantive changes to the methodology that would affect the safety-significant classification assigned to structures, systems, and components (SSCs). These proposed substantive changes were reviewed by the NRC staff in its authorization letter for ANO2-R&R-004 and included clarification how operator actions are credited; clarification how shutdown operation and external initiating events are characterized; modifications to the qualitative considerations; and guidelines for basing the consequence evolution on small pipe breaks instead of large breaks. The NRC staff also approved the licensee's implementation of Code Case N-660's generic PRA quality and monitoring requirements and its proposed treatment program. Code Case N-752 incorporates the approved substantive changes listed above in the methodology.

Licensees that have implemented 10 CFR 50.69, "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors," may specify alternative treatment for Risk-Informed Safety Class (RISC)-3 and RISC-4 SSCs to the ISI, and repair and replacement (with the exception of fracture toughness), requirements for ASME Class 2 and Class 3 SSCs in 10 CFR 50.55a(g). The licensee has not yet implemented 10 CFR 50.69 at ANO Units 1 and 2. However, Code Case N-752 also permits exemptions from ASME Code, Section XI, Subsection IWA requirements for repair/replacement activities. The specified exemptions in Code Case N-752 are consistent with scope of the requirements for RISC-3 and RISC-4 SSCs listed in 10 CFR 50.69(b)(1) that licensees can voluntarily exempt after implementation of 10 CFR 50.69.

Code Case N-752 requires the licensee to define alternative treatment requirements that confirm with reasonable confidence that each LSS item remains capable of performing its safety-related functions under design-basis conditions. Code Case N-752, paragraph -1420,

“LSS Items,” describes the characteristics that must be addressed by the licensee’s alternate treatment for these activities on LSS components. The elements covered include:

- (a) Establishing administrative controls for these repair/replacement activities.
- (b) Fracture toughness requirements of the original Construction Code and Owner’s Requirements shall be met.
- (c) Evaluation of changes in configuration, design, materials, fabrication, examination, and pressure-testing requirements of the repair/replacement activity, as applicable, to ensure the structural integrity and leak-tightness of the system are sufficient to support the design bases functional requirements of the system.
- (d) Items used for repair/replacement activities shall meet the Owner’s Requirements or revised Owner’s Requirements as permitted by the licensing basis.
- (e) Items used for repair/replacement activities shall meet the Construction Code to which the original item was constructed. Alternatively, items used for repair/replacement activities shall meet the technical requirements of a nationally recognized code, standard, or specification applicable to that item.
- (f) Repair methods of nationally recognized post construction codes and standards applicable to the item may be used.
- (g) Repair/replacement activities, and associated non-destructive examination, shall be in accordance with the Owner’s Requirements and, as applicable, the Construction Code, or post-construction code or standard, selected for the repair/replacement activity. Alternative examination methods may be used, as approved, by the Owner. Non-destructive examination personnel may be qualified in accordance with IWA-2300, in lieu of the Construction Code.
- (h) Pressure testing of the repair/replacement activity shall be performed in accordance with the requirements of the Construction Code selected for the repair/replacement activity or shall be established by the Owner.
- (i) Baseline examination of the items affected by the repair/replacement activity, if required, shall be performed in accordance with the requirements of the Owner’s program for periodic inspection of the item selected for examination.

The NRC staff finds that the licensee’s adherence to the above elements covered in Code Case N-752 for repair/replacement activities provides reasonable confidence that each LSS item will remain capable of performing its safety-related function.

The list of treatment requirements in Code Case N-752, paragraph -1420, however, is not totally consistent with 10 CFR 50.69(d)(2), “RISC-3 SSCs.” The regulation at 10 CFR 50.69(d)(2) states, in part, that “[i]nspection and testing, and corrective action shall be provided for RISC-3 SSCs.” In its letter dated May 27, 2020, the licensee stated that the ISI, inservice testing (IST), snubber IST, and other inspection programs of LSS components were not affected by this request. In addition, Section 5.2.E, Item No. 12 of the licensee’s application defines corrective actions for LSS items. Therefore, the NRC staff finds the licensee’s alternative treatment

requirements are consistent with the requirements in 10 CFR 50.69(d)(2)(ii), "Corrective action," and therefore acceptable.

Code Case N-752, Mandatory Appendix I, "Risk-Informed Categorization Process for Class 2 and 3 Systems," states, in part, that for plants with a risk-informed inservice inspection (RI-ISI) program, the technical adequacy of the PRA used to support the evaluations required by this Appendix shall be assessed to confirm the applicability to categorization, including verification of assumptions on equipment reliability. The alternative authorized for ANO2-R&R-004, Revision 1 for ANO, Unit 2 was the basis for Code Case N-752 and demonstrated adequate PRA technical requirements, as outlined in the NRC staff's safety evaluation dated April 22, 2009. ANO, Units 1 and 2 are approved by the NRC for the Electric Power Research Institute streamlined RI-ISI methodology in safety evaluations dated June 2, 2010 (ADAMS Accession No. ML101170127) and January 5, 2011 (ADAMS Accession No. ML103500532). More recently, the NRC staff approved license amendments for Risk-Informed Technical Specifications Task Force (TSTF) Initiative 5b for ANO, Units 1 and 2, in safety evaluations dated May 22, 2019 and April 23, 2019 (ADAMS Accession Nos. ML19098A955 and ML19063B948, respectively). Risk-Informed TSTF Initiative 5b requires a higher level of PRA technical adequacy than RI-ISI. The licensee states that it intends to review and assess the existing PRAs to verify that they support the evaluations required by Code Case N-752, and will also maintain a feedback and process adjustment process as defined in 10 CFR 50.69(e), which will require updates to the PRA and categorization and treatment process based on review of changes to the plant, operational practices, and applicable plant and industry operational experiences. In its request dated May 27, 2020, the licensee states that these reviews and process adjustments will be done in a timely manner and at a period not to exceed every two refueling outages.

Based on the above, , the NRC staff finds that the ANO, Units 1 and 2 PRAs reflect the as-built, as-operated plants and are capable of supporting the safety significance categorization of Code Case N-752, and that the feedback and process adjustments will provide reasonable confidence that each LSS item remains capable of performing its safety-related function.

Code Case N-752 would allow LSS items to be exempt from ASME Code, Section XI, IWA-1400(o), which requires the licensee to document a Quality Assurance Program in accordance with 10 CFR Part 50 or ASME NQA-1. However, footnote (1) in Code Case N-752 states, "If compliance with 10 CFR 50 Appendix B or NQA-1 is required at the Owner's facility, IWA-1400(o) is not exempt." By letter dated October 26, 2020 (ADAMS Accession No. ML20300A324), the licensee submitted a proposed revision to the Entergy Quality Assurance Program Manual (QAPM), which stated, in part, that program elements would be developed for repair/replacement of LSS items to ensure continued capability and reliability of the design basis function. The applicable quality controls that will be implemented for the treatment of the LSS SCCs are described in the NRC staff's safety evaluation approving Entergy's QAPM change, dated May 19, 2021 (ADAMS Accession No. ML21132A279).

Based on information provided, the NRC staff finds that: (1) the proposed risk categorization methodology will satisfactorily classify the affected Class 2 and 3 components as HSS or LSS, (2) the alternate treatment requirements in Code Case N-752 will provide confidence that each LSS item remains capable of performing its safety-related function, (3) the current ISI, IST and other inspection programs will continue, (4) the licensee's corrective action program will continue to provide actions to correct conditions that could prevent an LSS item from performing its safety function, (5) the feedback and process adjustment will allow timely update of the elements of this program, (6) the licensee's PRA has sufficient technical quality to support this

application, and (7) the repair/replacement program quality elements will ensure that the LSS items remain capable of performing their design safety function. Therefore, the NRC staff finds that the proposed alternative will provide an acceptable level of quality and safety.

### **CONCLUSION**

The NRC staff has determined that the proposed alternative in the licensee's request referenced above would provide an acceptable level of quality and safety.

The NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1).

The NRC staff authorizes the use of proposed alternative EN-20-RR-001 at ANO, Units 1 and 2 for the remainder of each units' fifth 10-year ISI interval.

All other ASME Code, Section XI, requirements for which an alternative was not specifically requested and authorized in this alternative remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector, except as modified by this request.

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Date: May 19, 2021

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\*via eConcurrence

NRR-106

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