



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

May 28, 2021

Mr. James Barstow
Vice President, Nuclear Regulatory Affairs
and Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A-C
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 – PROPOSED ALTERNATIVE
TO THE REQUIREMENTS OF THE ASME CODE (EPID L-2021-LLR-0019)

Dear Mr. Barstow:

By letter dated March 26, 2021, the Tennessee Valley Authority submitted a request to the Nuclear Regulatory Commission (NRC) for the use of an alternative to certain American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV Code), Section XI requirements at Sequoyah Nuclear Plant, Units 1 and 2. Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(2), the licensee requested to use an alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty.

The NRC staff has reviewed the subject request and concludes, as set forth in the enclosed safety evaluation, that the Tennessee Valley Authority has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Therefore, the NRC staff authorizes the use of proposed alternative 21-ISI-1 at Sequoyah Nuclear Plant, Units 1 and 2, starting with the Spring 2021 Outage and for the duration of the fourth 10-year inservice inspection interval, currently scheduled to end on April 30, 2025. All other ASME BPV Code, Section XI, requirements for which relief was not specifically requested and approved remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

If you have any questions, please contact the Project Manager, Michael Wentzel, at 301-415-6459 or Michael.Wentzel@nrc.gov.

Sincerely,

David J. Wrona, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosure: Safety Evaluation

cc: Listserv



UNITED STATES
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE REQUEST NO. 21-ISI-1

FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

1.0 INTRODUCTION

By letter dated March 26, 2021, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21085A764), the Tennessee Valley Authority (the licensee) requested relief from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPV Code) for the Sequoyah Nuclear Plant (Sequoyah), Units 1 and 2.

The licensee proposed to perform an enhanced visual examination as an alternative to the liquid penetrant examination required by the original Construction Code for the final weld. In addition, if a modified seal weld overlay is required due to an identified defect that cannot be removed, a weld buildup will be installed over the subject canopy seal weld without removal of the defect. Pursuant to Paragraph 50.55a(z)(2) of Title 10 of the *Code of Federal Regulations* (10 CFR), the licensee requested to use the proposed alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

The regulations at 10 CFR 50.55a(g), "Preservice and inservice inspection requirements," require, in part, that inservice inspection (ISI) of the ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda as a means of detecting anomaly and degradation indications so that structural integrity of these components can be maintained.

The regulations at 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state, in part, that alternatives to the requirements of paragraphs (b) through (h) of 10 CFR 50.55a, or portions thereof may be used, when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that: (1) the proposed alternative would provide an acceptable level of quality and safety, or (2) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.0 TECHNICAL EVALUATION

3.1 Licensee's Alternative Request No. 21-ISI-1

Applicable Inservice Inspection (ISI) Program Interval and Interval End Date

Fourth 10-year ISI interval, currently scheduled to end on April 30, 2025.

ISI Requirement

ASME BPV Code, Section XI, Article IWA-4000, "Repair/Replace Activities."

Applicable Code Edition and Addenda

ASME Code, Section XI, 2007 Edition through 2008 Addenda, and ASME Code Section III, 1971 Edition through Winter 1972 Addenda.

Proposed Alternative

Starting with the Spring 2021 refueling outage, the licensee is planning to periodically inspect the control rod drive mechanism (CRDM) latch assemblies and associated driveline components. If a latch assembly needs to be replaced, the mid canopy seal weld for the subject CRDM would need to be cut and rewelded after the CRDM housing is reassembled. Because of a combination of physical limitations, personnel safety, and consideration of high radiation exposure, the licensee has requested the use of contingent alternative 21-ISI-1 for the re-installation of the CRDM mid canopy seal welds at Sequoyah, Units 1 and 2. For additional details on the licensee's request, please refer to the document located at the ADAMS Accession No. ML21085A764.

3.2 NRC Staff Evaluation

Article IWA 4000 of the ASME Code, Section XI requires that repairs be performed in accordance with the owner's original construction code for the component or system, or later editions and addenda of the Code. The original construction code for 53 of the CRDM housings at Sequoyah, Units 1 and 2, is the ASME Code, Section III, Summer 1968 Edition. However, that edition of the Code does not have specific fabrication or examination requirements applicable to the canopy seal welds. Four CRDM housing assemblies for each of the Sequoyah units were purchased separately and are certified to the ASME Code, Section III, 1971 Edition through Winter 1972 Addenda. The ASME Code, Section III, 1971 Edition through Winter 1972 Addenda has requirements applicable to the CRDM canopy seal welds. The licensee has chosen to apply the requirements of the ASME Code, Section III, 1971 Edition through Winter 1972 Addenda to the re-installation of Sequoyah canopy seal welds. The NRC staff notes that in order to replace or repair a canopy seal weld in accordance with ASME Code, Section III, 1971 Edition through Winter 1972 Addenda, a new or repaired canopy seal weld would require surface examination and removal of indications followed by another surface examination to ensure that rejectable indications have been removed. There are currently no known degraded canopy seal welds at Sequoyah, Units 1 and 2. The licensee's current request is intended as a contingency in case a CRDM latch assembly is repaired as a result of the planned internal inspections for the CRDMs at Sequoyah, Units 1 and 2.

The NRC staff reviewed the licensee's basis and justification for its contingency alternative repair and subsequent examination method, as stated in proposed alternative 21-ISI-1. The NRC staff finds that the licensee's assertion that compliance with the ASME Code requirements for the CRDM mid-canopy seal welds at Sequoyah, Units 1 and 2, would result in hardship or unusual difficulty is acceptable on the basis that the subject components are located such that there is limited space and high radiation levels.

In the event that a CRDM mid canopy seal weld at Sequoyah, Units 1 and 2, would require to be replaced or modified with a seal weld overlay, the licensee has proposed using a remote enhanced visual examination on the completed weld in lieu of the required ASME Code surface examinations. Additionally, as an added contingency in the event that a defect is identified in the seal weld or adjoining base metal that cannot be removed, the licensee has proposed using a modified seal weld overlay, without removal of the defect. The final weld will be examined by the proposed remote enhanced visual means. The licensee will perform a demonstration of the remote visual examination for the Authorized Nuclear Inservice Inspector to qualify the adequacy of the enhanced visual examination.

The NRC staff notes that the structural components associated with the CRDMs are assembled by threaded connections. The CRDM assemblies and their threaded joints provide the primary pressure boundary and structural support for the CRDMs. The canopy seal welds are intended for secondary pressure retention only and do not provide the primary pressure boundary or structural support. The licensee provided a drawing that demonstrates the general configuration of a CRDM with the mid canopy seal weld along with a latch assembly that may need to be replaced (Figure 1 of submittal).

The NRC staff also notes that it approved similar alternatives in 1996 and 2000 for use at Sequoyah, Unit 1, to repair and examine lower canopy seal welds (ADAMS Accession Nos. ML20107L104 and ML003749067).

In summary, the NRC staff reviewed the licensee's submittal and finds that compliance with the ASME BPV Code requirements for the re-installation of mid canopy seal welds would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Additionally, the NRC staff finds that proposed alternative 21-ISI-1 will provide reasonable assurance of leak tightness and structural integrity because: 1) the proposed repair follows the welding qualification requirements of the ASME Code, Section XI, 2) the proposed repair will meet the design requirements of ASME Code, Section III, 3) alternate enhanced examination will be qualified by demonstration for the Authorized Nuclear Inservice Inspector, 4) similar alternatives were approved and used previously at Sequoyah, Unit 1, 5) structural integrity of the subject components will not be altered by the alternative, and 6) these components would be subject to the periodic system leakage testing requirements of the ASME BPV Code, Section XI.

4.0 CONCLUSION

The NRC staff has determined that complying with the specified requirements described in the licensee's request referenced above would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The proposed alternative provides reasonable assurance of structural integrity and leak tightness of the subject components. Therefore, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(2).

The NRC staff authorizes the use of proposed alternative 21-ISI-1 at Sequoyah, Units 1 and 2, starting with the Spring 2021 Outage and for the duration of the fourth 10-year ISI interval, currently scheduled to end on April 30, 2025.

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

Principal Contributor: R. Kalikian

Dated: May 28, 2021

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 – PROPOSED ALTERNATIVE TO THE REQUIREMENTS OF THE ASME CODE (EPID L-2021-LLR-0019) DATED MAY 28, 2021

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