



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

September 3, 2024

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SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1 – AUTHORIZED ALTERNATIVE TO REQUIREMENTS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE (EPID L-2024-LLR-0028)

Dear Edward Casulli:

By letter dated April 9, 2024, as supplemented by letter dated April 11, 2024, Susquehanna Nuclear, LLC (the licensee) submitted Relief Request 4RR-11 (a proposed alternative) to the U.S. Nuclear Regulatory Commission (NRC) for Susquehanna Steam Electric Station, Unit 1. Pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(z)(2), the licensee requested to use an alternative to certain requirements in the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (BPV Code), Section XI, on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. In its supplement, the licensee stated that the proposed alternative provides for an acceptable level of quality and safety as set forth in 10 CFR 50.55a(z)(1).

The licensee proposed an alternative to defer the system leakage test for the volume between the inboard and outboard main steam isolation valves (MSIVs) on the 'D' main steam line until the next Unit 1 refueling and inspection outage. The NRC staff has reviewed the subject request and concluded that Relief Request 4RR-11 has adequately addressed all the regulatory requirements set forth in 10 CFR 50.55a(z)(1) and that the proposed alternative provides an acceptable level of quality and safety. On April 11, 2024, the NRC staff communicated its verbal authorization of Relief Request 4RR-11 to the licensee in accordance with Office of Nuclear Reactor Regulation Office Instruction LIC-102, Revision 3, "Review of Relief Requests, Proposed Alternatives, and Requests to Use Later Code Editions and Addenda." LIC-102, Revision 3 states that the staff should issue its written safety evaluation within 150 calendar days after giving verbal authorization. The NRC staff's written safety evaluation is enclosed.

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.

E. Casulli

- 2 -

If you have any questions, please contact Audrey Klett (NRC's licensing project manager for Susquehanna) at (301) 415-0489 or [Audrey.Klett@nrc.gov](mailto:Audrey.Klett@nrc.gov).

Sincerely,

Hipólito González, Chief  
Plant Licensing Branch I  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-387

Enclosure:  
Safety Evaluation

cc: Listserv



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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September 3, 2024

**SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION FOR  
RELIEF REQUEST 4RR-11 (PROPOSED ALTERNATIVE)  
FIFTH 10-YEAR INSERVICE INSPECTION INTERVAL  
SUSQUEHANNA NUCLEAR, LLC  
ALLEGHENY ELECTRIC COOPERATIVE, INC.  
SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1  
DOCKET NO. 50-387**

1.0 INTRODUCTION

By letter dated April 9, 2024 (Agencywide Documents Access and Management System Accession No. ML24100A832), as supplemented by letter dated April 11, 2024 (ML24102A125), Susquehanna Nuclear, LLC (the licensee) submitted Relief Request 4RR-11 to the U.S. Nuclear Regulatory Commission (NRC) for Susquehanna Steam Electric Station (Susquehanna), Unit 1. The licensee requested to use an alternative to certain requirements in the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (BPV Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," paragraph IWB-5222(b) to delay a system leakage test until the next Susquehanna, Unit 1 refueling and inspection outage expected in spring 2026.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, paragraph (z)(2), the licensee requested to defer the system leakage test for the volume between the inboard and outboard main steam isolation valves (MSIVs) on the 'D' main steam line on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. In its supplemental letter dated April 11, 2024, the licensee stated that the information provided in Relief Request 4RR-11 would justify that the proposed alternative provides an acceptable level of quality and safety as set forth in 10 CFR 50.55a(z)(1). The licensee requested this alternative for the remainder of the current fourth inservice inspection (ISI) interval (scheduled to end on May 31, 2024) and the portion of the fifth ISI interval that includes the period between the start of the interval (i.e., June 1, 2024) and the end of cycle 24 in spring 2026 for Susquehanna, Unit 1.

The NRC staff concluded that the licensee has adequately addressed all the regulatory requirements set forth in 10 CFR 50.55a(z)(1) and found that the proposed alternative provides an acceptable level of quality and safety. On April 11, 2024 (ML24103A001), the NRC staff communicated its verbal authorization of Relief Request 4RR-11 to the licensee in accordance with Office of Nuclear Reactor Regulation Office Instruction LIC-102, Revision 3, "Review of

Enclosure

Relief Requests, Proposed Alternatives, and Requests to Use Later Code Editions and Addenda.”

## 2.0 REGULATORY EVALUATION

### 2.1 Regulations

The NRC regulations in 10 CFR 50.55a(g)(4), “Inservice inspection standards requirement for operating plants,” state, in part, that ASME BPV Code Class 1, 2, and 3 components must meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME BPV Code, Section XI.

The NRC regulations in 10 CFR 50.55a(z), “Alternative to codes and standard requirements,” state, in part, that alternatives to the requirements of 10 CFR 50.55a(b) to (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 submitted Relief Request 4RR-11 on the basis that compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, but in its supplement stated that the proposed alternative also provides an acceptable level of quality and safety as required by 10 CFR 50.55a(z)(1).

### 2.2 ASME BPV Code

#### *Applicable Code Edition*

Susquehanna’s fourth ISI program interval began on June 1, 2014, and ended on May 31, 2024. The applicable code of record for the fourth ISI program interval is the 2007 Edition of ASME BPV Code, Section XI, with 2008 Addenda.<sup>1</sup>

The fifth ISI interval for Unit 1 began on June 1, 2024, and is currently scheduled to end on May 31, 2034. The applicable code of record for the fifth ISI program interval is the 2019 Edition of ASME BPV Code, Section XI. Because the proposed alternative for Susquehanna, Unit 1 Cycle 24 operation will span portions of the fourth and fifth ISI intervals, the applicable codes are provided for both intervals.

#### *Applicable Code Requirements*

Paragraph IWB-5222(b) in Section XI of the ASME BPV Code requires the system leakage test pressure retaining boundary to extend to all Class 1 components within the system boundary. Specifically, IWB-5222(b) states that the Class 1 pressure retaining boundary, which is not pressurized when the system valves are in the position required for normal reactor startup, shall be pressurized and examined at or near the end of the inspection interval. This boundary may be tested in its entirety or in portions, and testing may be performed during the testing of the boundary of IWB-5222(a).

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<sup>1</sup> All references to ASME BPV Code, Section XI, in this document are to the 2007 Edition with the 2008 Addenda unless another edition is explicitly cited.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Proposed Alternative

##### *ASME BPV Code Components Affected*

The components affected are the 'D' main steam line piping between, and including, the inboard and outboard MSIVs. The MSIVs are designed to prevent uncontrolled primary coolant release to the environment in the event of a steam line break downstream of the MSIVs.

##### *Proposed Alternative*

The licensee's proposed alternative includes performing a partial IWB-5222(b) pressure boundary test for all applicable piping for the 'D' main steam line to the inboard MSIV during the spring 2024 refueling outage, while deferring the remaining IWB-5222(b) inspection for the volume between the inboard and outboard MSIVs on the 'D' main steam line until the unit's next refueling and inspection outage, which is projected for spring 2026. In addition, the licensee will continue to perform the required IWB-5222(b) leakage test at or near the end of the fifth ISI interval, which is projected for 2034. The volume between the inboard and outboard MSIVs on the 'D' main steam line for this alternative was previously inspected satisfactorily in 2014, 2016, 2018, and 2020 as part of the IWB-5222(b) inspection and as part of inspections performed in accordance with IWB-5222(a) as allowed by Section XI of the ASME BPV Code.

##### *Licensee's Basis for Use*

The licensee requested to use the alternative pursuant to 10 CFR 50.55a(z)(2), on the basis that compliance with the specified ASME BPV Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The licensee requested NRC authorization of the proposed alternative pursuant to 10 CFR 50.55a(z)(2) on the basis that the alternative provides a hardship or unusual difficulty without a compensating increase in the level of quality and safety. However, in its supplement, the licensee stated that the proposed alternative would provide an acceptable level of quality and safety as set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff determined that it would review the request pursuant to 10 CFR 50.55a(z)(1) to evaluate whether the proposed alternative provides an acceptable level of quality and safety.

##### *Reason for the Proposed Alternative*

During the spring 2024 refueling outage, leakage through the outboard MSIV on the 'D' main steam line was detected during the required leak rate test per 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." The licensee elected to repair the valve within the scope of work being performed this outage. However, the unanticipated need to repair the valve impacted the scheduling and resources needed for the pressure boundary test. In addition, previous inspections in accordance with IWB-5222(a) and IWB-5222(b) of the 'D' main steam line did not reveal any adverse conditions.

#### 3.2 NRC Staff Evaluation

As part of the licensee's proposed alternative, the licensee would defer the IWB-5222(b) inspection for the volume between the inboard and outboard MSIVs on the 'D' main steam line

until the unit's next refueling outage, which is projected for spring 2026. Therefore, all other required Class 1 pressure boundary components, except for the volume between the inboard and outboard MSIVs on the 'D' main steam line, have been inspected per IWB-5222(b) during the spring 2024 refueling outage. In addition, the licensee provided a summary of all the inspections performed for the volume between the inboard and outboard MSIVs on the 'D' main steam line during each of the unit's refueling and inspection outages since 2014. The volume between the inboard and outboard MSIVs on the 'D' main steam line for this alternative was previously inspected satisfactorily in 2014, 2016, 2018, and 2020 as part of the IWB-5222(b) inspection and as part of inspections performed in accordance with IWB-5222(a) as allowed by Section XI of the ASME BPV Code. The NRC staff reviewed this proposed alternative of deferring the inspection by taking into consideration the intent of the specific ASME BPV Code requirement and the previous inspections performed to determine whether the alternative provides an acceptable level of quality and safety.

The NRC staff notes that Table IWB-2500-1, "Examination Category B-P," of Section XI requires specific inspections of all Class 1 pressure retaining components under Item B15.10 and Item B15.20. Item B15.10 of Table IWB-2500-1 requires a system leakage test of the Class 1 pressure boundary, which is conducted prior to a plant startup following each refueling outage in accordance with IWB-5222(a) with all valves in the position required for normal reactor startup. Item B15.20 of Table IWB-2500-1 requires testing of the Class 1 pressure boundary, which is not pressurized during the first inspection. The second inspection is performed in accordance with IWB-5222(b) of Section XI and is required to be performed at or near the end of the ISI interval. In addition, per IWB-5222(b), this inspection may be performed in its entirety or in portions and may also be performed during the inspection conducted in accordance with IWB-5222(a). The fourth ISI interval for Susquehanna, Unit 1 ended on May 31, 2024, and, therefore, per IWB-5222(b) the leakage test should have been performed at this refueling outage. All required Class 1 pressure boundary components, except for the volume between the inboard and outboard MSIVs on the 'D' main steam line, have been inspected per IWB-5222(b) this past refueling outage.

The intent of the IWB-5222(b) requirement to perform the inspection at or near the end of the ISI interval is to ensure that the inspection interval does not exceed 10 years. The NRC staff finds that deferring the IWB-5222(b) inspection for the volume between the inboard and outboard MSIVs on the 'D' main steam line to 2026 would make the time between inspections to be less than 10 years. Taking into consideration the proposed inspections with the previous inspections, the volume between the inboard and outboard MSIVs on the 'D' main steam line would have been inspected in 2014, 2016, 2018, 2020, 2026, and 2034. In addition, the licensee had performed a satisfactory volumetric inspection of the weld upstream of the outboard isolation valve in 2020, which provides another verification on monitoring any degradation in the system. With these inspections, the NRC staff finds that the volume between the inboard and outboard MSIVs on the 'D' main steam line has been effectively monitored to ensure its leak tightness and structural integrity. Therefore, the NRC staff finds that the proposed alternative meets the intent of Section XI of the ASME BPV Code for inspecting the applicable components at least every 10 years. In addition, in its supplemental letter dated April 11, 2024, the licensee stated that the information provided in the proposed alternative would justify that the proposed alternative provides for an acceptable level of quality and safety as set forth in 10 CFR 50.55a(z)(1). Based on the numerous inspections performed on the volume between the inboard and outboard MSIVs on the 'D' main steam line that met or exceeded the requirements of IWB-5222(b), except for the timing of the inspection, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety.

Based on the above evaluation, the NRC staff finds that the licensee's proposed alternative in Relief Request 4RR-11 will provide an acceptable level of quality and safety in accordance with 10 CFR 50.55a(z)(1).

#### 4.0 CONCLUSION

The NRC staff concludes that the proposed alternative to defer the IWB-5222(b) inspection for the volume between the inboard and outboard MSIVs on the 'D' main steam line until the unit's next refueling outage, which is projected for spring 2026, is acceptable.

As described above, the NRC staff determines that the licensee's proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1). Therefore, the NRC staff authorizes the use of the proposed alternative as documented in the licensee's submittal, as supplemented, at Susquehanna, Unit 1 for the remainder of the fourth ISI interval and the portion of the fifth ISI interval that includes the period between the start of the interval (i.e., June 1, 2024) and the end of cycle 24 (projected for spring 2026) for Susquehanna, Unit 1.

All other 10 CFR 50.55a and 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.

#### 5.0 PRINCIPAL CONTRIBUTORS

J. Honcharik, NRR  
T. Scarbrough, NRR

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1 – AUTHORIZED ALTERNATIVE TO REQUIREMENTS OF THE ASME BOILER AND PRESSURE VESSEL CODE (EPID L-2024-LLR-0028) SEPTEMBER 3, 2024

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