



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

REGULATORY AUDIT REPORT

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

IN SUPPORT OF THE REVIEW OF EPRI REPORT 3002032184, "U.S. INDUSTRY
PERFORMANCE MONITORING INSPECTION PLAN FOR SELECT ASME CODE
EXAMINATION ITEMS OF PWR STEAM GENERATORS AND PRESSURIZERS"

DECEMBER 2025 – MAY 2026

ELECTRIC POWER RESEARCH INSTITUTE

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1. BACKGROUND

By letter dated June 19, 2025 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML25171A128), Electric Power Research Institute (EPRI) submitted Non-Destructive Examination (NDE) Technical Report (TR) titled "U.S. Industry Performance Monitoring [(PM)] Inspection Plan for Select ASME [American Society of Mechanical Engineers] Code Examination Items of PWR [Pressurized Water Reactor] Steam Generators [(SGs)] and Pressurizers [(PZR)]" (TR or the NDE Optimization TR), to the U.S. Nuclear Regulatory Commission (NRC) for review and approval. This letter was supplemented by letter dated April 7, 2026 (ML26098A337, the Supplement). The PM inspection plan presents a comprehensive, U.S. PWR fleet-wide inspection plan for the SG and PZR components to address the NRC's requirement for PM.

By email dated July 18, 2025 (ML25078A179), the NRC staff accepted the NDE Optimization TR for review.

The NRC staff had determined that a regulatory audit of EPRI NDE Optimization TR should be conducted in accordance with the Office of Nuclear Regulatory Reactor (NRR) Office Instruction LIC-111, "Regulatory Audits," Revision 2, effective October 1, 2024 (ML24309A281), for the NRC staff to gain a better understanding of EPRI's U.S. PWR-fleet-wide inspection plan for SGs and PZR components to address the NRC's requirement for PM. The audit plan was issued on December 8, 2025 (ML25211A269) and supplemented on January 13, 2026 (ML26013A088).

A regulatory audit is a planned license or regulation-related activity that includes the examination and evaluation of primarily non-docketed information. The audit is conducted with the intent to gain understanding, to verify information, and to identify information that will require

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docketing to support the basis of a licensing or regulatory decision. Performing a regulatory audit is expected to assist the NRC staff in efficiently conducting its review and gaining insights into the vendor's processes and procedures. Information that the NRC staff relies upon to make the safety determination must be submitted on the docket.

2. REGULATORY AUDIT OBJECTIVES

To assist in its review, the NRC staff conducted a virtual regulatory audit from December 8, 2025, through May 8, 2026, from the NRC Headquarters in Rockville, MD. The objective of the audit was to increase review process efficiency through interaction with the EPRI technical experts. During the audit, the NRC staff reviewed pertinent documentation made available by EPRI and discussed various topics to gain an understanding of the NRC staff's docketed information needs. A more detailed narrative on the topics covered is included below in Section 4, "Discussion," of this audit report. A list of all the documents that the NRC staff reviewed is included in Section 5, "Documents Reviewed."

The NRC audit team was composed of the following members:

NAME	ASSIGNMENT	BRANCH	DIVISION
Stephen Cumblidge	Technical Reviewer fMaterials Engineer	Piping and Head Penetration Branch (NP)	Division of New and Renewed Licenses (DNRL)
Lois James	Senior Project Manager	Licensing Projects Branch	Division of Operating Reactor Licensing
Steven Levitus	Technical Reviewer fMaterials Engineer	Vessels and Internals Branch (NVIB)	DNRL
Dan Widrevitz	Technical Reviewer fMaterials Engineer	NVIB/NPHP	DNRL

The following personnel represented or supported EPRI during the audit:

NAME	AFFILIATION
James Cirilli	EPRI
Robert Grizzi	EPRI
Scott Chesworth	Structural Integrity Associates, Inc (SIA)
Nat Cofie	SIA

3. REGULATORY AUDIT BASES

The NRC regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(g)(4), “Codes and standards,” state, in part, components that are classified as ASME Code Class 1, 2, and 3 must meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The NRC regulations in 10 CFR 50.55a(z) state, in part, that alternatives to the requirements of paragraph (g) of 10 CFR 50.55a may be used, when authorized by the NRC staff, if the licensee demonstrates (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.

4. AUDIT SUMMARY

4.1. Audit Discussion

The audit began with a detailed overview of each section of the TR and the associated methodology used by EPRI. Specific audit questions and discussions focused on the following topic areas: plant-specific welds reported per component, distribution of examinations across intervals, handling of component replacements in the fleet-wide inspection plan, handling of plant restarts in the fleet-wide inspection plan, defect reporting and monitoring requirements, the periodicity of PM inspection plan update submittals, and changes needed for clarity.

4.1.1. Plant-Specific Welds Reported Per Component

Section 4.2 of the TR discusses the methodology behind the TR sampling plan. The plan samples from the population of SG and PZR welds in the U.S. PWR fleet, which are detailed in Tables 2 and 3, respectively, of the TR. The NRC staff performed a cursory review of the number of welds reported in Tables 2 and 3 prior to the audit and submitted Audit Question 1. After discussion during the audit, the NRC staff requested EPRI perform a detailed review of a sample of Group 2 plants (plants which do not already have an NRC approved alternative), along with a detailed review of specific plants which seemed inconsistent with the NRC understanding of those plant designs. The NRC staff also performed a review of Tables 2 and 3 data against the licensee submittals for alternative approval which are designated as Group 1 plants. Although the detailed review resulted in small changes to the population count of SG and PZR welds, the changes were minimal. Further, the TR proposes sampling rate aims to sample 38 percent of the population, which greatly exceeds the 25 percent minimum which has been approved by the NRC in specific alternatives. The NRC staff considers the proposed sampling plan to be adequate to meet PM minimums.

4.1.2. Distribution of Examinations Across Intervals

Section 5.2.1 of the TR states that exams can be divided within the assigned interval but also seems to limit the ability to divide them entirely. For a unit with four or more exams, the TR states to perform at least two exams within one period of the prescribed period. The NRC staff submitted Audit Question 3 noting that the words in Section 5.2.1 of the TR did not match the example provided in Figure 15 to demonstrate the way in which examinations can be distributed. EPRI confirmed that Figure 15 was incorrect and updated it to match the description in Section 5.2.1 via the Supplement.

4.1.3. Component Replacement

Section 5.3 of the TR discusses how examinations would be handled at a unit which replaced the SGs or PZR. Because a replacement SG or PZR does not have a history of defect-free examinations, the NRC staff submitted Audit Question 4 to clarify how the PM inspection plan will address component replacement. EPRI clarified that replacement of SGs or PZR are subject to 100 percent of the required ASME Section XI examinations during one interval, although the examinations can be spread out over the three successive periods following the repair/replacement activity rather than over a defined interval. EPRI updated the associated wording regarding this clarification in the Supplement. This methodology ensures that new components receive at least one interval worth of baseline ASME Section XI inspections prior to entering the fleet-wide PM inspection plan, and it allows licensees who wish to re-enter the fleet-wide PM inspection plan to do so after three periods, regardless of the period in which the repair/replacement activity occurred.

4.1.4. Plant Restarts

Section 6.3 of the TR addresses the steps to be taken by a new PWR or by a PWR that had been shut down for an extended period prior to participating in the fleet-wide PM plan. The NRC staff submitted Audit Question 13 requesting clarification regarding these processes. After audit discussions, the NRC staff asked if it would be appropriate to separate plants in extended outages due to prolonged work scope or emergent repairs from plants which have been shuttered or decommissioned and subsequently seek to restart. EPRI proposed that plants in extended outages, but which otherwise continue to execute licensing operation and maintenance functions, maintain eligibility to participate in the fleet-wide PM plan. New PWR plants and plants which have ceased operations and subsequently seek to restart will need to complete at least one full interval of ASME Code Section XI required examinations prior to participating in the fleet-wide PM plan. The NRC staff considers this approach reasonable for new PWR plants for the same reasons noted when discussing component replacements. The NRC staff also considered this approach reasonable for shuttered plants which seek to restart to ensure that a lack of maintenance during the period of closure do not result in unanticipated degradation mechanisms.

4.1.5. Defect Reporting and Defect Monitoring Requirements

Section 6.1 of the TR discusses the process that would take place if any new unacceptable service-induced indications were identified during examinations covered by the PM inspection plan. Since the EPRI technical basis reports which support the reduction in inspections of the PWR SG and PZR welds indicate that development of new unacceptable service-induced indications should be extremely unlikely in the covered applications, the NRC staff is particularly concerned that an indication would be evidence of a previously unidentified degradation mechanism. The NRC staff issued Audit Questions 7 through 11 to clarify several aspects regarding the defect reporting and adjudication process.

First, the NRC staff asked for clarification about how defect reporting would be addressed. EPRI reported that indications would be evaluated as required by ASME Code, Section XI, and by the corrective action program at the affected plant. Based on the welds which fall under the TR, regulatory requirements would likely trigger automatic reporting to the NRC by the plant. Further, EPRI confirmed that licensees shall notify the EPRI Materials Issue Program of inspection findings that are significant or that may have potential generic implications in accordance with Nuclear Energy Institute guidance document NEI 03-08, "Guidelines for the

Management of Material Issues,” Appendix B, “Implement Protocol.” The NRC staff confirmed that these mechanisms address NRC staff concerns about ensuring the PWR community is aware of potential new degradation mechanisms.

Second, the NRC staff requested clarification regarding whether the additional examinations required by ASME Code, Section XI, IWB/IWC-2430(a)(1)(-a), referenced in the first bullet of Section 6.1 of the TR, would require additional examinations based on the number of examinations scheduled under the fleet-wide PM inspection plan or based on the number of examinations that would have been required by ASME Code, Section XI, were the fleet-wide PM inspection plan is not in effect. EPRI confirmed that additional examinations equal to the number that would have been performed under the baseline ASME Code, Section XI, requirements will be performed.

Third, the NRC staff and EPRI representatives had several discussions about the need to expand examinations of the potentially degraded welds to examine the affected item numbers at other plants. The EPRI representatives proposed that all PWR units at the same plant site of the same nuclear steam supply system design will revert to the ASME Code, Section XI, examination requirements. EPRI representative also proposed that examinations of the weld category and item number containing an unacceptable indication at one unit will be inspected at the first refueling outage following discovery of the defect at the other units at the plant site. The NRC staff considers that this approach balances the need for a timely response to the discovery of a potentially unidentified degradation mechanism with the likelihood that plant-specific factors could be the cause of an unacceptable defect and limits the expansion of examinations to units at the same site of the same design.

The results of these discussions and clarifications have been fully captured in the Supplement.

4.1.6. PM Inspection Plan Update Periodicity

Sections 5.4 and 7 of the TR discuss when the fleet-wide PM inspection plan would be updated and when the updated version would be transmitted to the NRC by a Letter Addendum on a “for information” basis. The NRC staff requested clarification about the second and third bullets on the list of events which would trigger an update by Audit Questions 5 and 6 in the Letter Addendum. The second bullet on the list of events included when PWR units request and receive approval for alternative inspections schedules from the NRC. Although the use of the PM plan will streamline alternative submittals, all uses of the PM plan by licensees would require submittal of an alternative so this language implies a high frequency of updates. The third bullet on the list of events that would trigger an update noted when units “deviate from the original inspection schedule” but the use of the word “original” is unclear in this context. EPRI confirmed that the intent in both cases was to capture when licensees deviate from the fleet-wide inspection plan. The two bullets were updated in the Supplement to capture the intended event trigger for updates.

4.1.7. Administrative Clarifications

Section 5.2.1 of the TR discusses the logic behind the proposed inspection schedule and contains a statement that “approximately ten components are inspected every year.” The NRC staff submitted Audit Question 2 to clarify if the statement intended to specify ten examinations or ten components (i.e., a full complement of inspections on each component). EPRI confirmed that the statement intends to refer to ten examinations and corrected it via the Supplement.

Section 6.2 of the TR discusses how the fleet-wide PM inspection plan will operate in regard to future license renewals. The NRC staff noted that the TR states the "...PM plan shall be addressed in the plant-specific license renewal application or in a separate proposed alternative submitted to the NRC..." The NRC staff submitted Audit Question 12 noting that mixing regulatory actions such as a license renewal or subsequent license renewal under 10 CFR Part 54, "Requirements for renewal of operating licenses for nuclear power plants," and an Alternative Request under 10 CFR 50.55a(z) can be logistically difficult to process for both licensees and the NRC staff. The EPRI representatives agreed with the NRC staff's concern and updated the language to remove the wording about license renewal applications from the TR as in the Supplement.

5. DOCUMENTS REVIEWED

The following documents were made available on the electronic portal by EPRI and were reviewed by the NRC staff during the audit:

- EPRI draft responses to NRC Audit Question Responses, revised January 22, 2026
- North Anna, Units 1 and 2, SG and PRZ Raw Data
- Diablo Canyon, Units 1 and 2, SG and PRZ Raw Data
- Summary sheets (per plant) of item counts for SGs and PRZs
- St Lucie Unit 1, SG and PRZ Raw Data
- South Texas Project, Units 1 and 2, SG and PRZ Raw Data
- Wolf Creek, Unit 1, SG and PRZ Raw Data
- St Lucie, Unit 2, SG and PRZ Raw Data
- Prairie Island, Unit 2, SG and PRZ Raw Data
- Prairie Island, Unit 1, SG and PRZ Raw Data
- Point Beach, Unit 2, SG and PRZ Raw Data
- Point Beach, Unit 1, SG and PRZ Raw Data
- Draft Template – PM Relief Request for SG and PRZ

6. CONCLUSION

The audit accomplished the objectives listed in Section 2 by allowing direct interaction with EPRI technical experts. The NRC staff participants were able to obtain clarification on multiple questions and examine calculation notes and supporting documentation. The clarifications and examination allowed the NRC staff to assess the need for requests for additional information (RAIs). Based on the results of the audit and the submittal of the Supplement, the NRC staff do not anticipate the need for RAIs.