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To: [Michael Schultheis](#); [Johann Britting](#)
Cc: [ext. Amy Filbrandt](#); [Marlayna Doell](#); [Ilka Berrios](#)
Subject: Request for Additional Information RE: Steam Generator Tube Sleeve Amendment L-2025-LLA-0036
Date: Wednesday, May 7, 2025 10:19:00 AM
Attachments: RAI-10571-TS.pdf

Mike/Johann,

By letter dated February 11, 2025 (Agencywide Documents Access and Management System Accession No. ML25042A692), Holtec Palisades, LLC requested U.S. Nuclear Regulatory Commission (NRC) review and approval of a license amendment request (LAR) to revise the Palisades Nuclear Plant (PNP) technical specifications to allow the use of Framatome Alloy 690 sleeves to repair defective steam generator (SG) tubes as an alternative to removing the tubes from service by plugging.

On April 10, 2025, the NRC staff sent the licensee DRAFT RAIs to ensure that the questions are understandable, the regulatory basis is clear, there is no proprietary information contained in the RAIs, and to determine if the information was previously docketed. On April 29, 2025, the NRC and the licensee held a clarification call to discuss the DRAFT RAIs. During the call, a 30-day from the date of this email to respond to the RAIs was agreed upon. The attached is the final version of the RAIs. These RAIs will be put in ADAMS as a publicly available document.

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REQUEST FOR ADDITIONAL INFORMATION
BY THE OFFICE OF NUCLEAR REACTOR REGULATION
PALISADES - LAR TO SUPPORT SG REPAIR BY SLEEVING
HOLTEC DECOMMISSIONING INTERNATIONAL, LLC
PALISADES NUCLEAR PLANT
DOCKET NO. 05000255

Background

By letter dated February 11, 2025 (Agencywide Documents Access and Management System Accession No. ML25042A692), Holtec Palisades, LLC requested U.S. Nuclear Regulatory Commission (NRC) review and approval of a license amendment request (LAR) to revise the Palisades Nuclear Plant (PNP) technical specifications to allow the use of Framatome Alloy 690 sleeves to repair defective steam generator (SG) tubes as an alternative to removing the tubes from service by plugging. The approval of this LAR is contingent upon the prior approval of the LAR, dated December 14, 2023 (ML23348A148), that supports resumption of power operations at PNP (e.g., restores power operation technical specifications) and is currently under NRC review.

The LAR to permit SG sleeve installation proposed changes to the following PNP technical specifications. Note, these proposed changes modify the PNP power operation technical specifications that are currently under NRC review in the December 14, 2023, LAR.

- Surveillance Requirement (SR) 3.4.1.3, Verify PCS [primary coolant system] total flow rate within the limit specified in the COLR [core operating limits report],
- Technical Specification (TS) 3.4.17, "Steam Generator (SG) Tube Integrity,"
- TS 5.5.8, "Steam Generator (SG) Program," and
- TS 5.6.8, "Steam Generator Tube Inspection Report."

Regulatory Basis

Section 182(a) of the Atomic Energy Act requires nuclear power plant operating licenses to include TS. In 10 CFR 50.36, "Technical specifications," NRC regulatory requirements related to the content of the TS are established. The TS for all current pressurized water reactor (PWR) licenses require that an SG Program be established and implemented to ensure that SG tube integrity is maintained. Programs established by the licensee, including the SG Program, are listed in the administrative controls section of the TS and contain the necessary requirements to operate the facility in a safe manner.

SG tube integrity is maintained by meeting the performance criteria specified in the TS for structural and leakage integrity, consistent with the plant design and licensing basis. The TS require that a condition monitoring assessment be performed during each outage in which the SG tubes are inspected, to confirm that the performance criteria are being met. The TS include provisions regarding the scope, frequency, and methods of SG tube inspections. These provisions require that the inspections be performed with the objective of detecting flaws of any type that may be present along the length of a tube and that may satisfy the applicable tube plugging criteria.

The applicable tube plugging criteria, specified in the TS, are that tubes found during in service inspection to contain flaws with a depth equal to or exceeding 40 percent of the nominal wall

thickness shall be plugged, unless the tubes are permitted to remain in service through application of alternate repair criteria provided in the TS. The TS also include a limit on operational primary-to-secondary leakage, beyond which the plant must be promptly shut down. Should an existing flaw that exceeds the tube integrity repair limit not be detected during the periodic tube surveillance required by the plant TS, the operational leakage limit provides added assurance of timely plant shutdown before tube structural and leakage integrity are impaired, consistent with the design and licensing bases.

The general design criteria (GDC) in Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (10 CFR) provide regulatory requirements that state the reactor coolant pressure boundary (RCPB) shall have “an extremely low probability of abnormal leakage and of gross rupture” (GDC 14), “shall be designed with sufficient margin” (GDCs 15 and 31), shall be of “the highest quality standards practical” (GDC 30), and shall be designed to permit “periodic inspection and testing...to assess ...structural and leak tight integrity” (GDC 32).

Question 1

LAR Section 3.5.1.c, “Sleeve Plugging Criteria,” states, “[t]he PNP TS tube plugging limit of >40 percent through wall (TW) is also applicable to the TSP [tube support plate] sleeve.”

The power operation PNP TS 5.5.8 item c, contains provisions for SG tube repair criteria. It currently states:

Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding 40% [percent] of the nominal tube wall thickness shall be plugged (emphasis added).

The proposed change in the LAR to support SG tube repair by installing sleeves states:

Tubes found by inservice inspection to contain a flaw in a non-sleeved region flaws with a depth equal to or exceeding 40% [percent] of the nominal tube wall thickness shall be plugged or repaired (emphasis added).

The proposed change to TS 5.5.8 does not appear to address tubes found by inservice inspection to contain flaws in the sleeve (e.g., a requirement to plug tubes found by inservice inspection that contain a flaw in a sleeve with a depth equal to or exceeding 40 percent of the nominal sleeve wall thickness). Given the discussion above, the NRC staff requests the licensee explain how this LAR Section 3.5.1.c plugging requirement is addressed in the proposed technical specifications or justify any alternative approach.

Question 2

LAR Section 3.5.1.c, “Sleeve Plugging Criteria,” states, “[t]he PNP SG Program currently requires plugging of crack-like indications on detection in the parent tubing, except in areas within the tubesheet covered by the existing alternate repair criteria. This same plug-on-detection criteria applies to the parent tubing portion of the pressure boundary in the sleeve joint regions.”

The proposed change to TS 5.5.8 does not appear to address “plug-on-detection” criteria for the parent tubing portion of the pressure boundary in the sleeve joint regions (e.g., a requirement to plug tubes with a flaw in a sleeve to tube joint). Given the discussion above, the NRC staff requests the licensee explain how this LAR Section 3.5.1.c plugging requirement is addressed in the proposed technical specifications or justify any alternative approach.

Question 3

SR 3.4.1.3 requires the licensee to “verify PCS total flow rate within the limit specified in the COLR,” with (in part) an event based Frequency based on plugging SG tubes that currently states:

After each plugging of 10 or more steam generator tubes

LAR Section 2.2, “Description of Proposed Change,” explains that the event based Frequency will add repairing SG tubes by sleeving because sleeves can impact PCS total flow rate. The proposed change (shown below with underline and italics) to SR 3.4.1.3 event based Frequency states:

After each plugging *or repairing of the number of steam generator tubes which results in the same primary flow reduction as plugging* 10 or more steam generator tubes

There is some ambiguity in the expression “... plugging **or** repairing...” (emphasis added). The use of “or” could mean that plugging or repairing would be considered individually. Based on the LAR, it appears that plugging or repairing or any combination of both should be compared against the event based Frequency criterion (e.g., results in the same primary flow reduction as plugging 10 or more steam generator tubes). The expression “and/or” means it could be one of these (plugging or repairing) or both of these (plugging and repairing) and may remove ambiguity. However, TSTF-GG-05-01, Revision 1, “Writer’s Guide for Plant-Specific Improved Technical Specifications” (ML12046A089), indicates the term “and/or” is to be avoided. Given the discussion above, the NRC staff requests the licensee explain how it plans to address the apparent ambiguity. In the response, the NRC staff requests the licensee evaluate the merits of modifying the expression in part to state, “After each plugging or repairing (or both) ...” as a means to address any ambiguity.

Question 4

The power operation PNP TS 5.5.8 provisions for items c.1 and c.2 provide tube repair criteria as an alternate to the tube plugging (40 percent depth) criteria. TS 5.5.8 provisions for item c.1 are associated with the SG hot-leg tubesheet region. TS 5.5.8 provisions for item c.2 are associated with the SG cold-leg tubesheet region.

- a. The LAR for SG tube repair by sleeving does not appear to directly impact or require changes to the TS 5.5.8 provisions for items c.1 and c.2. However, the LAR proposed changes to these provisions without a justification. Therefore, the NRC staff requests the licensee to provide a justification for updating the TS 5.5.8 provisions for items c.1 and c.2.
- b. Aside from differences between c.1 and c.2 such as “hot-leg” and “cold-leg” and dimensional differences “12.5 inches” versus “13.67 inches,” respectively, it appears that the proposed wording for c.1 and c.2 should have a parallel structure when compared to each other (note, the current specifications contain a parallel structure). However, the LAR proposed changes that structures c.1 and c.2 differently, which could introduce an unintended technical change. For example, “flaws located XX inches below ...” versus “flaws located below XX inches ...” convey different meanings. Therefore, the NRC staff requests the licensee provide a justification for the structural differences between the provisions for items c.1 and c.2 and address the potential introduction of an unintended technical change.