

## **NRR-PMDAPEm Resource**

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**From:** Rankin, Jennivine  
**Sent:** Monday, April 18, 2016 10:14 AM  
**To:** ERICKSON, JEFFREY S (JERICKS@entergy.com); MIKSA, JAMES P (jmiksa@entergy.com)  
**Subject:** DRAFT RAIs for Palisades C-STAR License Amendment Request (MF7435)  
**Attachments:** DRAFT PNP Cstar RAIs.docx

Mr. Erickson and Mr. Miksa,

By letter dated March 3, 2016 (Agencywide Documents Access and Management System Accession No. ML16075A103), Entergy Nuclear Operations, Inc., submitted a license amendment request to revise portions of the Palisades Nuclear Plant Technical Specifications, to allow implementation of the C\* alternate repair criterion on the steam generator tubes.

The U.S. Nuclear Regulatory Commission staff has reviewed the information provided and determined that additional information is required in order to complete its review. Please see the attached file for the DRAFT request for additional information.

Please let me know by Wednesday April 20, 2016, or earlier, if a clarifying phone call is needed.

Thanks,  
Jennie

Jennie Rankin, Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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**From:** Rankin, Jennivine

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REQUEST FOR ADDITIONAL INFORMATION

ENTERGY NUCLEAR OPERATIONS, INC.

PALISADES NUCLEAR PLANT

LICENSE AMENDMENT REQUEST TO USE

THE C\* ALTERNATE REPAIR CRITERION FOR STEAM GENERATORS

DOCKET NO. 50-255

By letter dated March 3, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16075A103), Entergy Nuclear Operations, Inc. (the licensee), submitted a license amendment request to revise portions of the Palisades Nuclear Plant (PNP) Technical Specifications (TS), to allow implementation of the C\* (C-star) alternate repair criterion on the steam generator (SG) tubes.

Based on its review of the amendment request, the U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is required to complete the review. The requests for additional information below only pertain to the cold-leg; however, the licensee may want to consider revising the hot-leg requirements to prevent the TS from becoming overly complex.

RAI 1

In Section 5.1 of Attachment 1 (page 9), the tube-to-tubesheet (TTS) weld is described as a seal weld. As noted in Regulatory Issue Summary 2016-02, "Design Basis Issues Related to Tube-to-Tubesheet Joints in Pressurized-Water Reactor Steam Generators," dated March 23, 2016 (ADAMS Accession No. ML15169A543), the term "seal weld" does not always fully describe whether the weld was also qualified as a "structural weld." Please clarify whether the TTS welds in the PNP SGs are qualified as structural welds and whether this qualification was in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. If not, please discuss the design basis of the TTS joint to ensure structural integrity. Please discuss whether any of the qualification data for the TTS joint (if the joint is not a structural weld) is applicable to the C\* methodology. If applicable, discuss its impact on your application for C\*.

RAI 2

The proposed wording of TS Section 5.5.8c.2 addresses plugging tubes with flaws found within 12.5 inches below the bottom of the cold-leg expansion transition or top of the cold-leg tubesheet, whichever is lower. As currently proposed, this requirement would require tubes with nonservice-induced flaws (e.g., manufacturing burnish marks or over expansions) to be plugged. Please clarify if this was your intent. If not, consider revising the TS for clarity.

### RAI 3

When the NRC staff reviewed the H\* alternate repair criteria, one of the concerns was that cracks could exist in the TTS welds. If H\* was not applied to all tubes (i.e., if application of H\* was optional, rather than mandatory), it was not clear to the NRC staff how the integrity of the TTS welds would be assured, since there was not a qualified inspection technique for the TTS welds. As a result, licensees that adopted H\* applied it to all tubes in all of the steam generators at a given unit, rather than allowing an option that it may be applied.

- a. Please discuss whether C\* will be applied to all tubes on the cold-leg, rather than providing an option for it to be applied at PNP.
- b. In the proposed TS 5.5.8d., periodic inspections are required to be performed from the TTS weld at the tube inlet (i.e., hot-leg), to the TTS weld at the tube outlet (i.e., cold-leg). During these inspections, if a crack were found between the C\* depth and a TTS weld, TS 5.5.8d.3. requires an inspection for cracking in the next refueling outage, even though the tube with the crack would not require plugging in the current outage. Please discuss if TS 5.5.8d.3. is consistent with your proposed application of the C\* alternate repair criteria.
- c. In the proposed TS 5.5.8d.5., there is a 100 percent sampling of cold-leg tubes when and if C\* is implemented. The NRC staff notes that licensees adopting alternate repair criteria similar to C\* (e.g., H\* and F\*) typically used an inspection strategy that was less than a 100 percent sample on the cold-leg, based on their degradation assessment and their performance-based technical specification requirement to maintain tube integrity. Given past precedent, discuss whether you would still like to retain the 100 percent sampling requirement.
- d. TS 5.5.8d states, "...requirements of d.1, d.2, and d.3, d.4, and d.5 below, ..." The staff notes that TS 5.5.8d contains an extra "and" between d.2 and d.3. Please discuss your plans to remove the redundant "and".

### RAI 4

TS 5.6.8i references monitoring tubes for displacement. The word displacement could be misinterpreted to mean rotation or bending. The slippage of concern associated with implementation of C\* is axial tube displacement. Was your intent to monitor and report all these displacements? If not, please clarify what you plan to monitor and report in the Steam Generator Tube Inspection Report.

### RAI 5

The following questions pertain to Attachment 8 of the application, "Discussion of Applicability of H\* Lessons Learned, If Applicable to the Palisades Nuclear Plant Cold Leg C\* Analysis," LTR-SGMP-15-88, Rev. 1 NP-Attachment, dated February 23, 2016.

- a. Table 1 (page 4) provides cold-leg C\* distances, ranging from 12.79 inches to 13.67

inches, for various coefficient of thermal expansion (CTE) conditions. As part of the basis for not increasing the previously calculated C\* inspection distance of 12.5 inches, you referenced the current practice at PNP of inspecting one inch greater than the 12.5 inch inspection distance. It is possible that the tubesheet has a plus one sigma CTE and the tube has a minus one sigma CTE. Given that surveillance requirements are intended to assure the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met, please explain why the C\* inspection distance on the cold-leg is proposed at 12.5 inches, or provide a revised value supported by the analysis of Attachment 8 of the application (e.g. 13.67 inches).

- b. On page 5, it is stated that the only potential leakage source is from postulated indications below the inspection distance, since indications detected within the C\* distance must be plugged. Although this may be true most of the time, unexpected conditions could arise (e.g., missed indications or indications below the threshold of detectability within the C\* region). Please discuss your plans to assess the indications detected within the C\* distance to confirm that they do not pose a leakage concern.