

Regulatory Guide Periodic Review

Regulatory Guide Number: 1.121, Revision 0

Title: Bases for Plugging Degraded PWR Steam Generator Tubes

Office/division/branch: NRR/DNRL/NCSG

Technical Lead: Gregory Makar

Staff Action Decided: Reviewed with issues identified for future consideration

1. **What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?**
 - a. RG 1.121 Revision 0 refers to RG 1.83, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes," as guidance for performing steam generator (SG) tube inspections. However, RG 1.83 was withdrawn in 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13066A546) and was superseded by a Steam Generator Program in the Technical Specifications for each PWR unit.
 - b. The RG references a 1973 presentation to the NRC as demonstrating that degraded steam generator tubes have a safety margin against burst or collapse. That presentation is not readily available.
2. **What is the impact on internal and external stakeholders of not updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?**
 - a. Internal and external stakeholders, including applicants for licensing actions, would not be impacted if the existing RG is not updated. RG 1.121 provides guidance on establishing the amount of degradation of a PWR steam generator tube beyond which the tube should be removed from service (ML003739366). Therefore, the regulatory positions are related primarily to the safety margins for tube integrity, which are still based on stress analysis according to the ASME Code referenced in the RG. Although the limiting amount of degradation depends, in part, on the non-destructive inspection for measuring degradation, following RG 1.121 does not depend on the inspections being performed according to RG 1.83. All PWR licensees are now required to have a Steam Generator Program in the plant Technical Specifications. The Steam Generator Program includes tube inspection requirements that produce tube degradation measurements that are applicable to RG 1.121. Therefore, the withdrawal of RG 1.83 is an administrative issue for RG 1.121.
 - b. Internal and external stakeholders, including applicants for licensing actions, would not be impacted if the existing RG is not updated. The reference is not needed in order to use the RG and it has been well established that SG tubes have a safety margin against burst or collapse that allows for some degradation. For example, NUREG/CR-2336 (ML12202A073) describes the margin to burst and collapse based on laboratory tests of SG tubes with simulated thinning and cracking. In addition, the NRC staff concluded that the performance-

based Steam Generator Program in the Technical Specifications of all PWRs is consistent with the safety factors described in RG 1.121 (Nuclear Regulatory Commission (U.S.), Washington, D.C. *Federal Register*. Vol. 70, No. 40, pp. 10298-10312. March 2, 2005). Therefore, availability of the reference is an administrative issue for RG 1.121.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

Revision of RG 1.121 for the issues identified will take an estimated 0.2 FTE, including resolution of any public comments that may be received.

4. Based on the answers to the questions above, what is the staff action for this guide (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

Reviewed with issues identified for future consideration.

5. Provide a conceptual plan and timeframe to address the issues identified during the review.

Given the lack of impact for the identified issues, the staff will consider revising the RG prior to the next time the RG is periodically reviewed.

NOTE: This review was conducted in April 2023 and reflects the staff's plans as of that date. These plans are tentative and subject to change.