

NUCLEAR VALUE GUIDE – NVG-007

Decreasing Steam Generator Inspection Frequency

Summary

EPRI's Steam Generator Management Program (SGMP) helped develop steam generator technical specifications for performance-based inspection requirements.

This work eventually led to a regulator-approved revision of the technical specification to allow up to eight years of operation between inspections, saving time, money, and dosage from unnecessary inspections.

Example – Member Application

Savings have been realized by nuclear operators in the United States that have performed operational assessments justifying the longer inspection intervals. Such savings can apply for nuclear operators outside the United States as well.

Background

All Pressurized Water Reactors (PWR) have steam generators, which require inspections of their tubes due to their inherent nature as the important pressure boundary between the primary and secondary sides of the reactor. The required inspection intervals are prescribed in technical specifications. These inspections, while critical for safe and reliability operations, also incur significant expenditures for staffing requirements, as well as radiation doses to personnel.

APPLICABILITY

All PWRs with Alloy 690TT and Alloy 600TT tubing

VALUE

Each steam generator inspection cost \$3M-\$7M USD depending on the scope, which offers significant savings if it can be shown that the inspection is not required and can be delayed until a later refueling cycle.

Savings also include a **reduction in radiation dose to personnel**, as well as a **reduction in outage staff requirements by 30 to 180 people**.

EPRI PROGRAM

Steam Generator Management

EPRI's Role

EPRI's Steam Generator Management Program (SGMP) continues to provide the technical bases, guidance, and curated operating experience to improve steam generator technical specifications.

In 2012, EPRI successfully led an effort to revise this technical specification of the performance-based inspection interval to six years. Then in 2021, EPRI led a project and



discussions with the U.S. regulator to revise the technical specification again, which allowed up to eight years of operation between inspections for Alloy 690 Thermally Treated (TT) tubing material, and up to six years between inspections for Alloy 600 TT tubing material.

IMPLEMENTATION GUIDANCE

EPRI's staff expertise, and the many technical guides and other EPRI deliverables, can provide a technical basis to help determine an appropriate period of operations between inspections for specific sites.

Contact EPRI staff to discuss the details.

Value

Each steam generator inspection usually costs \$3M-\$7M USD depending on the scope. Operating the plants for more cycles without inspections can results in significant cost savings, such as the reduction in outage staff requirements by 30 to 180 people. An additional benefit of decreasing inspection frequency is a reduction in radiation dose to personnel.

Resources

- <u>3002020909</u>, Steam Generator Management Program: Steam Generator Integrity Assessment Guidelines, Revision 5
- <u>3002021140</u>, Steam Generator Management Program: Technical Bases for the Integrity Assessment Guidelines: Stress Corrosion Cracking (SCC) Default Growth Rates, Structural Minimum Method, and SCC Leak Rate Equations Technical Bases
- <u>3002018258</u>, Feasibility Study for Multi-Cycle 600TT Operational Assessments
- <u>3002019984</u>, Steam Generator Management Program: Extended Inspection Interval Analyses of Axial ODSCC at Tube Support Plate Intersections on High Residual Stress Tubes for Steam Generators with Alloy 600TT Tubing
- Updated operating experience from Alloy 690 Thermally Treated (TT) and Alloy 600 TT tubing in SGMP's Steam Generator Degradation Database

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To support more effective technology transfer, EPRI is tracking implementation of key R&D activities.

Please access this link to provide input on your company's use of this particular research:

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Access additional Value Guides and examples of EPRI R&D application at:

https://interactive.epri.com/nuclear-value/p/1

For more information, contact:

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February 2025

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