



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

March 13, 2023

U.S. Nuclear Regulatory Commission Public Meeting Summary

Title: Meeting with the Industry Steam Generator Task Force

Meeting Identifier: 20230122

Date of Meeting: February 23, 2023

Location: Webinar

Type of Meeting: Observation Meeting

Purpose of the Meeting: The purpose of this meeting was for the U.S. Nuclear Regulatory Commission (NRC) staff to discuss steam generator (SG) issues with the industry Steam Generator Task Force (SGTF).

General Details: The industry SGTF met with NRC staff on February 23, 2023, by webinar. The purpose of the meeting was to discuss a variety of SG issues. The NRC and industry slides are available in Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML23052A123 and ML23046A123, respectively. This meeting was noticed as a public meeting and the agenda is available under ML23045A120.

**LISTING OF ATTENDEES
U.S. NRC MEETING WITH THE INDUSTRY STEAM GENERATOR TASK FORCE**

February 23, 2023

Participant	Affiliation	Participant	Affiliation
Isaac Anchondo-Lopez	NRC	Allen Hiser	NRC
John Arhar	PG&E	Mike Innes	
Sasan Bakhtiari	ANL	Andrew Johnson	NRC
Jesse Baron	TVA	Craig Kelley	Framatome
James Benson	EPRI	Sean Kil	EPRI
Ashley Birdett	Luminant - CPNPP	Paul Klein	NRC
Cotasha Blackburn	Southern Company	Greg Makar	NRC
Steven Bloom	NRC	Tim Martinson	
Jasmyn Bone	Entergy	Jeremy Mayo	TVA
Steve Brown	Entergy	Patrick Purtscher	NRC
Brent Capell	EPRI	Jeff Raschiatore	Westinghouse
Brad Carpenter	Westinghouse	Adam Roslund	Westinghouse
James Cirilli	EPRI	Jay Smith	Westinghouse
Helen Cothron	EPRI	Michael Stark	Dominion Energy
Bill Cullen	EPRI	Leslie Terry	NRC
Jason Daniel	NRC	Kester Thompson	FPL
Timothy Deziel	NextEra Energy	Tim Thulien	Duke Energy
Lee Friant	Constellation Nuclear	Pat Wagner	Wolf Creek Nuclear Operating Corp.
Michael Frotscher	Entergy	John Wise	NRC
Veena Gubbi		Jonathan Zeitz	
Rich Guill	EPRI		

Summary of Presentations: Industry representatives made presentations on recently published Electric Power Research Institute (EPRI) reports, the status of revisions to industry guidelines, an update on inspection plans from EPRI's implementation letter related to Technical Specifications Task Force Traveler 577 (TSTF-577),¹ a status update on the laboratory-cracked stress corrosion cracking (SCC) tube samples supplied by Equipos Nucleares, S.A. (ENSA), and a status update on eddy current signal simulation software.

The NRC staff presented feedback on SG tube inspection reporting requirements in Section 5.6.7.c.2 of Revision 5 of the Standard Technical Specifications (STS)² and a schedule update on revisions to subsequent license renewal guidance documents.

Additional details of the information exchanged during the meeting is provided below.

- Recently published EPRI reports on the following topics were discussed: planning for SG chemical cleanings, optimizing titanium dioxide concentration for lead SCC mitigation, optimization sourcebook for SG secondary side inspection maintenance, operating experience assessment of primary water reactor dispersant application, SG blowdown radiation monitor system primary-to-secondary leak detection limits and confirmation times, sourcebook for SG layup, characterization of SG tube dings/dents and study of SCC, simulation model to validate eddy current inspection data, and updates to generic tube degradation predictions.
- Industry stated that a revision to the "Steam Generator Management Program [SGMP]: Pressurized Water Reactor Steam Generator Examination Guidelines" is currently in progress.
- The SGMP provided an update for seven units that have adopted TSTF-577 but had not yet performed the inspections required to implement TSTF-577. The inspection plans for these units were previously communicated by SGMP letter to the NRC dated June 28, 2022.³ The SGMP reported no changes to the seven units' status from the letter, with two inspections completed in fall 2022, three to be completed in spring 2023, one to be completed in fall 2023, and one to be completed in fall 2024.
- An industry representative provided a status update on the ENSA tube samples with laboratory-produced SCC. The information from the destructive analyses will be used to support Model Assisted Probability of Detection (MAPOD) calculations. A destructive analysis report on axial primary water SCC (PWSCC) samples has been finalized and the SGMP has completed its quality assurance (QA) process. A preliminary destructive analysis

¹ TSTF Response to NRC Questions on TSTF-577, Revision 0, "Revised Frequencies for Steam Generator Tube Inspections," and Submittal of Revision 1, dated March 1, 2021 (ML21060B434).

² NUREG-1430, Revision 5, "Standard Technical Specifications – Babcock and Wilcox Plants," dated September 2021 (ML21272A363 (Volume 1) and ML21272A370 (Volume 2)); NUREG-1431, Revision 5, "Standard Technical Specifications – Westinghouse Plants," dated September 2021 (ML21259A155 (Volume 1) and ML21259A159 (Volume 2)); and NUREG-1432, Revision 5, "Standard Technical Specifications – Combustion Engineering Plants," dated September 2021 (ML21258A421 (Volume 1) and ML21258A424 (Volume 2)).

³ SGMP-22-08 - Implementation of Technical Specification Task Force (TSTF) Traveler TSTF-577 (ML22200A268).

report on circumferential outside diameter SCC (ODSCC) has been completed and the SGMP's QA process is currently ongoing. In 2023, destructive analysis will continue and begin for axial ODSCC and for circumferential PWSCC, respectively. Efforts to produce circumferential ODSCC lab-induced cracks are ongoing. Existing axial PWSCC EPRI Examination Technique Specification Sheets (ETSS) will be updated and transitioned from Appendix H to Appendix I using MAPOD. Flaw injection at certain locations is planned for spring 2023.

- An industry representative provided a status update on eddy current signal simulation software. The industry representative stated that one potential benefit is using simulated eddy current signals to determine probe and system performance, including probability of detection. To validate the software, acquired eddy current signals were compared to simulated eddy current signals by inserting the acquisition probe (i.e., bobbin, rotating pancake, +Point™, and array) and test parameters (i.e., tube material, dimensions, and conductivity, flaw dimensions, orientation, and origin, and test frequency) into the software. At various modes and frequencies, the signal shapes, phases, and amplitudes were compared. Validation studies indicated a difference between the voltage values for acquired and simulated crack signals, due to the crack width in the software being fixed at 0.005 inches. Final release of the eddy current signal simulation software is expected August 2023. However, the industry plans to develop array probe simulation models, validate the code on inside and outside diameter circumferential cracks and outside diameter axial cracks; and simulate eddy current signals for foreign objects, tube deposits on the outside of the tube, and volumetric wear. In response to the "Conclusions" slide, the NRC provided feedback that the eddy current simulation software would need additional validation before it could be considered for ETSS development.
- The NRC staff discussed the SG tube inspection report (SGTIR). Technical specifications (TS) require a SGTIR be submitted to the NRC. TSTF-577 made changes to the STS, including changes to the requirements for the SGTIR. Section 5.6.7.c.2 in Revision 5 of the STS provides the reporting requirements for all service-induced indications detected during the inspection (i.e., location, orientation, if linear, measured size, if available, and voltage response (detailed reporting)). It provides additional information on reporting tube wear at support structure indications less than 20 percent through-wall (TW). Specifically, licensees that have adopted TSTF-577 or converted to Revision 5 of the STS have the option to provide only the total number of tube wear at support structure indications less than 20 percent TW. Tube wear at support structures refers to tube wear due to tube contact with support structures.

The NRC staff provided feedback on the reporting requirements in light of two recent SGTIRs. The first SGTIR was for a plant with TS based on TSTF-577 that did not include detailed reporting for foreign object wear indications less than 20 percent TW and did not describe re-characterizing a lattice grid wear indication as a foreign object wear indication, which resulted in a request for additional information. The second SGTIR was for a plant with TS based on TSTF-510 that did not include detailed reporting for volumetric indications less than 20 percent TW (as required by TSTF-510). The NRC staff encouraged including explanations that may clarify information in the SGTIR and summarized the reporting requirements for plants that have adopted TSTF-577 or converted to Revision 5 of the STS and take the option of reporting the total number of tube wear at support structure indications less than 20 percent TW. Specifically, for service-induced indications less than 20 percent TW, the SGTIR would include the total number of tube wear at support structure

indications and detailed reporting for all other indications, and for service-induced indications greater than or equal to 20 percent TW, the SGTIR would include detailed reporting for all indications.

- The NRC staff provided an update on the status of subsequent license renewal guidance document updates that will address the conflict between the visual inspection frequency in NUREG-2191⁴ (72 effective full power months (EFPM) or every third refueling outage, whichever results in more frequent inspections) and TSTF-577 (96 EFPM) for divider plate assemblies, tube-to-tubesheet welds, heads (channel or lower/upper heads), and tubesheets. During an October 2021⁵ NRC public meeting with the industry SGTF, the NRC staff agreed clarification could be made through interim staff guidance related to visual inspection of these components being performed every 96 EFPM if the unit's TS allow such intervals and the degradation assessment supports such intervals. However, instead of issuing interim staff guidance, the NRC is currently revising subsequent license renewal guidance documents. The current schedule includes issuance of draft guidance documents for a 60-day public comment period and public meetings from August 2023 through December 2023 and issuance of final guidance documents in October 2024. The staff stated that until the final guidance documents are issued, license renewal applicants that have adopted TSTF-577 or converted to Revision 5 of the STS may take an exception to the conflicting guidance in NUREG-2191. In response to an industry representative question, the staff stated that licensees that have already been issued a renewed license may update their Steam Generators aging management program once their license amendment request to adopt TSTF-577 or convert to Revision 5 of the STS is approved by the NRC.

If you have any questions regarding this meeting summary, please feel free to contact Leslie Terry by phone at 301-415-1167, or by email at Leslie.Terry@nrc.gov.

Attachments:

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|---------------------|-------------|
| 1. Meeting Notice: | ML23045A120 |
| 2. NRC Slides: | ML23052A123 |
| 3. Industry Slides: | ML23046A123 |
| 4. Package: | ML23067A054 |

⁴ NUREG-2191, "Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report," dated July 2017 (ML17187A031 (Volume 1) and ML17187A204 (Volume 2)).

⁵ October 7, 2021, Meeting Summary - NRC Public Meeting with Industry Steam Generator Task Force (ML21293A119).

SUBJECT: SUMMARY OF THE FEBRUARY 23, 2023, MEETING WITH THE INDUSTRY
STEAM GENERATOR TASK FORCE TO DISCUSS STEAM GENERATOR
ISSUES DATED: MARCH 13, 2023

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