



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

August 30, 2018

MEMORANDUM TO: Steven D. Bloom, Chief  
Chemical, Corrosion, and Steam Generator Branch  
Division of Material and License Renewal  
Office of Nuclear Reactor Regulation

FROM: Alan T. Huynh, Materials Engineer /*RA*/  
Chemical, Corrosion, and Steam Generator Branch  
Division of Material and License Renewal  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE AUGUST 21, 2018 CATEGORY 2  
PUBLIC MEETING WITH THE STEAM GENERATOR TASK  
FORCE TO DISCUSS STEAM GENERATOR ISSUES

The industry's Steam Generator Task Force (SGTF) met with U.S. Nuclear Regulatory Commission (NRC) staff on August 21, 2018, at the NRC Headquarters in Rockville, MD. The purpose of the meeting was to discuss a variety of steam generator (SG) issues. The topics are shown in the industry slides, which are available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML18233A520. After the meeting, the industry provided an update to slide 35 of the industry slides (ADAMS Accession No. ML18241A316). The enclosure to this letter provides a list of people who attended the meeting in person and by phone. This meeting was noticed as a public meeting and the agenda is available in ADAMS under Accession No. ML18211A591.

During the meeting, industry representatives made presentations which addressed topics described in the meeting notice. At various points in the meeting, there were additional discussions about agenda topics. A summary of the information exchanged during the meeting is discussed on the next pages. Unless noted otherwise, the information below was stated by industry representatives.

CONTACT: Alan T. Huynh, NRR/DMLR/MCCB  
(301) 415-1137

- The two-phase Freon tests at Canadian Nuclear Laboratories were completed this year and successfully achieved fluid elastic instability (FEI) in a U-tube bundle with flat-bar supports. The final test report has not been received, but is due at the end of August. There seems to be a consensus among researchers that preventing motion or providing sufficient friction damping, via tube-to-support contact, can prevent in-plane FEI. The Electric Power Research Institute (EPRI) is in contact with other researchers in the field and has an interest in collaborating with other researchers in the future. Various SGTF members indicated that they have not yet decided how the test results will be implemented in either steam generator design or operational guidance, since the main goal of the FEI testing was to first understand the thermal hydraulic and physical support conditions that allow the phenomena to occur in operating steam generators. The test results will likely be presented at the next American Society of Mechanical Engineers Code Week in Atlanta, GA, during the week of November 11, 2018.
- An EPRI representative discussed the EPRI generic qualification process using the automated analysis performance demonstration database (AAPDD). To qualify a system for use in the field, the EPRI generic qualification is performed after software development beta testing and is required before site-specific performance demonstration. The AAPDD is a database of field and laboratory data assembled by EPRI and interpretation of signals in the AAPDD is based on expert opinion. In order for a flaw system to pass, the probability of detection (POD) must be greater than 80 percent at 90 percent confidence, for flaws greater than 40 percent through-wall (TW), and the percentage of flaws detected must be greater than 80 percent for flaws less than 40 percent TW. The NRC staff questioned whether more conservative criteria should be used for certain flaw types and sizes that can be detected with PODs much greater than 80 percent. Representatives from industry indicated that a potential variable acceptance criteria that takes different degradation mechanisms and flaw sizes into account had not been previously considered but could be evaluated, since maximizing POD allows for more accurate condition monitoring and operational assessments. If an automated data analysis system fails to meet the acceptance criteria for one damage mechanism category, the system must be retested and a passing grade must be achieved for all damage mechanism categories, before it is allowed to be used in the field. Any modifications to the detection algorithms would require retesting of any affected degradation mechanism or location categories.
- In response to an NRC staff question, a SGTF representative explained that additions to Appendix L of the Steam Generator Examination Guidelines are generally initiated as recommendations or best practices until there is enough experience gained to change them to requirements. The industry also stated that attributes are intentionally written generically so that they can be applied to vendors across the industry. The NRC staff indicated interest in visiting the EPRI NDE Center in Charlotte, NC to review documentation related to the automated analysis system qualification process.
- An industry representative discussed the investigation regarding a welded plug qualification issue. The current analysis methodology utilized conservatism related to the dilation of tubesheet bore holes that impacted the 40-year fatigue life of the weld. A re-analysis was performed on previously installed taper-welded plugs using actual and projected heat-up and cool-down cycle counts, which showed an acceptable fatigue life through the next few operating cycles. Framatome provided a letter to members of the Steam Generator Management Program who then informed BWXT Canada and

Westinghouse of the issue and stated that it is applicable to two US units. The NRC staff indicated interest in hearing from the two plants regarding their plans moving forward.

- In response to an NRC request based on international operating experience with steam generator tube plugs, the industry provided an overview of the experience with steam generator tube plug alloys and designs currently employed in the US. The majority of tube plugs in use are Alloy 690 mechanical plugs. Approximately 80 tubes have welded Alloy 600 plugs, with the majority of them having been shop-welded. The NRC staff inquired whether there were plans to replace these welded Alloy 600 plugs and an industry representative responded that since these welds are under compressive stresses, stress corrosion cracking is unlikely to occur and it is not necessary to replace the plugs. There are approximately 10 tubes among two units that have mechanical Alloy 600 plugs. Each unit subsequently installed mechanical plug-in-a-plugs in these 10 mechanical Alloy 600 plugs. One unit installed 9 Alloy 600TT plug-in-a-plugs and the other unit installed 1 Alloy 690 plug-in-a-plug. There is no recent operating experience of leaking plugs in the US.
- The NRC staff inquired about any updates regarding the anti-vibration bar insertion depth studies that were discussed in a previous meeting with the NRC in 2015 (ADAMS Accession No. ML15043A610). An EPRI representative stated that separate generic EPRI reports have been issued for each steam generator model and a presentation about the anti-vibration bar study could be presented at the next meeting between the NRC and the SGTF.

Project No.: 689

Enclosure:  
Attendance List

S. Bloom

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ADAMS Accession Nos.: Package: ML18241A137  
Meeting Summary: ML18241A101; Meeting Notice: ML18211A591  
Industry Slides: ML18233A520 Updated Slide: ML18241A316

<b>OFFICE</b>	NRR/DMLR/MCCB	NRR/DMLR/MCCB
<b>NAME</b>	AHuynh	SBloom
<b>DATE</b>	08/30/2018	08/30/2018

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**Attendance List**  
**August 21, 2018, NRC Public Meeting with the**  
**Steam Generator Task Force to Discuss Steam Generator Issues**

Note: The list of phone participants may not be all-inclusive

**SGTF/Industry Participants**

Jesse Baron, Westinghouse  
James Benson, EPRI  
Thomas Bipes, Zetec  
Steven Brown, Entergy  
Helen Cothron, EPRI  
Steve Fluit, BWXT  
Lee Friant, Exelon  
Edward Korkowski, Nextera Energy  
Daniel Mayes, Duke Energy  
Jeremy Mayo, TVA  
Jeff Raschiatore, Westinghouse  
Scott Redner, Xcel Energy  
Phil Rush, MPR Associates  
Michael Stark, Dominion Energy  
Damian Testa, Westinghouse  
Tim Wiger, Framatome

**NRC**

Allen Hiser  
Alan Huynh  
Andrew Johnson  
Paul Klein  
Greg Makar  
Seung Min  
Pat Purtscher  
Leslie Terry

**Phone Participants**

John Arhar, PG&E  
Brent Capell, EPRI  
John Conly, Certrec  
Rich Guill, EPRI  
Sean Kil, EPRI  
Tim Thulien, Duke Energy  
Jeff Lanum, Entergy  
Kevin Savabi, Entergy