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

October 5, 2017

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

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

SUBJECT: SUMMARY OF THE SEPTEMBER 7, 2017 CATEGORY 2 PUBLIC MEETING WITH THE STEAM GENERATOR TASK FORCE TO DISCUSS STEAM GENERATOR ISSUES

The industry's Steam Generator Task Force met with the U.S. Nuclear Regulatory Commission (NRC) staff on September 7, 2017, 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 and NRC staff slides, which are available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML17264A763 and ML17264A779, respectively. 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. ML17212B141.

During the meeting, industry made presentations which addressed topics described in the meeting notice. At various points in the meeting, there were additional discussions about agenda topics. Information exchanged during the open portion of the meeting and not included in the presentation materials is summarized below. Unless noted otherwise, the information below was stated by industry representatives.

- The industry provided a history of the Steam Generator Task Force and the evolution of the NRC's regulatory framework from the original Technical Specifications to the current Technical Specifications Task Force Travelers (TSTF). The industry guideline documents were incorporated into regulations via Technical Specification Task Force Traveler-449.

- The Examination Technique Specification Sheets (ETSSs) are the basis documents for eddy current testing and are generated at the Electric Power Research Institute (EPRI) Non-Destructive Examination (NDE) center.

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

- The NRC staff asked whether a process exists to independently verify that ETSSs are appropriate to site-specific conditions. The industry responded that it is ultimately a utility role to validate ETSSs with site conditions.

- Regarding the strategic plans for the chemistry guideline documents, the industry stated that the Primary and Secondary Water Chemistry Strategic Plans are heavily scrutinized during evaluations by the Institute of Nuclear Power Operations (INPO).

- Regarding the chemistry milestones in the Secondary Water Chemistry Guidelines, the industry stated that the strategic plan should describe the milestones for when a plant changes chemistry regimes or goes to a different dispersant.

- Industry stated that the consideration of rate of change of leakage when responding to rapidly rising leakage is the result of operating experience of tube leakage events.

- Slide 16 states that action levels for primary-to-secondary leakage are based on overall risk for tube rupture due to cracking. The NRC staff asked whether action levels for increased monitoring of leakage consider other degradation mechanisms, such as wear, since the leading cause for leakage in SGs with Alloy 690TT tubes is foreign object wear. The industry responded that wear is also considered in the development of action leakage levels.

- Degradation assessments are performed prior to inspections. The ability of plants to run multiple cycles between inspections is based on performance with an operational assessment demonstrating that tube integrity will be maintained during the interval between inspections.

- Regarding operating experience with Alloy 600TT tubing, the industry stated that it is suspected that there may be a small number of tube bundles that are more susceptible to degradation and cracking.

- Regarding the plot on slide 24, the NRC staff asked whether it is possible that improved inspection techniques have led to the detection of more cracks. The industry responded that while it is a possibility, there are probe techniques that were used before and after the point of extrapolation that maintain the difference between predicted and actual number of circumferential cracks at the top of the tubesheet. The NRC staff also noted that the alternate repair criteria has reduced the number of cracks that are reported and identified, since a section of tubing at the end of the tubes, which is more susceptible to cracking, is precluded from inspection. Even though licensees have approved alternate repair criteria that allow these cracks not to be reported, these cracks should still be included in the population of cracks being considered in the Alloy 600TT tubing cracking investigation.

- With respect to fluid elastic instability testing, the purpose of the air tests was to determine which parameters were most important before engaging in the more expensive two-phase Freon tests.

- The NRC staff asked whether power uprates can lead to increases in the onset of fluid elastic instability. The industry responded that before a power uprate is implemented,

the licensee will consider parameter changes that could cause increases in wear mechanisms and that the correlations for these parameters are fairly well-understood.

- Regarding signal injection and the Westinghouse Data Union Software (DUS), industry stated that DUS has been used to add cracking data to datasets that only include flat bottom holes and electrical discharge machined (EDM) notches since they are not always representative of flaws in operating units.

- The DUS has also been used to place foreign object wear at or just below the top of the tubesheet to test analysts and auto systems.

- Regarding the "'representative' combined signal response" on slide 31, the NRC staff asked how these representative responses are determined. The industry responded that tube integrity personnel use the most limiting signals/flaws and adjust the signals, as necessary, by comparing the signal characteristics to laboratory and/or field data.

- Regarding using the DUS to extend the applicability of ETSSs, the industry stated that notches are inserted at locations such as bulges and tube expansions to challenge capabilities of detection. The NRC staff asked whether crack sample data is also used, rather than just EDM notches. The industry responded that what is inserted depends on the region of interest. The industry also stated that DUS is benchmarked by comparing lab and field data, as shown on slide 36.

- Regarding slide 38, industry stated that a peer review process is used to determine if the flaw signals are representative of conditions prior to adding them to the EPRI performance databases.

- Regarding the locating capabilities of automated data analysis systems, industry stated that supports can be moved or eliminated to test the system's ability to identify off-normal conditions.

- The NRC staff asked whether it is possible for flaws to get dismissed due to analyst expectations of where flaws are typically found. The industry responded that because signal injection can insert flaws anywhere, it forces analysts to consider atypical flaws. Industry also noted that complacency is not a possibility in automated analysis technology.

- Industry stated that the EPRI Examination Guidelines contain the requirements for acceptable performance of automated analysis systems.

- The NRC staff asked whether the probability of detection has been compared between the two-party and single-party data analysis processes. The industry responded that the performance of human versus automated data analysis has been studied using an older Alloy 600MA tube bundle with multiple indications. In some cases, the automated system performs better and in some cases the human analysis performs better. This is the reason the industry is only allowing automated systems to be used as a single-party analysis with Alloy 690TT tubing that has not experienced cracking. The industry also noted that more work needs to be performed on this area.

- Regarding research into lead stress corrosion cracking for Alloy 690TT, industry noted that lead was found at crack tips in pulled tubes. The industry also stated that the research parameters that were used in testing were not representative of normal operation.

- Revision 5 of the Primary-to-Secondary Leakage Guidelines is scheduled to be published by 2019.

- The Steam Generator Degradation Specific Flaw Handbook contains burst calculations for every degradation mechanism.

- The NRC staff mentioned that SG tube flaw data from Argonne National Laboratory is available to interested members of industry for the purpose of benchmarking their automated analysis systems.

Project No. 689

Enclosure:
Attendance List

SUBJECT: SUMMARY OF THE SEPTEMBER 7, 2017 CATEGORY 2 PUBLIC MEETING WITH THE STEAM GENERATOR TASK FORCE TO DISCUSS STEAM GENERATOR ISSUES

DISTRIBUTION:
PUBLIC
GWilson
JDonoghue
AHiser
SBloom
DRudland
AJohnson
RidsNrrOd
GMakar
SMin
RidsNrrAdes
WYuken
PKlein
PPurtscher
TLeslie

ADAMS Accession Nos.: Package: ML17264A657; Meeting Summary: ML17264A674; Meeting Notice: ML17212B141, Industry Slides: ML17264A763; NRC Slides: ML17264A779

OFFICE	NRR/DLR/RCCB	NRR/DMLR/LA	NRR/DLR/RCCB
NAME	AHuynh	YEdmonds	SBloom
DATE	10/ 5 /2017	10/ 4 /2017	10/ 5 /2017

OFFICIAL RECORD COPY

Attendance List
September 7, 2017, 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
John Arhar, Pacific Gas & Electric
Jana Bergman, Curtiss-Wright
Jesse Baron, Westinghouse
Jim Benson, EPRI
Thomas Bipes, Zetec
Steve Brown, Entergy
Russ Cipolla, Intertek
Helen Cothron, EPRI
Steve Fluit, BWXT
Carl Friant, Exelon
Greg Kammerdeiner, First Energy
Chuck Marks, DEI
Rick Maurer, Westinghouse
Velvet Moroney, DEI
Jeff Raschiatore, Westinghouse
Scott Redner, Prairie Island
Phil Rush, MPR
Damian Testa, Westinghouse

NRC
Steven Bloom
Alan Huynh
Andrew Johnson
Paul Klein
Greg Makar
Seung Min
Pat Purtscher
George Wilson

Phone Participants
Matthew Domke, NRC
Brent Capell, EPRI
Sean Kil, EPRI
Daniel Mayes, Duke Energy
Jeremy Mayo, TVA
Mahvash Mirzai, Entergy
Robert Moyers, TVA
Ryan Spencer, TVA