August 23, 2016

MEMORANDUM TO: Juan D. Peralta, Chief
Steam Generator Tube Integrity and
Chemical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Alan T. Huynh, Materials Engineer **/RA by Juan D. Peralta for/**
Steam Generator Tube Integrity and
Chemical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE AUGUST 17, 2016, 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 17, 2016, at the NRC Headquarters in Rockville, Maryland. The purpose of the meeting was to discuss a variety of steam generator issues. The topics are shown in the industry slides, which are available in the Agencywide Documents Access and Management System (ADAMS) under Accession No. ML16231A188. The enclosures to this letter provides a list of people who participated in the meeting in person and by phone, as well as a list of acronyms used and not defined in the industry slides. This meeting was noticed as a public meeting, and the agenda is available in ADAMS under Accession No. ML16214A067.

During the meeting, industry made a presentation which addressed topics described in the meeting notice. At various points in the meeting, there were additional discussions about agenda topics. Information exchanged during these discussions and not included in the presentation materials is summarized below:

- Canadian Nuclear Labs (CNL) had already built the test facility being used for fluid elastic instability tests. Input for the tests is being solicited from all of the steam generator (SG) designers. The purpose of the air tests is to obtain data and experience

CONTACT: Alan T. Huynh, NRR/DE/ESGB
(301) 415-1137

to set up for the Freon tests, since the Freon tests are more expensive, and cannot be modified as readily.

- The tests can be performed with either one or two antivibration bar supports.

- The industry indicated that once the results from the air tests are reviewed, they will make recommendations for the Freon tests.

- Several of the tubes in the bundle have instrumentation inside of them during the tests.

- The industry indicated that significant changes must be made to the test setup in order to convert from air tests to Freon tests. Some of the conversion work and design have already been started. The industry plans to review the final report from the air tests by the end of the year.

- The industry indicated that the Freon tests will be conducted early in 2018 (winter) due to the availability of a substantial heat sink.

- The industry indicated that most of the international efforts related to SG tube vibration is modeling, and that the test setup at CNL may be able to validate the models currently being developed.

- The industry indicated that the ASME Code is intended to be used to design the pressure boundary from a structural integrity perspective, and that environmental effects are to be considered and determined by the individual program owner (i.e., the owner/designer should be aware of corrosion effects, but there are not explicit rules in the ASME Code).

- *Generic Elements of U-Bend Tube Vibration Induced Fatigue Analysis for Westinghouse Model 44F Steam Generators* and *Generic Elements of U-Bend Tube Vibration Induced Fatigue Analysis for Westinghouse Model 51F Steam Generators* provide guidance to plants for performing analyses to ascertain the susceptibility of SG tubes to fatigue failure.

- *Model Assisted Probability of Detection Using R (MAPOD-R) Version 2.0* provides utilities and vendors with a tool to calculate site-specific probabilities of detection. The software can be used to evaluate how noise can affect the probability of detection.

- *Assessment of Lead Induced Stress Corrosion Cracking Inhibitor Effectiveness* discusses the effectiveness of inhibitors on the secondary side to mitigate stress corrosion cracking. The industry stated that more work needs to be done on evaluating the adverse effects of inhibitors.

- With respect to *Correlating Primary-to-Secondary Leakage with Probability of Burst*, the industry indicated that this report documents the technical bases for relating primary-to-secondary leakage to the probability of burst during normal operation. The report extends the analyses from mill-annealed Alloy 600 operating experience to thermally treated Alloy 690 and Alloy 800.

- *Steam Generator Management Program: Steam Generator Foreign Object Handbook, Revision 1* provides a wide range of information related to foreign objects and trends seen in the industry.

- Regarding the status of the tube-to-tubesheet weld issue, the NRC staff indicated that it had contacted all units involved to ask if the vendor for the steam generators had performed structural analyses on the tube-to-tubesheet welds. The NRC staff stated that it may need to follow up with one unit regarding the classification of its tube-to-tubesheet welds (i.e., whether the tube-to-tubesheet welds are now considered the reactor coolant pressure boundary).

- The NRC staff indicated that it plans to incorporate the SG pre-service inspection requirements in Title 10 of the *Code of Federal Regulations* 50.55a, “Codes and Standards.”

- The NRC staff indicated that draft License Renewal Interim Staff Guidance (LR-ISG) 2016-01 had been issued on June 7, 2016. The comment period expired July 7, 2016, and the staff plans to evaluate the public comments and issue the final version of LR-ISG 2016-01 by the end of 2016.

- The NRC staff recently revised a portion of the steam generator Standard Review Plan (NUREG-0800). It was published in the Federal Register on August 3, 2016 (81 FR 51217).

Project NO.: 689

Enclosures
1. Attendance List
2. List of Acronyms Used and Not Defined in the Industry Slides

- With respect to *Correlating Primary-to-Secondary Leakage with Probability of Burst*, the industry indicated that this report documents the technical bases for relating primary-to-secondary leakage to the probability of burst during normal operation. The report extends the analyses from mill-annealed Alloy 600 operating experience to thermally treated Alloy 690 and Alloy 800.

- *Steam Generator Management Program: Steam Generator Foreign Object Handbook, Revision 1* provides a wide range of information related to foreign objects and trends seen in the industry.

- Regarding the status of the tube-to-tubesheet weld issue, the NRC staff indicated that it had contacted all units involved to ask if the vendor for the steam generators had performed structural analyses on the tube-to-tubesheet welds. The NRC staff stated that it may need to follow up with one unit regarding the classification of its tube-to-tubesheet welds (i.e., whether the tube-to-tubesheet welds are now considered the reactor coolant pressure boundary).

- The NRC staff indicated that it plans to incorporate the SG pre-service inspection requirements in Title 10 of the *Code of Federal Regulations* 50.55a, “Codes and Standards.”

- The NRC staff indicated that draft License Renewal Interim Staff Guidance (LR-ISG) 2016-01 had been issued on June 7, 2016. The comment period expired July 7, 2016, and the staff plans to evaluate the public comments and issue the final version of LR-ISG 2016-01 by the end of 2016.

- The NRC staff recently revised a portion of the steam generator Standard Review Plan (NUREG-0800). It was published in the Federal Register on August 3, 2016 (81 FR 51217).

Project NO.: 689

Enclosures
1. Attendance List
2. List of Acronyms Used and Not Defined in the Industry Slides

DISTRIBUTION:	AJohnson	RidsNrrOd	PUBLIC	ASengupta	SMin
RidsNrrAdes	GMakar	JLubinski	AHiser	WYuken	MRossi
MJRoss-Lee	DE R/F				

ADAMS ACCESSION Nos.: Package: ML16231A370
Meeting Summary: ML16231A374
Meeting Notice: ML16214A067
Industry Slides: ML16231A188

OFFICE	NRR/DE/ESGB	NRR/DE	NRR/DE/ESGB
NAME	AHuynh/by JPeralta for/	KKarwoski	JPeralta
DATE	08/23/2016	08/22/2016	08/23/2016

OFFICIAL RECORD COPY

Attendance List
August 17, 2016, 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
Viki Armentrout, Dominion
James Benson, EPRI
Russ Cipolla, Intertek
Helen Cothron, EPRI
Greg Kammerdeiner, FirstEnergy
Dan Mayes, Duke Energy
Scott Redner, Xcel Energy
Phil Rush, MPR Associates
Steven Brown, Entergy
Ed Korkowski, Nextera Energy
Stephen Fluit, BWXT
Rich Maurer, Westinghouse
Daniel Folsom, TVA
Carl Friant, Exelon
Ryan Lowes, Westinghouse
Jim Stevens, Luminant

NRC
Alan Huynh
Andrew Johnson
Pat Purtscher
Ken Karwoski
Juan Peralta
Greg Makar
Seung Min
Matt Rossi
Brian Harris
David Werkheiser

Phone Participants
Allen Hiser, NRC
Lisa Kwong, State of NY
Sean Kil, EPRI
Brent Capell, EPRI
Jesse Baron, Westinghouse

ENCLOSURE 1

Acronyms Used and Not Defined in the Industry Slides

- AILPC – Accident-Induced Leakage Performance Criteria
- ASME – American Society of Mechanical Engineers
- AVB – Antivibration Bar
- CM – Condition Monitoring
- DA – Degradation Assessment
- ET - Eddy Current Testing
- GL - Guidelines
- IAGL – Integrity Assessment Guidelines
- ID – Inner Diameter
- OA – Operational Assessment
- OD – Outer Diameter
- ODSCC – Outside Diameter Stress Corrosion Cracking
- PSL – Primary-to-Secondary Leakage
- PWSCC – Primary Water Stress Corrosion Cracking
- R&D – Research and Development
- RG – Regulatory Guide
- Std – Standard
- TT – Thermally Treated
- UT – Ultrasonic Testing

ENCLOSURE 2