September 4, 2014

MEMORANDUM TO: Gloria J. Kulesa, Chief
Steam Generator Tube Integrity and
Chemical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Andrew B. Johnson, Materials Engineer ***/RA/***
Steam Generator Tube Integrity and
Chemical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE AUGUST 13, 2014, 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 13, 2014, at NRC Headquarters in Rockville, MD. The purpose of the meeting was to discuss a variety of steam generator issues. The topics are shown in the industry's and NRC slides, which are both available in the Agencywide Documents Access and Management System (ADAMS) under Accession Nos. ML14225A756 and ML14225A768, 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. ML14212A769. Members of the public participated in the meeting, as noted in the meeting attendance list.

During the meeting, industry and NRC participants made presentations. At various points in the meeting, there were additional discussions about the agenda topics. Information exchanged during these discussions is summarized below:

Acronyms used in the industry slides include:

- SSPD: Site Specific Performance Demonstration
- RCP: Reactor Coolant Pump

CONTACT: Andrew B. Johnson, NRR/DE/ESGB
(301) 415-1475

Electric Power Research Institute (EPRI) Steam Generator Management Program (SGMP) SGTF Update

Steam Generator Requirements in American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (Code)

- There will be further discussion about removing the steam generator inspection requirements from the ASME Code at an ASME Code Meeting during the week of August 18, 2014.

- The NRC staff reiterated that if the steam generator requirements are removed from the ASME Code, the NRC staff would have to evaluate the need to incorporate similar requirements into Title 10 of the *Code of Federal Regulations* Paragraph 50.55a.

Guidance for Channel Head Inspections

- Revision 4 of the EPRI Integrity Assessment Guidelines is expected to be published in 2015.

- It is expected that most plants would inspect the primary channel head area whenever an steam generator is accessed during an outage.

- The industry clarified that the boric acid corrosion rates seen in operation are bounded by the corrosion rates assumed in the guidelines.

Guidance for Automated Data Analysis

- Industry studies on bobbin coil data showed that the initial setup on one automated data analysis system outperformed two-party data analysis on larger flaws but tended to miss the smaller amplitude flaws more often.

- The industry clarified that there can be redundancy in both the analysis of eddy current data and in the techniques used for acquiring the data (i.e., technique redundancy). In this latter category, the techniques must be qualified for that specific degradation type at a specific location.

- Various tools are being implemented in the field to improve the performance of auto analysis systems including historical data comparison (where differences between current and past inspection data are evaluated), evaluation of noise outliers, and injecting flaws into data sets for site specific performance demonstration.

- With respect to the performance of automated analysis (AA) systems on new degradation mechanisms, the industry commented that each AA system must pass an AA performance demonstration which includes degradation mechanisms previously observed in the field. The qualification requirements to pass the Automated Analysis Performance Demonstration Database are consistent with the requirements for human analysts.

- The NRC staff commented that since auto-analysis continues to be pursued by the industry, it would be useful to have another workshop to provide information on the latest systems and to discuss the industry's response to NRC feedback on this issue.

Outside Diameter Stress Corrosion Cracking (ODSCC) Database Correlation Without Combustion Engineering (CE) Data

- The data set used for Examination Technique Specification Sheet I28432 was developed from four sources and is considered a good representative data set for ODSCC.

- The industry commented that the change in intercept of the depth vs. voltage correlation when the CE data was excluded from the database (and the slope kept constant) was small. In addition, even if the slope was allowed to change, the size of smaller flaws would be overestimated and the size of larger flaws would be underestimated. The NRC staff did not identify any issues with respect to the industry's presentation and considers this issue closed.

Examination Technique Specification Sheet Equivalency Study

- The equivalency study phase 4 effort will address issues raised during the last 3 phases of this effort including whether changes are needed to the frequency at which the rotating probe is operated for certain sized tubing.

Recently Issued SGMP Technical Reports

- For the report on applying examination techniques to materials other than Alloy 690, the industry indicated some, but not all, of the techniques provided depth sizing performance that was similar to the performance in Inconel 690 samples. A method was developed to provide a more quantitative statistical evaluation of the sizing equivalency.

- The report on denting at the top of the tubesheet discusses mitigative measures to help prevent, slow down, or eliminate the progression of the denting.

- The report on the development of system performance examination technique specification sheets addresses procedures and tools for technique performance.

- The report on the tubing specifications for alloy 690 primarily included an update to a prior version of the report to reflect new technology and advancement. The report is intended to ensure high quality steam generator tubing.

- With respect to the changes made to Table 3-1 of the "PWR Primary Water Chemistry Guidelines," it was indicated that the minor change implemented was a change in the pH from 6.9 to 7.0. The new section added to Chapter 2 on the impacts of steam generator replacements includes discussion of the crud bursts that typically happen between the 2nd and 4th operating cycles after replacement, and the release of nickel during the passivation of steam generator material.

- All the major stakeholders were included in the development of the primary water chemistry guidelines (e.g., fuels, radiation protection, Pressurized Water Reactor Owners Group).

NRC Items of Interest

San Onofre Nuclear Generating Station Tube-to-Tube Wear Lessons Learned

- The NRC staff clarified that they planned to send a letter to the SGMP Executive Chairman within the next week.

Other Issues

- The NRC staff clarified that with regard to the primary-to-secondary leakage limits, the question they posed was whether or not the action levels in the guidelines were appropriate for plants with Technical Specification limits less than 150 gallons per day, not whether or not the leakage limits themselves were appropriate.

- The NRC staff questioned whether or not there was sufficient guidance on measuring flaw amplitude, particularly with respect to whether the measurements should be from the leading or trailing edge of the flaw signal.

- The NRC staff indicated that it would be useful to understand how many plants have adopted TSTF-510, submitted amendments to adopt TSTF-510, and plan to submit applications in the next few years.

Questions from the Public

- A member of the public asked if the failure mode had been correctly identified/determined for San Onofre, and whether this was required before the plant was allowed to restart.

    - The NRC staff clarified that they are performing a lessons learned review which includes both technical and regulatory issues. The staff indicated that they would consider the state of knowledge with respect to the technical issues raised as a result of the San Onofre experience in their assessment of any needed changes to its regulatory guidance.

  - The NRC staff has already engaged ASME regarding this issue and ASME has developed a group to evaluate any needed changes to the ASME Boiler and Pressure Vessel Code.

- A member of the public asked if the 150 gallons per day limit was sufficient considering the fluid elastic instability limit.

  - The NRC staff has stated that this leakage limit is not relied on to ensure tube integrity, but that this leakage limit is used as a defense-in-depth strategy. That is, the tubes/steam generators are initially designed to limit the likelihood of degradation; however, periodic inspections are performed to verify the condition of the tubing. The results of these inspections are evaluated to establish the sample size and frequency of steam generator tube inspections to ensure tube integrity is maintained throughout an operating interval. In the event that degradation occurs beyond what is expected, monitoring for leakage and responding to it provides additional assurance that tube integrity will not be compromised. In addition, the plant has been designed to effectively respond to a single steam generator tube rupture during normal operation in the event that excessive tube degradation occurs and it is not preceded by leakage in excess of the leakage limits. Lastly, the staff has assessed the risks associated with single and multiple tube ruptures during various conditions and has concluded that those risks are acceptable.

Project No.: 689

Enclosure:
Attendance List

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ADAMS ACCESSION Nos.: Package: ML14230A465
Meeting Summary: ML14230A462
Meeting Notice: ML14212A769
Industry Slides: ML14225A756
NRC Slides: ML14225A768

OFFICE	NRR/DE/ESGB	NRR/DE/ESGB	NRR/DE	NRR/DE/ESGB
NAME	AHuynh	AJohnson	KKarwoski *	GKulesa
DATE	08/ 29 /2014	09/ 02 /2014	08/ 28 /2014	09/ 04 /2014

*** By E-Mail** **OFFICIAL RECORD COPY**

Attendance List
August 13, 2014, 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
Phillip Rush, MPR Associates
Mark Richter, NEI
Jesse Baron, Westinghouse
Damian Testa, Westinghouse
Edward Korkowski, FPL
Richard Maurer, Westinghouse
Jim Stevens, Luminant
Steve Brown, Entergy
Scott Redner, Xcel Energy
Anthony Martin, Southern Company
Jana Bergman, CW/Scientech
Stephen Fluit, B&W
James Benson, EPRI
Clayton Webber, TVA
Helen Cothron, EPRI
Dan Mayes, Duke

NRC
Alan Huynh
Andrew Johnson
Emmett Murphy
Seung Min
Ken Karwoski
Mica Baquera
Marioly Diaz
Greg Makar
Gloria Kulesa

Phone Participants
Christopher Hamilton, Westinghouse
Viki Armentrout, Dominion
Kent Colgan, Areva
Brent Capell, EPRI

Members of the Public Phone Participants
Ace Hoffman, Public

NRC Phone Participants
None

ENCLOSURE