March 23, 2010

MEMORANDUM TO: Robert M. Taylor, Chief
Steam Generator Tube Integrity and
Chemical Engineering Branch
Division of Component Integrity
Office of Nuclear Reactor Regulation

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

SUBJECT: SUMMARY OF THE FEBRUARY 25, 2010, CATEGORY 2 PUBLIC MEETING WITH THE NUCLEAR ENERGY INSTITUTE (NEI) AND INDUSTRY TO DISCUSS STEAM GENERATOR ISSUES

The Nuclear Energy Institute (NEI) Steam Generator Task Force (SGTF) met with U.S. Nuclear Regulatory Commission (NRC) staff on February 25, 2010, at NEI offices in Washington DC. The purpose of the meeting was to discuss a variety of steam generator issues. The topics discussed are summarized in the industry's slides, which are available in the Agencywide Documents Access and Management System (ADAMS) under Accession Number ML100570301. The enclosure provides a list of those in attendance. This meeting was noticed as a public meeting and the meeting agenda is available in ADAMS under Accession Number ML100350021. Other than industry representatives, no members of the public were present.

During the meeting there was discussion on a number of steam generator issues. These discussions are summarized below:

- The axial outside diameter stress corrosion cracking indication detected at the top of the tubesheet on the hot-leg side of the Seabrook steam generators was not in a "-2 sigma" tube nor was it in a low row tube.

- There was some discussion on standard technical specification paragraph 5.5.9.d.3, which deals with the inspections performed following the discovery of cracks in a steam generator. The staff commented that the intent of this requirement was that all steam generators would be inspected following the discovery of a crack in one or multiple steam generators. In addition, the staff commented that it expects it would be very difficult to demonstrate that tube integrity could be maintained without inspecting all steam generators given the probability of detection and growth rate of cracks (unless there were some unique circumstances which generally is difficult to prove). As a result of this discussion, the industry was encouraged to clarify paragraph 5.5.9.d.3 as part of TSTF 510.

- Since the industry will be revising NEI 97-06, “Steam Generator Program Guidelines,” there was some discussion on whether this new revision could be referenced into the on-going revision of the Generic Aging Lessons Learned (GALL) report. The NRC staff indicated that it may be helpful if this comment were provided when the GALL report is issued for public comment; however, reference to a newer version of NEI 97-06 in the revision of the GALL report would depend on the timing of these two revisions.

- The industry indicated it would evaluate whether clearer guidance should be given on updating steam generator programs (i.e., clarifying when plant-specific and vendor procedures must be updated).

- There was some discussion on whether plants with stainless steel tube supports have verified the position of their anti-vibration bars given the effects that deposits may have on the susceptibility of tubes to fluid-elastic instability. These plants may not have performed the assessments discussed in NRC Bulletin 88-02, “Rapidly Propagating Fatigue Cracks in Steam Generator Tubes” since this Bulletin was focused on plants with carbon steel tube supports. The staff questioned whether Information Notice 2005-29, “Steam Generator Tube and Support Configuration” prompted licensees to verify the position of their anti-vibrations bars and whether the industry will consider any additional guidance in this area.

- The NRC staff indicated that an information notice on the cracking of the divider plate to channel head weld in the San Onofre replacement SGs should be issued soon.

- There was some discussion on obtaining an update on divider plate cracking in foreign reactors. The industry indicated it would send the final divider plate report to the NRC when it is finished and recommended closure of the divider plate cracking issue. Except for the replacement steam generators at San Onofre and Calvert Cliffs, steam generator structural analyses do not take credit for the divider plate.

- The industry agreed to review the in-situ pressure test database to confirm that it bounds the type of flaws that were observed at Vogtle (i.e., verify the adequacy of the in-situ screening criteria given that a few through-wall flaws were discovered at Vogtle).

- There was some discussion on whether there should be a margin of 3 against normal operating pressure (or 1.4 on accident differential pressure) for large wear scars that could pop through the wall and potentially leak at rates comparable to a tube burst. The industry currently does not apply such margins against pop-through (rather leakage assessments are typically done at steam line break differential pressures).

- During the meeting, there was some discussion on whether all low row tubes with an offset were plugged. The NRC staff indicated it thought that some plants left low row tubes with an eddy current offset in service. Following the meeting, the NRC staff informed the industry that NRC records indicate that at least one plant (Comanche Peak 2) has left low row tubes with an eddy current offset in service.

- There was some discussion on whether the outside and inside diameter initiated

cracking that has been observed was more prevalent in tubes that have potentially elevated residual stresses (i.e., eddy current offset tubes or “-2 sigma” tubes). The NRC staff recalled that it thought at least one plant had a disproportionate number of cracks in the “-2 sigma/offset” tubes. Following the meeting, the NRC staff informed the industry that during the Braidwood 2, 2008 outage, 2 crack-like indications were detected in the "-2 sigma tubes" (71 tubes), and 286 crack-like indications were found in "non -2 sigma tubes (approximately 18000 tubes). As a result, the percentage of crack-like indications in the "-2 sigma tubes" is roughly twice that of the "non -2 sigma tubes." The staff identified this issue since it questioned whether more frequent monitoring of these “-2 sigma tubes” with rotating probes at locations such as in the tubesheet, at the expansion transition, dents, and dings was warranted (i.e., more frequent sampling if they are more susceptible to cracking at these locations than the general population of tubes). The industry position is that the “-2 sigma” criterion is not applicable to the portion of the tube within the tubesheet or within the U-bends. The criterion for a “-2 sigma” tube is that both the hot- and cold-leg side of the tube must meet this criterion.

- There was a discussion on TSTF-510. The draft RAI’s were reviewed and the industry had no issues with them. The staff also indicated that they did not identify any technical issues with the TSTF.

July 2010 was identified as a tentative timeframe for the next NRC-SGTF meeting, following the 29th annual SG non-destructive evaluation workshop.

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Attendance List

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NAME	AJohnson	KKarwoski	RTaylor
DATE	03/22/2010	03/22/2010	03/23/2010

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Attendance List
February 25, 2010, Meeting with the NEI SGTF and Industry

SGTF/Industry
Helen Cothron, EPRI
Greg Kammerdeiner, FENOC
Scott A. Redner, XCEL
Jim Riley, NEI
Gary L. Boyers, FPL
Herm Lagally, Westinghouse
Richard Mullins, SNC
Dan Mayes, Duke Energy
Steve Swilley, EPRI
Ernest Shaw, SNC
Russell Lieder, Next Era Energy
Forrest Hundley, SNC
Nick Idvorian, B&W
Jim Benson, EPRI
Jay Smith, Exelon
Chris Cassino, Westinghouse

Phone Participants
Heather Feldman, EPRI
Bob Cullen, Entergy
John Arhar, PG&E
Jeff Fleck, AREVA

NRC
Robert Taylor
Ken Karwoski
Emmett Murphy
Greg Makar
Charles Harris
Andrew Johnson
Thomas Morgan
Rachel Vaucher

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