

September 19, 2013

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

FROM: Marioly Diaz Colon, Chemical Engineer */RA/*  
Steam Generator Tube Integrity and  
Chemical Engineering Branch  
Division of Engineering  
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF THE AUGUST 21, 2013, CATEGORY 2 PUBLIC  
MEETING WITH THE ELECTRIC POWER RESEARCH INSTITUTE  
AND INDUSTRY 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, 2013, at the Nuclear Energy Institute (NEI) office 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 Agency wide Documents Access and Management System (ADAMS) under Accession Number ML13234A195. The enclosure is 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 ML13213A237.

During the meeting there was discussion on a number of steam generator issues. Information exchanged during the meeting that is not included in the slides is summarized below:

- Acronyms used in the industry slides include:
  - EFPY- Effective Full Power Year
  - GL- Generic Letter
- The industry indicated that anti-vibration bar (AVB) position verification work is focused on older steam generators since modern steam generator fabrication techniques (early-to-mid 1990s) are more robust and less likely to result in gross mis-positioning of the AVBs (e.g., installing AVBs in layers as the steam generator is tubed rather than physical insertion of the AVBs at the end of tubing.).

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- The NRC staff indicated that it has a better understanding of the basis for the 95% probability with 50% confidence performance standards that the industry uses for assessing tube integrity (based on a review of the Electric Power Research Institute (EPRI) report 1012984, "Technical Basis for Steam Generator Tube Integrity Performance Acceptance Standards"). The staff indicated that the 95/95 standard has historically been used in development of alternate tube repair criteria such as H\* and the criteria described in Generic Letter (GL) 95-05. The NRC staff does not approve the industry guidelines and indicated that for most cases the 95/50 standard should be adequate so the issue can be closed; however, there may be specific circumstances where a more rigorous standard (e.g., 95/95) may be appropriate.
- The industry indicated that it performed its assessment of crack growth for the divider plate study for 40 years of operation. The staff questioned the use of 40 years since some plants may operate with more than 40 years with their steam generators. The industry indicated they believed this is conservative since crack initiation is not expected at the start of operation. Degradation identified to date has been shallow and has not propagated near pressure boundary components. The NRC staff commented that this may complicate the assessment of this issue since it involves assessing the crack initiation time. The industry will address this issue in the final report.
- For the comparison of manual analysis to automatic analysis, the industry is going to compare the results of the primary manual analysis, secondary manual analysis, resolution analysis, and automatic analysis to the results of an "expert panel."
- The NRC staff indicated it would be interested in seeing the relationship between flaw amplitude and metallurgical depth for the various sizing techniques for wear attributed to tube-to-tube contact. Although not discussed at the meeting, to fully understand this relationship, the NRC staff would need to know how the probes were calibrated.
- Regarding probe variability, the industry indicated the Long Life Magnetic Coil (LLMC) probe (Corestar/Westinghouse) has a lower center frequency than the Magnetic U-bend Long Cone (MULC) probe. As a result, the LLMC probe is more sensitive to shallower outside diameter initiated flaws than the MULC probe. Similarly, the MULC probe is more sensitive to deeper outside diameter initiated flaws or shallower inside diameter initiated flaws than the LLMC probe. The industry is currently evaluating data for the assessment of probe variability.
- The NRC staff clarified during the meeting, the intent of its question on "whether the eddy current examination technique equivalency study resulted in changes in past practices". The request was a result of its understanding that the results may have indicated that a different frequency should be used when performing rotating probe inspections of certain size tubing.
- Although not discussed at the meeting, the NRC staff is interested in whether the industry guidance (e.g., in the Examination Technique Specification Sheet) is sufficient to ensure consistent measuring of flaw amplitudes such that comparisons of the amplitudes (and analyses based on amplitudes) are meaningful. In addition, although the +Point coil may reduce the noise level in many circumstances, the noise level at some locations may still be large (e.g., in the U-bend region of a tube with a small bend

radius). Another potential issue is that flaw signals may not be symmetric; therefore, guidance may be needed on whether to measure the amplitude at the entrance or exit of the flaw signal.

- The NRC staff clarified its concern related to the Appendix I qualification of a technique for sizing axially oriented outside diameter stress corrosion cracks. One utility indicated that the Combustion Engineering data used in the Appendix I qualification is from a different statistical population than the remaining data. As a result, it would appear that the Appendix I qualification should be revisited separating out the two distinct data sets. When this is done, the NRC staff indicated that the size estimates in the field may decrease for one set of plants (e.g., the Combustion Engineering plants) and increase for the other set of plants (which means currently that some of the plants may be underestimating their flaw sizes). The industry indicated they reviewed this issue and that the size estimates are appropriate for both sets of plants. The NRC staff is still reviewing this issue.
- The NRC staff asked whether the industry was considering any work in the structural mechanics area as a result of the recent experience at a plant with recirculating steam generators that experienced tube-to-tube wear. The industry indicated it was not.
- The industry indicated that the number of plants affected by wear includes domestic units with Alloy 690 thermally heated SG tubes that recently permanently ceased operation (See slide 56 for further details).
- The NRC staff indicated that it was considering issuing an Information Notice which would highlight corrosion of the steam generator channel head and tubesheet region.

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OFFICE	NRR/DE/ESGB	NRR/DE	NRR/DE/ESGB
NAME	MDiazColon	KKarwoski	GKulesa
DATE	09/11/2013	09/16/2013	09/19/2013

Attendance List  
August 21, 2013, Meeting between NRC staff and SGTF

SGTF/Industry

Helen Cothron, EPRI  
Jay Smith, Exelon  
Phil Rush, MPR Associates  
Vicky Armentrout, Dominion  
Jim Begley, TCA Solutions  
Jasmin Melvin, Platts  
Hitoshi Kaguchi, MNES  
Frank Gillespie, MNES  
M Vann Mitchell, MNES  
Koichiro Masumoto, MNES  
Dan Mayes, Duke  
Kent Colgan, Areva  
Steve Brown, Entergy  
Anthony Martin, Southern Nuclear  
Jesse Baron, Westinghouse  
Damian Testa, Westinghouse  
Richard S. Maurer, Westinghouse  
Stephen Fluit, Babcock & Wilcox  
James Benson, EPRI  
Scott A. Redner, Xcel Energy

Phone Participants

Pat G. Wagner, Wolf Creek Nuclear Cooperation  
Russel Lieder, NextEra Energy Seabrook  
Ryan Wolfe, EPRI  
John Arhar, PG&E Diablo Canyon Power Plant  
Clayton B. Webber, Tennessee Valley Authority (TVA)  
Tammy Sears, Tennessee Valley Authority (TVA)  
Dan Folsom, Tennessee Valley Authority (TVA)  
Tina Taylor, EPRI

NRC

Allen Hiser  
Gloria Kulesa  
Ken Karwoski  
Marioly Diaz Colon  
Andrew Johnson  
Emmett Murphy

ENCLOSURE