



February 20, 2013  
NRC:13:009

The Honorable Allison Macfarlane, Chairman  
The Honorable Kristine L. Svinicki, Commissioner  
The Honorable George Apostolakis, Commissioner  
The Honorable William D. Magwood IV, Commissioner  
The Honorable William C. Ostendorff, Commissioner

U.S. Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852

On behalf of AREVA Inc. (AREVA), we would like to express our appreciation for the invitation from the Commission to discuss our experience with tube wear and vibration at the steam generator tube degradation briefing that took place on February 7, 2013. We trust our presentation provided the information and insight you were seeking. The purpose of this letter is to provide additional clarification regarding a question that was posed to AREVA during the meeting.

Tube wear at support locations (Anti-Vibration Bar and Tube Support Plate locations) detected in San Onofre Nuclear Generating Station (SONGS) Unit 2 is within previous industry experience and can be evaluated using standard practices as described in the EPRI Tube Integrity Assessment Guidelines. These degradation mechanisms are not threatening in Unit 2, as demonstrated by the Operational Assessment for non-Tube-To-Tube Wear (TTW) in SONGS Unit 2 prepared by AREVA, which justified a full cycle of operation at full reactor power. This leaves TTW due to fluid elastic instability as the limiting degradation mechanism.

In our presentation, AREVA noted that the deep TTW observed in the SONGS Unit 3 steam generators (SGs) resulted from fluid elastic instability. While the evidence provided by the shallow TTW observed in the pair of tubes in SONGS Unit 2 may not be as conclusive, AREVA considers that Unit 2 is susceptible to the same fluid elastic instability mechanism that occurred in Unit 3 for the following reasons:

- The units have the same designs and operating conditions.
- The tube locations where the TTW was identified in both units are coincident.
- The guidance in the EPRI Steam Generator Management Program and NEI 97-06 recommend SG assessments take into account operating experience at similarly designed and operated units.

It should be noted that there is an analysis that concludes that the TTW in SONGS Unit 2 is a consequence of tubes being in very close proximity to one another with self-limiting wear produced by a combination of turbulence and out-of-plane fluid elastic excitation. This conclusion, while viable, has been evaluated by AREVA and found to be less conservative when compared to the potential TTW resulting from fluid elastic instability which has wear rates that are higher and not self-limiting.

**AREVA INC.**

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Consequently, in our operational assessment for TTW in SONGS Unit 2, AREVA sought to determine the probability of the onset of fluid elastic instability and compare it to the industry's tube integrity performance criteria. Our results show that operating Unit 2 at 70% power will not result in fluid elastic instability; thus, the structural tube integrity limits will not be challenged during the proposed five-month operating period.

Please feel free to contact me at (434) 832-4937, or by e-mail at [Pedro.Salas@areva.com](mailto:Pedro.Salas@areva.com) if you wish to discuss the recommendations and concerns addressed in this letter.

Sincerely,

A handwritten signature in black ink, appearing to read 'Pedro Salas', is written over a large, stylized circular scribble. The signature is written in a cursive, somewhat illegible style.

Pedro Salas, Director  
Regulatory Affairs  
AREVA Inc.

cc: R. W. Borchardt  
E. J. Leeds