

Joosten, Sandy

From: Vinod Arora <vinnie48in@gmail.com>
Sent: Thursday, July 11, 2013 7:28 PM
To: CHAIRMAN Resource; Lantz, Ryan; Walls, William; R4ALLEGATION Resource
Subject: San Onofre NRC Lessons Learnt Series - San Onofre Truth is Bitter but cannot be Covered . \$1 Billion + Rate Payer Money needs to be returned.

Due to design and operation flaws and human errors, Unit 3 San Onofre replacement steam generator tubes experienced tube-to-tube wear and high cycle fatigue incubating cracks due to violent tube-to-tube clashing (extreme forces) caused by fluid elastic instability (film boiling) due to poor circulation ratios, extremely high steam flows, in-plane fluid velocities (> 50 feet/second) and high void fractions (~ 100%, Film Boiling). Design Changes due to additional and longer tubes for higher steam flows and more profits reduced steam side flow area, which resulted in substantially higher fluid velocities. Higher RCS and Feedwater flows contributed to extremely high steam flows, which caused heat transfer coefficient to be exceeded and higher primary side temperature. It was noted that Unit 3 ran with slightly higher primary temperatures, about 4°F higher than Unit 2

Even with design flaws and human errors, Unit 2 San Onofre replacement steam generator tubes still did not experience tube-to-tube wear and potentially high cycle fatigue incubating cracks because fluid elastic instability did not occur due to moderate void fractions (Nucleate Boiling). Even though the circulation ratio was also poor in Unit 2, lower steam flows prevented FEI.

Based on recent testing of AVBs by MHI in Japan and review of Westinghouse, AREVA and John Large's Assessments, It has been proven beyond the shadow of doubt, that AVBs were not designed for preventing in-plane FEI and double the tube-to -AVB contact forces and better supports in Unit 2 prevented FEI is a story manufactured by SCE and later on expanded by MHI based on hideous test data and false statistical computer simulations.

With this in mind and NRC tube inspections, it would have been deterministically very easy to prove to the public, environmental groups

and ASLB, that Unit 2 would have survived all DBAs and AOOs (may be a few cracked tubes) with operator action without exceeding the FSAR analyzed doses and any potential releases to the public.

Since SCE and NRC AIT did not look for the True Root Cause and wanted to pin all the blame on MHI, SCE was not able to defend their Bogus Root Cause to the public, environmental groups and ASLB, which resulted in Shutdown of Units 2 & 3. This is a real loss for NRC, Nuclear Industry, SONGS Shareholders, Ratepayers and SONGS Workers, which could have been prevented. Greedy and Blind SCE Management dug their own grave by concealing the facts and not listening to the San Onofre Insider and Dwight Nunn's warnings. NRC Region IV friendship with SCE Management did not help SCE from preventing shutdown of SONGS.

Defects or Deviations:

The design of San Onofre replacement steam generators (RSGs) are identical. SONGS Unit 2 potentially did not suffer in-plane fluid elastic instability because of lower void fractions (98-98.8% range) due to operation at higher steam pressures and lower RCS flows compared with Unit 3. SONGS Unit 3 suffered in-plane fluid elastic instability due to operation at lower steam pressures and higher RCS flows. If the operating and local thermal-hydraulic conditions were the same in both Units, then Unit 2 should have suffered tube-to-tube wear like Unit 3. This is because the double the tube-to-AVB contact force (2N) and better supports in Unit 2 are not enough to prevent FEI or tube-to-tube wear for the following reasons: (1) AREVA states, "A contact force of 1N did not resist in-plane motion but a force of 10N was completely effective", and (2) MHI states, "Tube-to-AVB contact forces in excess of 30N will prevent in-plane tube-displacement and tube-to-tube contact in high region of wear." The number of Unit 2 tube-to-AVB wear indications and their wear rates are less than that of Unit 3, because the lower void fractions (98-98.8% range) in Unit 2 produced lower fluid velocities (25 feet/second), lower hydrodynamic pressure and hence lower intensity flow-induced random vibrations. It is therefore concluded that lower intensity flow-induced random vibrations produced lower Unit 2 tube-to-AVB wear indications with less wear rates than that of Unit 3.

NRC AIT Report, SCE, MHI and AREVA conclusions on Unit 3 and Unit 2 operating and thermal-hydraulic conditions causing FEI and double the tube-to-AVB contact forces and better supports for

prevention of FEI in Unit 2 are incomplete, inconsistent, confusing and inconclusive and based on faulty computer simulations and hideous testing data (Shielded under the false pretense of Proprietary information). The analysis in these reports does not meet the intent of NRC CAL ACTION 1, which states "Southern California Edison Company (SCE) will determine the causes of the tube-to-tube interactions that resulted in steam generator tube wear in Unit 3, and will implement actions to prevent loss of integrity due to these causes in the Unit 2 steam generator tubes. SCE will establish a protocol of inspections and/or operational limits for Unit 2, including plans for a mid-cycle shutdown for further inspections."

Repeated requests to NRC AIT Leader, NRC SONGS Special Panel and NRC Region IV Allegation Coordinator to examine carefully the operational difference between Units 2 & 3 and determine its impact on the tube-to-tube interactions and contact forces that resulted in steam generator tube wear in Unit 3, and actions to prevent loss of integrity due to these causes in the Unit 2 steam generator tubes have not been addressed to date. NRR has not asked SCE in its RAI(s) the impact of operational differences between Units 2 and 3 on Unit 2 and Unit 3 tube-to-tube wear. Honorable NRC Commissioner Mr. Apostolakis was totally confused on Unit 2 FEI inconsistent statements by SCE, Westinghouse and AREVA.

From: Vinod Arora <vinnie48in@gmail.com>
Sent: Thursday, July 11, 2013 9:50 PM
To: CHAIRMAN Resource; R4ALLEGATION Resource; Lantz, Ryan; Walls, William
Subject: San Onofre NRC Lessons Learnt - Thought for the Day

Often the best source of information about nuclear safety concerns in a nuclear power plant is a nuclear worker committed to public safety and willing to speak out. Such acts of courage and patriotism, which can sometimes save lives and often save Ratepayer and Shareholder dollars, **SHOULD BE ENCOURAGED** rather than stifled. I hope that NRC Chairman will strengthen enforcement of whistleblower laws to **PROTECT** nuclear workers, who expose nuclear safety concerns and report abuse by Utility Management for Profits. San Onofre Shutdown is a prime example and lesson of ignoring the steam generator and other safety concerns (by SONGS Senior Leadership Team) expressed by a long-term dedicated and fearless employee (Previously and currently a Company President, Management Trouble Shooter, Engineering & Public Safety Consultant, Multi-Disciplined Professional Engineer and Shift Chemical Engineer).