OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

Date Printed: Dec 11, 2012 14:32

PAPER NUMBER: LTR-12-0776 **LOGGING DATE:** 12/11/2012

ACTION OFFICE: EDO

To: Leeds, NRR
cys: OEDO
RIV
Merzke, OEDO

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AFFILIATION: CA

ADDRESSEE: Chairman resource

SUBJECT: Press release - SCE's claims about SONGS Unit 2 Steam Generator Operating Pressures are Erroneous

ACTION: Appropriate

DISTRIBUTION: RF

LETTER DATE: 12/10/2012

ACKNOWLEDGED No

SPECIAL HANDLING:

NOTES:

FILE LOCATION: ADAMS

DATE DUE: **DATE SIGNED:**

Template: SECY-017

E-RIDS: SECY-01

Joosten, Sandy

From: Ace Hoffman [rhoffman@animatedsoftware.com]
Sent: Monday, December 10, 2012 12:49 PM
Subject: Press Release: SCE's Claims About SONGS Unit 2 Steam Generator Operating Pressures Are Erroneous ...

Press Release

The DAB Safety Team: December 7, 2012

Media Contact: Don Leichtling (619) 296-9928 or Ace Hoffman (760) 720-7261

SCE's Claims About SONGS Unit 2 Steam Generator Operating Pressures Are Erroneous Because They Conflict With SCE's Submitted NRC Reports And SCE's Plant Procedures (Operational Data).

Now SCE is claiming in their Unit 2 Restart documents, "Limiting power to 70% significantly reduces fluid velocity. The reduction in fluid velocity significantly reduces the potential for FEI." What they are not saying is that reducing power to 70% significantly increases the steam generator operating pressures, (as the NRC said in its AIT Report) which will:

- Increase the pressure inside all the already damaged SG tubes
- Do nothing to completely eliminate FEI from happening at any time during normal plant operations, and especially during a MSLB or similar accident, which can cause a nuclear incident or worse!

SCE's attempt in using evasive and misleading technical inconsistencies to justifying their dangerous and possibly catastrophic restart plan cannot hide the truth, revealed in their actual plant operational data provided to the NRC and published in the NRC AIT Report.

Background History:

After the radioactive leak occurred in the San Onofre Unit 3 steam generator, Arnie Gundersen along with a team of anonymous steam generator experts were the first ones in the industry to absolutely state, "The pitch to diameter ratio of tubes in the original CE generators is dramatically different from any of the Westinghouse generators fabricated by Mitsubishi. As water moves vertically up in a steam generator, the water content reduces as more steam is created. With the Mitsubishi design the top of the U-tubes are almost dry in some regions. Without liquid in the mixture, there is no damping against vibration, and therefore a severe fluid-elastic instability developed. The real problem in the replacement steam generators at San Onofre is that too much steam and too little water is causing the tubes to vibrate violently in the U-bend region. The tubes are quickly wearing themselves thin enough to completely fail pressure tests. Even if the new tubes are actively not leaking or have not ruptured, the tubes in the Mitsubishi fabrication are at risk of bursting in a main steam line accident scenario and spewing radiation into the air."

SCE's Restart Plan Justification Is Just Scientific Misinformation:

Based on analysis of the NRC AIT Report, Westinghouse's Operational Assessment, SONGS procedures, operational data, plant daily briefing sheets and engineering calculations the DAB Safety Team concludes the following:

- Secondary side lower pressures (833 psi) along with higher reactor thermal power and design deficiencies (low tube clearances) at 100% power created conditions of "ALMOST NO WATER" in certain regions of both Unit 3 steam generators tube bundles. This resulted in fluid elastic instability, where unprecedented tube-tube wear was observed. At the June 18, 2012 AIT presentation, the NRC said, "Throughout the US nuclear industry, this is the first time more than one steam generator tube failed pressure testing.... Eight tubes failed. The pressure testing identified that the strength of eight tubes was not adequate and structural integrity might not be maintained during an accident... this is a serious safety issue." Southern Californians were lucky, that SONGS Unit 3 tube leakage was detected and stopped in time. Otherwise, this condition could have potentially caused a reactor meltdown like Fukushima in Southern Californian's backyards.

- Secondary side higher pressures in Unit 2 (864-942 psi) at 100% power negated the effects of "low tube clearances" and prevented steam "dry-out" (high void fractions) in the Unit 2 tube bundle region, where no fluid elastic instability (tube-tube wear) was observed.

The DAB Safety Team's findings are summarized as follows:

- DAB Safety Team "Strongly Agrees" with Arnie Gundersen and his team of anonymous steam generator experts and with MHI on the causes of fluid elastic instability in Unit 3. What did SCE do, instead of thanking Arnie Gundersen, who first identified the real cause of the problem, tried to discredit him by implying, "What does he know about steam generators, he is just a high school math teacher." [See Mr. Gundersen's actual credentials, below.]

- DAB Safety Team "Agrees" with Westinghouse, why fluid elastic instability did not occur in Unit 2.

- DAB Safety Team "Strongly Disagrees" with ***both*** SCE's conclusions "that fluid elastic instability Most Likely Occurred in Unit 2" and "secondary side operating parameters were similar in the U3 and U2 SGs".

- DAB Safety Team "Strongly Disagrees" with NRC that the differences in the actual operation between units and/or individual steam generators had an insignificant impact on the results and in fact, the NRC AIT team did not identify any changes in steam velocities or void fractions that could account for the differences in tube wear between the units or steam generators. Discussions with two of the NRC panel members gives us the perception that the NRC panel members disagree amongst themselves and also with SCE on the effect of operational parameters on fluid elastic instability in Unit 2 Steam Generator E-089.

Adverse operational conditions, such as larger reactor thermal power and lower steam generator pressures (e.g., 833 psia) and design deficiencies (low tube clearances and no-in-plane fluid elastic instability structural protection) cause areas in the U-tube bundle of a nuclear steam generator to have "ALMOST NO WATER" as observed in SONGS Unit 3 steam generators. When this happens, fluid elastic instability occurs and the thin steam generator tubes carrying radioactive coolant move with large sprinting amplitudes and hit the neighboring tubes with violent and repeated impacts. Therefore, multiple tube failures can occur, as was observed in SONGS Unit 3 at main steam line break testing conditions.

MHI states, "The higher than typical void fraction is a result of a very large and tightly packed tube bundle, particularly in the U-bend, with high heat flux in the hot leg side. This high void fraction is a potentially major cause of the tube FEI, and consequently unexpected tube-to-tube wear (as it affects both the flow velocity and the damping factors). In general, larger thermal power is more severe for vibration, because the steam flow rate increases. At constant thermal power, lower steam pressure is more severe for vibration than higher pressure." MHI is indirectly saying that steam generator pressures of 833 psia created fluid elastic instability in Unit 3, where unprecedented tube-to-tube wear was observed. AREVA states, "At 100% power, the thermal-hydraulic conditions in the U-bend region of the SONGS replacement steam generators exceeded the past successful operational envelope for U-bend nuclear steam generators based on presently available data." MHI has officially notified the NRC that all SONGS damaged RSG Tubes subject to tube-to-tube wear (FEI) should be plugged and or stabilized. SCE cannot certify this as having been done, since they have not inspected the majority of Unit 2's RSG tubes using the most advanced technology, as indicated in HMI's official notice to the NRC. ***Again SCE is caught guessing about the amount of tube fatigue damage***, which directly affects the RSG tube structural integrity; all RSG tubes are subject to tube-to-tube wear, extreme pressure variations and other stresses during a MSLB or other unanticipated operational transients.

NRC AIT Report states, "The team performed a number of different thermal-hydraulic analysis of Units 2 and 3 steam generators. The output of the various analyses runs were then compared and reviewed to determine if those differences could have contributed to the significant change in steam generator tube wear. It was noted that Unit 3 ran with slightly higher primary temperatures, about 4°F higher than Unit 2. The result of the independent NRC thermal-hydraulic analysis indicated that differences in the actual operation between units and/or individual steam generators had an insignificant impact on the results and in fact, the team did not identify any changes in steam velocities or void fractions that could attribute to the differences in tube wear between the units or steam generators. It should be noted that increases in primary temperature and steam generator pressures has the effect of reducing void fractions and peak steam velocities, which slightly decreases the conditions necessary for fluid elastic instability and fluid-induced vibration. The analysis included the varying of steam generator pressures from 833 to 942 psia."

SCE says in their Root Cause Analysis, "Secondary side operating parameters were similar in the U3 and U2 SGs and well within their design limits (e.g., steam generator pressures, 833 psia)." ***Note, NO mention varying the pressure to 942 psia at all...***

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Arnie Gundersen

Arnie Gundersen has 40-years of nuclear power engineering experience. He attended Rensselaer Polytechnic Institute (RPI) where he earned his Bachelor Degree cum laude while also becoming the recipient of a prestigious Atomic Energy Commission Fellowship for his Master Degree in nuclear engineering. Arnie holds a nuclear safety patent, was a licensed reactor operator, and is a former nuclear industry senior vice president. During his nuclear power industry career, Arnie also managed and coordinated projects at 70-nuclear power plants in the US. (from Fairewinds Associates)

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