

## OPSMPEm Resource

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**From:** West, Stephanie  
**Sent:** Wednesday, May 08, 2013 9:07 AM  
**To:** OPSMNPEm Resource; OPSMPEm Resource  
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# U.S. NRC Blog

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## NRC Notifies Licensees of Sequestration Impacts

posted on Fri, 01 Mar 2013 20:21:42 +0000

*Jim Dyer*  
Chief Financial Officer

The NRC today sent a Regulatory Issue Summary to its licensees, Agreement States and other stakeholders outlining the impact of sequestration on agency activities. The summary can be found [here](#). Basically, the document says that the NRC expects to take a reduction of \$52 million in FY2013 because of sequestration, with cuts scheduled to begin taking place today. It also says that while the cuts are challenging, we will manage them in a way that will not negatively affect our ability to carry out our core mission of public health and safety. Specific program delays or deferrals that would take place will be communicated to the affected NRC licensees, applicants or other stakeholders before being implemented. We plan to continue normal operations to the extent possible, and to continue our safety and security oversight activities. Please read the summary for the full text.

### Comments

comment #65765 posted on 2013-03-04 13:16:37 by Moderator in response to comment #64708

The NRC will continue to fulfill its mission, including its emphasis on openness and transparency. Jim Dyer

comment #64764 posted on 2013-03-01 20:23:21 by joffan7

How much are the license fees being reduced by? Because the sequestration seems to have been wrongly calculated on the whole budget of NRC, regardless of license income, rather than that portion of the NRC budget unfunded by licenses.

comment #65754 posted on 2013-03-04 12:16:33 by Moderator in response to comment #64764

For FY 2013, NRC does not have a final appropriations and is operating under a Continuing Resolution (CR). The sequestration order issued by the President on March 1, 2013, reduced the NRC Gross Budget Authority (GBA) by \$53M (including OIG) from the NRC FY 2013 CR rate of \$1044M GBA or \$991M GBA (including OIG). NRC is required to collect 90 percent of its FY 2013 final GBA appropriations less specific amounts for Waste Incidental to Reprocessing and Generic Homeland Security activities by September 30, 2013. The NRC FY 2013 Proposed Fee Rule is being issued based on the NRC budget submitted to Congress of \$1053M GBA (including OIG). If the NRC FY 2013 appropriations are changed before the final fee rule is issued, the fees will be adjusted to reflect the new amount. Jim Dyer

comment #66045 posted on 2013-03-05 15:57:25 by HELPAIHurtNeverBaba

Good Morning Mr. President Americans need safe, well-maintained & managed, affordable and reliable nuclear civilian nuclear energy to enjoy the modern comforts of 21st century technology. In addition, for example, we all rely on modern technological, medical and communication devices to save our lives. Life is a unique opportunity to serve the society. Americans are providing generous assistance to people all over the world to improve the standards of living. The conventional sources of power, excluding nuclear, are very expensive and are not readily available 24/7 to fulfill the needs of ALL Americans at this time. The NRC, like other Federal agencies, is planning to reduce the budget by approximately \$52 million in Fiscal Year 2013. Sir, instead of reduction, NRC needs more money, more experts and updated software to fulfill its public safety and regulatory mission assigned by the President and Congress. A 100 million dollar increase per year for NRC will make life safer for ALL Americans from potential radiological accidents by thorough oversight of Nuclear Power utilities and its Vendor by Brilliant and Dedicated NRC Staff. A prime example due to lack of resources and funds, and the resulting lack of strict oversight by NRC is in the case of SAN Onofre Nuclear Generating Station of Southern California Edison and Mitsubishi Heavy Industries. Thanks for your kind consideration. Thank you for contacting the White House. President Obama is committed to creating the most open and accessible Administration in history. That begins with taking comments and questions from you, the American people, through our website. 0http://www.whitehouse.gov/thank-you Thanks to Mr. Jim Dyer NRC Chief Financial Officer for posting this blog..... HAHN Baba

comment #64708 posted on 2013-03-01 18:46:58 by Garry Morgan

Will balancing the Federal budget have a negative effect on NRC openness of its meetings? Balancing the inflated Federal Budget should never have a negative impact on "Sunshine" relating to any NRC actions.

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## Melting Ice with the Peaceful Atom: The NRC and the End of the Cold War

posted on Tue, 05 Mar 2013 14:43:55 +0000

*Thomas Wellock*  
*NRC Historian*

Despite not seeing eye-to-eye on many matters, the U.S. and the Soviet Union, nevertheless, continued to exchange information about nuclear reactor safety even during the Cold War. Then the Soviets invaded Afghanistan in 1979 and the information exchanges stopped. It wasn't until the 1985 Reagan-Gorbachev summit that discussions were restarted. [caption id="attachment\_3860" align="alignright" width="300"]



U.S.-Soviet Signing Ceremony[/caption] After productive meetings with U.S. nuclear safety experts shortly after the Chernobyl nuclear accident in April 1986, Soviet expert Anfronik Petrosyants noted: "We hope we have broken the ice of mistrust." It appeared something good for reactor safety and Cold War relations might come from the disaster. A year and a half later the initial talks bore fruit. On the second anniversary of Chernobyl, NRC Chairman Lando Zech met with his Soviet regulatory counterpart for a signing ceremony at the U.S. State Department establishing a joint coordinating committee of U.S. and Soviet experts to share information on nuclear safety issues. It was an important moment for the world. As Hans Blix, the head of the International Atomic Energy Agency, observed: "a radiation cloud doesn't know international boundaries." But it was an uneasy relationship. Both sides entered negotiations with trepidation born of a long Cold War. In March 1987, an NRC safety team led by Commissioner Frederick Bernthal toured Soviet facilities, including two undamaged reactors at Chernobyl. The delegation reported that Soviet experts were not eager to discuss the possibility of formal cooperation with the U.S. on safety matters. They only agreed to further talks. At home, some U.S. officials suspected the negotiations were a trap. Carol Kessler, an NRC and State Department staffer, recalled strong opposition to the NRC initiative from military representatives. An officer, she recalled, "stood up on a chair in [an] inter-agency meeting and explained to us how were all ruining the lives of our grandchildren [by negotiating with the Soviets]. It was the most amazing meeting I have ever seen." Nevertheless, negotiations gained momentum with support from President Ronald Reagan and General Secretary Mikhail Gorbachev. In December 1987, the two leaders jointly called for a bilateral agreement on reactor safety. The memorandum was signed just four months later. It created 10 working groups to work on safety regulation, operations, research, and radiation protection. Similar agreements quickly followed with other Soviet-bloc nations. The Soviet memorandum marked a key shift for the NRC in international affairs that outlived the fall of communism. Surrounded by reactors that did not meet Western safety standards and bereft of regulatory agencies like the NRC, former communist countries desperately needed assistance. The bilateral agreements allowed the agency to become an ambassador among them advocating that they establish Western safety standards and regulations. In a future post, I will detail the 20-year international effort to Westernize the communist nuclear regulatory system.

#### Comments

comment #66207 posted on 2013-03-06 07:33:30 by jkmhoffman

Reblogged this on [kjmhoffman](#).

comment #66332 posted on 2013-03-06 12:10:29 by Keith Brooks

This is a certainly a fascinating little jewel of historicism, but the soviet union is long gone (thank G-d). What I'm more interested in is the existential threat that storm Saturn poses to our fragile nuclear engagements lining the atlantic coast. Meteorologists are forecasting flooding all throughout New England. How will the Pilgrim Plant fair? You've kept us safe thus far, and I have confidence that you'll keep us up to date on the status of any potential nuclear dilemma. Thankfully, this storm isn't half as bad as Sandy, so my fears appear to be warrantless as of now. Thanks, Keith

comment #66068 posted on 2013-03-05 18:04:43 by Joel Riddle

Very interesting bit of history there. Considering the timing, it almost makes one wonder whether the incident at Chernobyl might have been prevented if it weren't for that gap of collaboration between 1979 and 1985.

#### NRC's 25th Regulatory Information Conference Kicks Off Next Week; A Look Back at Its History Goes Live Today

posted on Thu, 07 Mar 2013 14:54:51 +0000

*Lorna P. Kipfer*  
*RIC 2013 Conference Program Specialist*

The NRC's 25th annual Regulatory Information Conference is being held in Maryland next week, from March 12-14, with an exciting agenda. Attendees will be able to attend technical sessions on a variety of topics associated with operating reactors, new and advanced reactors, fuel cycle facilities, nuclear security, safety research, and safety culture policies. What's new this year? You'll find a Force-on-Force Inspection Program display of tactical equipment used during NRC Force-on-Force inspections and for our tech-savvy attendees we're offering a mobile optimized agenda page. Other events include tours of the NRC's Operations Center. Visit [here](#) for information on these and other new items offered this year. Representatives from government, industry, international agencies and other stakeholders are among this



year's registrants. [caption id="attachment\_3869" align="alignright" width="300"] The first RIC registration in 1989. [caption] Usually just called the RIC, the conference began in 1989 as a small gathering on nuclear safety regulation. Today, it is the one annual public event where regulators, industry officials, and concerned citizens come together for a collective dialogue on nuclear reactor and materials safety. In a video posted to [YouTube](#) today, NRC Historian Tom Wellock interviews NRC staff and former employees who have been important to the start and development of the RIC. At this year's RIC, NRC Chairman, Allison M. Macfarlane will deliver the keynote remarks to open the first session. Bill Borchardt, NRC's Executive Director for Operations will follow with his presentation. Plenary sessions with Commissioners Kristine L. Svinicki, George Apostolakis, William D. Magwood, and William C. Ostendorff are included throughout the program. The RIC is open to industry representatives, stakeholders and members of the public and admission is free. You can register onsite. More information is available on the [RIC website](#).

#### Comments

## Two Important Reports about Steam Generators at SONGS Go Public

posted on Fri, 08 Mar 2013 19:57:52 +0000

*Victor Dricks*  
Senior Public Affairs Officer

The NRC made public today redacted versions of two reports prepared by Mitsubishi Heavy Industries concerning the steam generator replacement at the San Onofre Nuclear Generating Station (SONGS). [The Steam Generator Root Cause Analysis Report and a Supplemental Technical Evaluation Report](#) were prepared by Mitsubishi Heavy Industries as part of its effort to determine what contributed to the unusual wear in the steam generators after they were installed in 2010 and 2011 at Units 2 and 3, respectively. The NRC is using a variety of regulatory actions, such as inspections and investigations, to ensure that it is comprehensively addressing the issues that have arisen at the SONGS nuclear power plant. On Sept. 28, 2012, the NRC began an expansive investigation on the completeness and accuracy of information that Edison provided to the NRC regarding the steam generator degradation under the NRC's regulatory requirements. These reports are included in an array of documents being reviewed by the NRC as we investigate whether Edison demonstrated sufficient due diligence in its oversight of the redesign of the steam generators; how design changes that were made or rejected may have affected the safety of the steam generators; and the truthfulness and accuracy of all the information Edison has provided to the NRC regarding the redesign and replacement of the steam generators. Separately from the ongoing investigation, the NRC is evaluating Edison's responses to questions the NRC has raised about their request to restart Unit 2 at the plant. Additionally, the Atomic Safety and Licensing Board is reviewing issues related to the Confirmatory Action Letter issued by the NRC staff to Southern California Edison.

#### Comments

comment #81587 posted on 2013-03-22 02:36:29 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. HAHN BABA responding to MHI Root Cause – Part 3 - Mitsubishi explanation of low contact forces as the reason for Unit 3 FEI and increased out-of plane flat bars contact force serves to increase the in-plane natural frequency of the tubes does not make any sense. The Root Cause by SCE and MHI for both Units 2 & 3 RSGs does not address the exact reason for RSG design and operational flaws. Root Cause is defined as the exact reason (e.g., hardware, process, or human performance) for a problem, which if corrected, will prevent recurrence of that problem MHI Press Statement: An executive with the company that manufactured faulty equipment that led to the shutdown of the San Onofre nuclear plant defended decisions made in the design of the replacement steam generators. The company made choices in designing support structures at San Onofre that were intended to prevent one type of vibration, but ended up creating another type of vibration that ultimately led to the plant's closure, said Frank Gillespie, senior vice president with Mitsubishi Nuclear Energy Systems. The problematic vibration, he said, had not been seen at any other plant before, although it had been observed in experimental conditions. Rebuttal: Researchers have said long ago that nucleate boiling on the tube surfaces has a stabilizing damping effect to preclude fluid-elastic instability. At least 1.5 % water or void fraction less than 98.5% in a steam-water mixture and areas without localized tube dry-out conditions are required in a nuclear steam generator to preclude the

onset of fluid elastic instability. A review of NUREG-1841 published during the SCE/MHI design stages of San Onofre Replacement Steam Generators indicates that innovative and experienced manufacturers of steam generators (like Westinghouse/CE & BW&I) including with very high steam flows such as the largest steam generators in the world (e.g., Palo Verde) have used a combination of design and operational features [(high circulation ratios(>4), high steam pressures (> 900 psi) and low friction losses] to keep the void fractions at 98.5% or below and have prevented localized tube dry-out conditions and steam blanketing in operating US Steam Generators. The above statements by MHI are very damaging and affects its credibility as a NEI Qualified, "US Nuclear Plant Designer" and manufacturer of nuclear power plant components including the new APWRs. NRC Chairman has publicly stated that SCE is responsible for the work of MHI. Therefore, NRC/NRR San Onofre Special Members have to be extremely careful (to fulfill their mission of public safety) of all the false claims and wishy-washy Unit 2 Return to Service Reports, which are based on flawed statistical data, unreliable computer models, irrational logic and are nothing, but garbage, smoking mirrors, full of holes and contradictions. SUMMARY: As stated above and below, MHI is right with its limited knowledge and experience, when it states, "It was not recognized at the time that a certain amount of tube-to-AVB contact force was required to prevent in-plane FEI under high steam quality (void fraction) conditions, because the contact force serves to increase the in-plane natural frequency of the tube." Let us examine why MHI says that: (1) MHI did not have the experience with building large Combustion Engineering Replacement Steam Generators (RSGs) like San Onofre with large steam flows with the potential for FEI, high dry steam or tube dry-outs, (2) MHI had experience with building only Combustion Engineering RSGs in Fort Calhoun with very small flows compared with San Onofre, which did not have the potential for FEI, high dry steam or tube dry-outs (3) The tube-to-AVB contact force MHI is discussing to prevent in-plane FEI under high steam quality (void fraction) conditions only prevents damage of the tubes due to flow induced random vibrations in the out-of-plane direction. That is why, San Onofre Unit 3 RSGs tubes did not move in the out-of-plane direction, but moved in the in-plane direction due to double the velocities calculated by ATHOS Models, (4) In-plane FEI at SONGS for MHI is a new paradigm, but it has been observed in experimental conditions. Nuclear Manufacturers without large CE RSGs design and manufacturing experience like MHI design anti-vibration bar support structures for out-of-plane protection with the assumption that that in-plane FEI does not need to be considered if out-of-plane FEI is controlled, (5) MHI Engineers did not read Dr. Pettigrew's research papers published in 2006 during the early design stages of the San Onofre RSGs, in which he warned about the ineffectiveness of flat bars against in-plane vibrations. He said in 2013 again that San Onofre RSGs do not provide a positive restraint against in-plane vibrations, (6) AREVA states, "After instability develops, the amplitude of in-plane motion continuously increases and the forces needed to prevent in-plane motion at any given AVB location become relatively large. Hence shortly after instability occurs, U-bends begin to swing in Mode 1 and overcome hindrance at any AVB location", (7) Westinghouse/Combustion Engineering have successfully designed 6 CE replacement steam generators with high steam flows at Palo Verde and these generators have not experienced in-plane vibrations in almost 10 years of operation? Mitsubishi explanation of low contact forces as the reason for Unit 3 FEI and increased out-of plane flat bars contact force serves to increase the in-plane natural frequency of the tube does not make sense. Mitsubishi in its Root Cause, Document UES -20120254, Rev 0, page 20, Section 5.5, Discussion of Tube to Tube Wear - Tube Contact Force, states, "During the fabrication of the AVBs and the tubing and assembly of the tube bundle, MHI's manufacturing practices achieved dimensional control that resulted in smaller tube-to-AVB gaps and smaller tube-to-AVB contact forces. It was not recognized at the time that a certain amount of tube-to-AVB contact force was required to prevent in-plane FEI under high steam quality (void fraction) conditions, because the contact force serves to increase the in-plane natural frequency of the tube. The technical investigations after the tube leak incident determined that the amount of contact force necessary to prevent in-plane FEI depends on the localized thermal-hydraulic conditions (steam quality (void fraction), flow velocity and hydro-dynamic pressure). As the steam quality (void fraction) increases, the amount of contact force necessary to prevent vibration increases. This increase in required contact force occurs because as the steam quality (void fraction) becomes higher, the damping provided by the liquid phase in the form of a liquid film decreases. The reduced in-plane contact force due to the SONGS "effective zero gap" design and the avoidance of "excessive preload" resulted in lowering the tubes' natural frequency in the in-plane direction. The combination of the localized high steam quality (void fraction) and reduced tube to AVB contact force resulted in exceeding the in-plane critical velocity, which created a condition that led to tube to tube contact. The dominant role played by the low contact force is reflected by the differences in the tube-to-tube wear that was observed in the Unit 2 and the Unit 3 RSGs. Each of the Unit 3 RSGs had approximately 160 tubes that experienced tube-to-tube wear whereas only one of the Unit 2 RSGs experienced tube-to-tube wear in just two tubes, even though the Unit 2 RSGs have operated twice as long as the Unit 3 RSGs. MHI did a comprehensive statistical evaluation of the contact forces between the tubes and the AVBs of the two units and concluded, based on the manufacturing data, that the contact force between the tubes and the AVBs in the Unit 2 RSGs is approximately double the contact force in the Unit 3 RSGs. Thus, the lower contact forces in Unit 3 are consistent with the conditions determined necessary to permit in-plane FEI to occur and with the fact that tube-to-tube wear occurred almost exclusively in Unit 3." Mitsubishi in its Root Cause, Document UES -20120254, Rev 0, page 21 through 22, Section 5.5, Discussion of Tube to Tube Wear & Thermal-hydraulic Conditions, states, Many analyses are performed during the steam generator design process. One of these is MHI's FIT-III tube bundle flow analysis, which calculates tube bundle thermal / hydraulic parameters, including U-bend flow velocity and steam quality (void fraction). An after-the-fact comparison between the T/H parameters that FIT-III predicted and those predicted by ATHOS, another T/H code, determined that FIT-III's calculated values are lower than those obtained using ATHOS. Part of the difference was because the pressure loss coefficients for the tube bundle and the two-phase mixture density utilized in the two codes were different. Also, during the computation of the flow velocity, MHI used an inappropriate definition of the gap between tubes, with the result that the flow velocities were underestimated. These differences between MHI's use of the FIT-III model and the ATHOS model resulted in a higher margin to out-of-plane FEI than the margin that would have been determined using the appropriate definition of the gap and an ATHOS-calculated steam quality (void fraction). The margin calculated using ATHOS, nonetheless, would still have resulted in adequate margin against out-of-plane FEI. Using the ATHOS outputs, with all AVBs assumed active, the stability ratio was less than 1.0 for out-of-plane FEI, even for those case studies assuming reduced damping that could occur under high void fraction conditions.<sup>3</sup> Thus, the use of ATHOS as opposed to FIT-III would not have identified an inadequate design margin against FEI. Moreover, because industry practice was focused on out-of-plane FEI, use of ATHOS would not have identified the potential for in-plane vibration. Both the academic literature and subsequently conducted tests show that the thermal-hydraulic environment under which in-plane FEI arises is different from those that result in out-of-plane FEI. (See Supplemental Technical Evaluation Report). If



the steam quality (void fraction) predicted by FIT-III had been the same as the ATHOS calculated value, and if the appropriate tube to tube gap value had been utilized to compute the flow velocity, MHI would have identified a decreased margin against out-of-plane FEI. In that case, MHI might have incorporated an additional AVB to increase the design margin against out-of-plane FEI, but would not have taken measures to protect against in-plane FEI, for it was assumed (as was the practice and guidance in the industry) that the controlling effect of a well-designed AVB system was adequate to preclude it. Thus, not using ATHOS, which predicts higher void fractions than FIT-III at the time of design represented, at most, a missed opportunity to take further design steps, not directed at in-plane FEI, that might have resulted in a different design that might have avoided in-plane FEI. However, the AVB Design Team recognized that the design for the SONGS RSGs resulted in higher steam quality (void fraction) than previous designs and had considered making changes to the design to reduce the void fraction (e.g., using a larger downcomer, using larger flow slot design for the tube support plates, and even removing a TSP). But each of the considered changes had unacceptable consequences and the AVB Design Team agreed not to implement them. Among the difficulties associated with the potential changes was the possibility that making them could impede the ability to justify the RSG design under the provisions of 10 C.F.R. §50.59. Thus, one cannot say that use of a different code than FIT-III would have prevented the occurrence of the in-plane FEI observed in the SONGS RSGs or that any feasible design changes arising from the use of a different code would have reduced the void fraction sufficiently to avoid tube-to-tube wear. For the same reason, an analysis of the cumulative effects of the design changes including the departures from the OSG's design and MHI's previously successful designs would not have resulted in a design change that directly addressed in-plane FEI."

comment #93759 posted on 2013-04-26 10:11:22 by Corey

Do you mind if I quote a couple of your posts as long as I provide credit and sources back to your site? My blog is in the exact same niche as yours and my visitors would certainly benefit from a lot of the information you provide here. Please let me know if this okay with you. Many thanks!

comment #69156 posted on 2013-03-08 17:47:13 by CaptD

Finally: MHI's Root Cause Analysis Report for San Onofre <http://pbadupws.nrc.gov/docs/ML1306/ML13065A097.pdf> ... Among other things: snip " However, the AVB Design Team recognized that the design for the SONGS RSGs resulted in higher steam quality (void fraction) than previous designs and had considered making changes to the design to reduce the void fraction (e.g., using a larger downcomer, using larger flow slot design for the tube support plates, and even removing a TSP). But each of the considered changes had unacceptable consequences and the AVB Design Team agreed not to implement them. Among the difficulties associated with the potential changes was the possibility that making them could impede the ability to justify the RSG design under the provisions of 10 C.F.R. §50.59. Thus, one cannot say that use of a different code than FIT-III would have prevented the occurrence of the in-plane FEI observed in the SONGS RSGs or that any feasible design changes arising from the use of a different code would have reduced the void fraction sufficiently to avoid tube-to-tube wear. For the same reason, an analysis of the cumulative effects of the design changes including the departures from the OSG's design and MHI's previously successful designs would not have resulted in a design change that directly addressed in-plane FEI."

comment #81469 posted on 2013-03-21 11:10:44 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. HAHN BABA responding to MHI Root Cause – Part 2 SCE/MHI misrepresenting Tube Wear Root Cause at St. Lucie Unit 2 Replacement Steam Generators built by AREVA. Root Cause is defined as the exact scientific and operating reason (e.g., hardware, process, or human performance) for a problem, which if corrected, will prevent recurrence of that problem SUMMARY: Plant A MHI is referring below is actually about St. Lucie 2 located in Florida. Professor Daniel Hirsch states (See reference below), "SCE has attempted to compare its San Onofre Unit 2 steam generator experience to St. Lucie 2, in order to assert that what is happening at San Onofre is typical for new replacement steam generators and is simply a "settling in" process common to them. These assertions are clearly misplaced. St. Lucie 2's steam generators are having great trouble, and as the data shows, not in any fashion the norm. Indeed, St. Lucie 1 had only 17 damaged tubes at its first ISI. The serious problems at St. Lucie 2 have resulted in its operators having to conduct a root cause analysis which concluded that "the root cause was that the U-tubes were not effectively supported during SG [steam generator] manufacture, which caused the tubes to sag into the AVBs and led to slight AVB deformation that closed the tube-to-AVB gap at specific locations. This exacerbated tube wear in those locations." NRC's Advisory Committee on Reactor Safety concluded that the St. Lucie 2 tube wear is "different than the form of degradation reported to have occurred at San Onofre. There are a number of design differences between the SGs installed at San Onofre and those at St Lucie 2." Thus the problems at St. Lucie 2 are not standard "settling in" but due to a serious manufacturing error and unrelated to San Onofre's problems. Even with all the troubles St. Lucie 2 has, it had to plug only 14 tubes, compared to the hundreds plugged at San Onofre. The San Onofre Unit 2 tube-to-AVB damage has been caused due to flow-induced random vibrations and Mitsubishi flowering effects as a result of high steam flows, narrow tube to pitch diameter ratio and a very tall tube bundle (Outside the NORM compared with MHI SGs), high void fractions (< 98.5%) and high fluid velocities. Therefore the Root Causes of San Onofre and St. Lucie are completely different and misrepresented by SCE and MHI. Mitsubishi states in its Root Cause, Document L5-04GA588, Rev 0, Page 34, Section 3.2, Tube-to-AVB Wear Experience in Other Large CE-Plant RSGs, "Tube wear patterns similar to those observed at SONGS were reported at the Plant-A (St. Lucie Unit 2) large U-bend steam generators that were replacements for CE manufactured OSGs (See NRC ADAMS ML11270A015 and ML093230226). The Plant-A steam generators were designed by another vendor (AREVA). They are slightly smaller than the SONGS steam generators but have U-bend tubes, flat bar AVBs, and BEC type TSPs, that are similar to the SONGS RSGs, except SONGS features a 12 AVB design and Plant-A has an 8 AVB design. The Plant-A inspection results show a wear pattern with many tubes in the center of the U-bend that have tube-to-AVB wear similar to that found

in the SONGS steam generators. Figure 3.2.1-2 shows the tubes with tube-to-AVB wear identified at Plant-A during the first inspection following installation of the RSGs and Figure 3.2.1-3 shows the tubes with tube-to-AVB wear identified at Plant-A during the second cycle inspection. Note that the locations of the Plant-A indications are very similar to those for SONGS shown in Figs. 3.1-1 and 3.1-2. Figure 3.2.1-4 compares the total number of tube-to-AVB wear indications for Plant-A, SONGS Unit 2, and SONGS Unit 3 as a function of time and Figure 3.2.1-5 shows the average wear depths for the three plants (six RSGs) as a function of time. As can be seen from these figures, the total number of indications and average wear depth at Plant-A are comparable to that at SONGS. Figure 3.2.1-5 suggests that the tube-to-AVB wear depths at Plant-A have reached a plateau. The reason for such a plateau is unclear. It may be indicative of the type of tube vibration mechanism or an effect of the support condition. But it is clear that the number of tubes with tube-to-AVB wear at Plant-A is growing (refer to Fig. 3.2.1-2 and 3.2.1-3)." Reference: Far Outside The Norm: The San Onofre Nuclear Plant's Steam Generator Problems in the Context of the National Experience with Replacement Steam Generators by Daniel Hirsch and Dorah Shuey, "How does San Onofre compare with the experience with replacement steam generators (RSGs) more generally? A January 2002 article in Nuclear Engineering International, entitled "Replacement Steam Generators," answers that question: "Of the 30 RSGs now in operation, 26 have received 100% eddy current inspection during in service inspection. Of these, 12 have experienced limited fretting wear. The other 14 RSGs have no evidence of any wear. ECT [Eddy Current Testing] indications have resulted in 23 plugged tubes out of a total population of 176,282 in the 26 inspected SGs. Thus, when the article was written, the majority of replacement steam generators showed "no evidence of any wear." The remaining minority showed limited wear—so limited, that a total of only 23 tubes had to be plugged out of 176,282 tubes in the 26 inspected steam generators. Unit 2 of San Onofre, the reactor asserted to be far healthier than Unit 3, had plugged more than twenty times as many tubes as the 26 replacement steam generators considered in that 2002 review, combined. The NRC's AIT report dismissed all but the tube-to-tube wear (which is primarily in Unit 3) and four wear indications at retainer bars in Unit 2 as common in new steam generators. The report stated that, with those exceptions, "the wear indications found are similar to those found at other replacement steam generators after one cycle of operation ."xiii (emphasis added). However, at other times NRC has stated the opposite. For example, the Los Angeles Times quoted an NRC spokesman on July 14: "Other large steam generators have exhibited wear after one cycle of operation which resulted in tube plugging...but not to the extent seen on San Onofre steam generators." Another NRC spokesperson was quoted as saying, "It is accurate to say San Onofre's demonstrated wear is unprecedented for the length of time the steam generators were used." Also, SCE has made assertions similar to the statement in the NRC AIT report. In a July press statement about the release of the tube wear tables, for example, SCE stated, "The majority of this wear is related to support structures. The nature of the support structure wear is not unusual in new steam generators and is part of the equipment settling in.(emphasis added)"

comment #94184 posted on 2013-04-26 19:27:56 by richard123456columbia

If they try to repair the problems and it does not work, who pays for it or if the repairs cause a new problem. Who will insure this change? Who will be responsible if it goes bad, will they be charged with murder if people die and pay for all damages. NO, they will not so they have no risk if it goes bad 10 or 20 years from now. This will turn into a one of a kind plant with unique problems that no one has seen or experienced before so the out come is questionable at best. The top group to blame will be the NRC(Public Money) no matter who else will be next. The public's risk is above what they want to take for the possible gain. This is uncharted water with extreme consequences. STOP

comment #69936 posted on 2013-03-09 17:51:29 by James Greenidge

Good report. Time to fix blame and SONGS and juice back on-line! James Greenidge Queens NY

comment #76642 posted on 2013-03-15 17:35:19 by richard123456columbia in response to comment #76482

I am in the electronic engineering field and fire alarm life safety was a major area, we have ULC requirements to abide by and if you change anything in the design and manufacturing of the product you will have to get it tested by ULC or in sum miner items have them go to the site to approve the changes which is usually a one of a kind ancillary type device like building graphic enunciator panels. The type of changes that require retesting are changes of all kinds even screw size, power supplies, relay type, bulbs, labels, changing electronic components to a different manufactures equivalents, wire gauge and type, etc. Here we have changes made [1] type of metal pipe [2] extend lengths of pipe [3] change its form by bending it differently [4] change and add supports [5] added pipe loops [6] reconfigure pipe loops [7] added restrictions (narrowed pipe inside diameter in areas of pipe) [8] probably others And they managed to bypass NRC rules for re-certification !!! This looks bad and makes it look like all that where involved new exactly what was being hatched up and maybe even NRC, everyone that has Experience in contracting and working in this industry knows the rules inside and out or they would never have been put in their position. If !!! NRC did not know, then to stop this from happening again they will have to make the rules more stringent so that any changes will require NRC to investigate to see if the changes require a recertification. This would put the responsibility on NRC totally. I do not believe NRC wants that, so they will leave it as is and hope that this experience will shape up the industry.

comment #76620 posted on 2013-03-15 14:52:36 by dagreene

Author: David A. Greene, C.Phys.; F.Inst.P.; F.Inst.M.C. OVERVIEW This blog submittal covers a review of the MHI document on SONGS steam generator issues and problems. Based on this review and my own experience, suggestions for moving forward to resolve the issues are suggested and discussed. The responsibilities of NRC in moving towards practical, safe and reliable return of the steam generators to operation are an important part of possible solutions. I have many decades of working in the US and UK in nuclear technology and engineering, and steam generators in particular; including thermodynamics, lead roles in instrumentation and control, and R&D in several specialized SG engineering and technology fields. I have been a member of National and International



specialist information exchange and review teams. I have also had my engineering and R&D programs reviewed or been a member of review teams. It is against this background that I offer comments on this MHI report. I should also state I have never been employed by either MHI or SCE. I am a small business owner who has consulted in the nuclear field, but never for these companies. My company does have products which can be used in the nuclear field but they have not been purchased by either company.

DISCUSSION NRC has published a non-proprietary, redacted version of the 135 page MHI report "Root Cause Analysis Report for tube wear identified in the Unit 2 and Unit 3 Steam Generators of San Onofre Nuclear Generating Station". MHI have primarily protected the names of workers, and very detailed information on certain component or fabrication values they consider proprietary information which would be of value to competitors. Redactions in this report in no way prevent a full understanding of the report contents on issues with steam generator performance issues. First a general comment on the MHI document; the redacted report appears comprehensive and open in discussing both MHI design/fabrication process and their investigation into the root causes suspected for the tube wear problem. It is an engineering document presenting factual information and I saw no evidence of attempts to mislead or cloud issues. A Certified Design Specification SO23-617-01, Rev. 3, issued by SCE required an effective zero gap and gap uniformity and parallelism of the tube bundle in the out-of-plane direction. Establishing the goal to reduce tube-AVB gaps to an effective zero gap was in accordance with well accepted industry practice and understanding that minimizing gaps was highly desirable in preventing tube vibration wear. MHI had sought to minimize tube-AVB gaps in its previous SG designs. However, MHI took additional steps to minimize the tube-AVB gaps for the SONGS RSGs and to provide for gap uniformity throughout the U-bend region of the tube bundle. MHI and SCE augmented their design and fabrication teams with consultants who had experience of large U-bend style steam generators. They compared their design features to existing, successful operational steam generators. SONGS steam generator's design was very robust, built to last a very long, long time. MHI put a lot effort into every step from design and material selections to fabrication. The design and fabrication is consistent with Industry efforts for Plant Life Management (PLiM) to safely increase the utility of older plants, both fossil fired and nuclear. In the report MHI provide full details of their design and manufacturing process; it becomes obvious from reading the report the intention of MHI and SCE was to produce a state of the art, safe, reliable steam generator. The MHI-supplied replacement SGs (RSGs) had a number of differences from the existing steam generators provided by Combustion Engineering. One of the main differences was the substitution of Inconel 690 for Inconel 600 as the tube material. Inconel 690 is more resistant to corrosion than Inconel 600. The Certified Design Specification issued by SCE also required that MHI incorporate many design changes to minimize degradation and maximize reliability. For example; an effective "zero" tube-to-flat bar gap, gap uniformity and parallelism of the tube bundle in the out-of-plane direction prior to tube fabrication. These steps included increasing the nominal thickness of the Anti-Vibration Bars compared to previous MHI successful SGs and reducing the manufacturing tolerance of AVB thickness and twist in order to achieve effective zero gaps and provide gap uniformity. Steps were taken as well to minimize tube ovality and to minimize variations from the design value. Also, numerous additional steps were taken in fabricating the tube bundle to assure gap uniformity throughout the U-bend region. Additionally, in the fabrication of the Unit 2 RSGs MHI identified other enhancements that were implemented in the fabrication of the Unit 3 RSGs. The adequacy of the design against out-of-plane FEI was confirmed through test data and analyses that conservatively assumed that one of the AVBs provided in the design was inactive (that is, ineffective against out-of-plane FEI). Analyses using this criterion showed that an adequate margin against out-of-plane FEI exists in the SONGS RSGs. An additional AVB had been added to the design to provide further margin against out-of-plane FEI. My overall impression from the report was MHI and SCE produced magnificently engineered, state of the art steam generators; the type of steam generators that would set future SG standards for both replacement and for use in new power plants. As a person knowledgeable in the field I was impressed with the depth and breadth of the engineering efforts made to design and fabricate a safe, reliable modern steam generator. The report also makes it obvious that both companies understood flow induced vibration was potentially a severe reliability issue for power plant steam generators. Significant design effort was expended to minimize or prevent vibration problems. They used computer code analyses to help check design variant impact on vibration potential. Experimental and analytical investigations were completed. However, computer codes are a "best effort" to simulate thermo-dynamic performance and vibration potential. None of these approaches can provide absolute assurance that the design is adequate. One major issue I have is MHI/SCE did not install or have a vibration/wear monitoring system that allowed the plant operators to continuously monitor for vibration. (add something about NRC also not requiring such as system.) Since this was essentially a new design approach for steam generators (and its components and sub-components) it seems that vibration monitoring should have been an essential requirement. I believe that it is still an essential requirement for continued operation. Another issue is that MHI and SCE have fully opened their coats on their actions and these steam generator issues, but where is NRC in this picture? NRC's reason for existence is to provide overview of nuclear power plants. It was, and remains their responsibility, to ensure safe design and operation of the San Onofre Nuclear Power Plant. Why or where did their overview fail to ensure safe and reliable operation? Granted a secondary monitoring system provided an indication of a steam generator problem, but why did they accept that a major design parameter (tube vibration) would not be continuously monitored in the much modified steam generator design? And where is their 'mea culpa' (or better still mea maxima culpa) public document equivalent to the MHI document? Will they fall back to noting the loose parts monitor installed on the secondary loop? I hope not! The primary purpose of the loose part detection program is the early detection of loose metallic parts in the primary system (NUREG-0933, Main Report with Supplements 1-34). Will NRC say they only expect to detect a vibration problem when bits of steam generator tubing start to bounce around in the steam generators? I believe that their role was to require that an effective vibration monitoring system was in place on the new RSG design. This apparently did not happen. NRC is an independent Agency. I was pleased that our California Senators have involved themselves in the issues. They have not used SONGS problems to push political issues, but acted as California's front line representatives to the US Government. I hope they will continue to ensure the local NRC will receive any additional resources or support needed to get San Onofre NPP back in service, and providing revenues and services to both the local communities and the State of California. Until the current issues are resolved SONGS remains a drain on our State economy as well as the Companies involved. I believe MHI/SCE need to provide a clear plan to return the steam generators to service. If this includes installing a continuous vibration monitor, I believe the MHI/SCE approach of running at partial load is a good option. The steam generators have existing ports and nozzles that might allow "fixes" to be tested and provide confirmation that the fixes are viable. Included in this approach would be an internal vibration source (temporary or permanent) to demonstrate viability of continuous monitoring. I think eventual test operation at all operating conditions is essential to demonstrate fixes and monitoring are viable I would feel uncomfortable with operating at a "safe"

low power condition without a verified and validated vibration monitoring system. The science of vibration engineering in complex geometries with complex thermo/fluid dynamic conditions is not understood enough to precisely predict outcomes; not even with the most powerful CFD computer programs. NRC need to make clear up front to both companies and to the public what they expect or will demand, including criteria for measuring, verifying and validating fixes and steam generator monitoring. The “get me another rock!” approach to setting requirements is not going to be suitable. I hope that the requirements will include plans for vibration monitoring for an extended period, possibly at partial power. We know the processes and procedures needed to achieve this objective. All parties now need to focus on making them work! GHI DOCUMENTATION OF OPERATING PROBLEM The report documents that a problem in all four SONGS Replacement Steam Generators (RSG) was found after a primary loop into secondary loop small water leak was indicated in one RSG. Primary to secondary unplanned water leakage of approximately 82 gallons/day was measured in one RSG. The direct cause of the leakage was determined to be tube to tube wear in the free span section of the U-bend region of the RSG, leading to a leak from one of the tubes in that region. It was determined all of the new generators had higher tube wear than expected. Since the incident MHI and SCE have worked together to establish what caused the problem, calling on specialized help as needed. So what does the document report about their operating problem? Firstly it provides factual power plant information on the extent of the damage. The degree of damage from the relatively short period of steam generator power operation was extreme, and MHI was obviously shocked by the extent and severity they discovered. Teams were set up to determine the cause of the problem, the so called Root Cause Analyses, by both MHI and SCE. These teams concentrated on the RSGs because original steam generators they replaced did not have this wear problem. Concurrently MHI technical teams conducted in-depth technical evaluations of the RSG design and fabrication. MHI, supported by SCE, provide full details of their investigation into possible causes for excessive wear resulting from design and manufacturing and operating process and procedures. A modern problem analysis technology was used to systematically investigate and guide SG Problem analyses: Root cause analysis is a technique to systematically define and assess a complex set of possible causes of a problem. It was initially developed for business analyses but rapidly expanded to engineering and scientific fields. I am familiar with them, having completed training in the technique and successfully used it for systematically assessing many potential problem causes and possible solutions. MHI and SCE used these techniques to point to possible causes of the wear problem in the RSGs. Concurrently, possible mechanistic reasons for tube wear were investigated to provide inputs to the comprehensive problem analyses. Coolant flow caused tube vibration was identified as a probable cause, especially vibrations due to a phenomenon called fluid elastic instability. The main conclusion was tube wear was caused by random vibrations of the tube. This is an important conclusion because it means the damage was not primarily caused by resonant tube vibrations, which would imply a possible design or manufacturing problem. The damage is believed to be due to turbulent flow driven phenomena. Secondly, MHI teams searched all their historical design, technical, and fabrication reports and records for the replacement steam generators. The teams were not searching blind; they had the advantage of hindsight and knowledge of the steam generator performance. They had the advantage of the root cause analyses and several years of actual steam generator operational experience. I have been both a member of such retrospective review teams, and also the subject of reviews. Every aspect of a design, drawing, document, calculation, test, test facility, test plan, test report, logbook, etc., etc., etc., is questioned or second guessed; often several times by different teams. I could use the term witch-hunt but this would give a very wrong impression; it is a cooperative, in-depth search for truth. It is revisiting results and conclusions, data reviews, questioning reasons and assumptions. It is searching for a needle in a haystack, the needle being possible reason (s) for the steam generator problem. MHI report content indicates there are no smoking guns. Review of ‘root causes’ (MHI report section 5.8) have a flavor of second guessing rather than identifying any really new possible cause. For example it was believed that having a ‘zero gap’ in the anti-vibration bar would lead to less wear, but the conclusion of the review team is this ‘improvement’ was possibly a contributing factor to tube wear damage rate. Tube Wear Damage: Technical evaluations suggested five possible types of tube wear were present, two types being the most significant; 1) tube wear in the upper U-tube bend region of the steam generator with sufficient movement for tubes to collide; and also cause wear along the whole tube length where they contacted the anti-vibration bars or tube support plates. 2) Retainer bar to tube wear due to flow induced vibration Tube wear occurred on tubes at the periphery of the U-bend, adjacent to the retainer bars; these tubes have no wear indications at any other location along their length, which indicates that they are stationary, and that the wear is caused by movement (vibration) of the retainer bars. CONCLUSION I believe NRC needs to now step up to the plate and require that a proven effective vibration monitoring system is in place on the RSG’s at SONGS prior to startup. This system must provide Operations staff with timely, continuous, real-time data on operating conditions such that potential problems are clearly located and identified prior to escalation, including information on when and how operators should proceed. Ideally the system should have been proven effective under similar operating conditions for an extended period. We know that a fully engineered, verified and validated SG monitor that uses external sensors for reliability, long life and ease of replacement is currently available, e.g. [www.grdi.com](http://www.grdi.com).

comment #77600 posted on 2013-03-17 00:54:13 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog Nuclear Safety and Economic Lessons Learnt - San Onofre SCE Awareness Series by HAHN Baba 1. Everyone is personally responsible for nuclear safety 2. Leaders demonstrate commitment to safety 3. Trust permeates the organization 4. Decision-making reflects safety first 5. Nuclear technology is recognized as special and unique 6. A critical questioning and investigative attitude is cultivated 7. Organizational learning is embraced 8. Nuclear safety undergoes constant critical and thorough examination. Prepare for the Unexpected: When periodic reviews or new information indicates the potential for conditions that could significantly reduce safety margins or exceed current design assumptions, a timely, formal, and comprehensive assessment of the potential for substantial consequences should be conducted. An independent, cross-functional safety review should also be conducted to fully understand the nuclear safety implications. Plant design features and operating procedures alone cannot completely mitigate the risk posed by a beyond-design-basis event. The Unfortunate \$1 Billion Dollar San Onofre Watergate and US Number 1 Nuclear Concern/Scandal could have been averted in one of the following ways: 1. SCE should have not avoided the NRC 50.90 License Amendment Process, or 2. SCE should have selected Westinghouse/Combustion Engineering or B&W to design and manufacture San Onofre Replacement Steam Generators like Palo Verde Nuclear Generating Station Replacement Steam Generators, because SCE/Mitsubishi AVB Team did not have the skills or experience to design such complex CE Replacement Generators with all the

added design changes, or 3. SCE/MHI should have researched the Academic Papers published by Dr. Pettigrew and other researchers in 2006 and NUREG-1841 published in 2007 or contacted their Counterparts at Palo Verde Nuclear Generating Station (SCE is a 20% shareholder in Palo Verde) on how to prevent the adverse effects of fluid elastic instability and flow-induced vibrations on RSGs with high steam flows (e.g., Flat Bars, Retainer Bars, keep void fraction less than 98.5%, keep circulation ratios > 4, Operate at high steam pressures > 900 psi, Special AVB design Considerations, etc.) or 4. Instead of rushing to make profits for SCE officers and Shareholders and speeding up the design and manufacture of Replacement Steam Generators, SCE Engineers should have analyzed the safety impact of each and every adverse design change discussed in the MHI Root Cause Report and DAB Safety San Onofre Papers (Lots More Interesting Technical Analysis to come ...), or 5. SCE should have accepted MHI recommendation to reduce void fraction, questioned the AVB and Retainer bar design, or 6. Hired qualified CE Replacement Steam Generator, Thermal-Hydraulic, Computer Modeling, 50.59 and FSAR Experts to prepare the RSG design documents and Analyses. Now SCE is rushing once again to restart degraded Unsafe Unit 2 without really analyzing what can go wrong at 70% reduced power operations. Pete, Ron and Ted, Please be careful, Do not think about your millions, People do not care, but think about EIX/SCE Overriding Obligation to Public Safety, San Onofre Workers and EIX/SCE Shareholders and Creditors Hard Earned Money/Credibility (Please Read DAB Safety San Onofre Papers and Lots More Interesting Technical Analysis and Media Alerts to come ..U2 did not have FEI, operational conditions in Unit 2 and 3 were different according to Key Plant Personnel, Plant Procedures, Plant Daily Briefs & NRC AIT Report, and Statistical/ECT/Guessing/Hideous Double Tube-to- AVB Contact forces theory between Units 2 & 3 does not make any sense, SCE is forcing MHI to just.... stuff, New FEI Research....), Press Reports state, "The MHI Report appears to provide decisive evidence that the Southern California Edison Company ("SCE") was imprudent in the design of the [steam generator] tubes, the failure of which has resulted in the shutdown of the San Onofre power plant. However, the costs of this plant remain in the rates that consumers are paying, and consumers remain potentially responsible for massive repair costs that would be incurred if SCE ultimately seeks to restart the whole plant. The dramatic new information revealed by . . . the MHI Report calls out for the Commission to address these key questions sooner rather than later. What is at stake in this case goes to the essence of the Commission's responsibility to protect the rate-paying consumer. The existing rates that SCE's customers are paying for the closed plant, even if eventually refunded, constitute an involuntary loan at low interest to SCE." "The MHI report appears to squarely place the cause of and responsibility for the outages at San Onofre at Edison's feet," said S. David Freeman, former head of the Los Angeles Department of Water and Power and a senior advisor to Friends of the Earth. "It's urgent that the Public Utilities Commission prioritize this phase of the investigation, and the additional documents we've requested from Edison are important to answering these questions." Rinaldo S. Brutoco, president of the World Business Academy, said that California ratepayers should not be forced to pay hundreds of millions of dollars for Southern California Edison's faulty steam generators. Brutoco said: "The Academy, which believes that companies can generate profits while being good corporate citizens, concludes that Edison's actions, in circumventing federal nuclear safety regulations and playing radioactive Russian roulette with the health of Californians, represent an unscrupulous way of doing business."

comment #94029 posted on 2013-04-26 14:26:53 by Moderator in response to comment #93759

You are free to quote the NRC blog. Moderator

comment #83828 posted on 2013-03-30 02:54:34 by

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. San Onofre Billion Dollar Debacle SCE/MHI/NRC Lessons Learnt and Public Awareness Series – HAHN BABA songscommunity.com website states, "SCE's own oversight of MHI's design review complied with industry standards and best practices," said Pete Dietrich, SCE senior vice president and chief nuclear officer. "SCE would never, and did not, install steam generators that it believed would impact public safety or impair reliability. In fact, MHI states in its root cause report (page 41), that its analysis of conditions in the steam generator during the design phase (which calculated void fraction and steam flow velocity) concluded that the thermal hydraulic conditions in the San Onofre steam generators were acceptable, and specifically that there was no need to reduce void fraction. Additionally, SCE never rejected a proposed design change to address void fraction based on its impact on compliance with 10 CFR 50.59. "At no time was SCE informed that the maximum void fraction or flow velocities estimated by MHI could contribute to the failure of steam generator tubes," said Dietrich. "At the time, the design was considered sound." SCE is disappointed that MHI decided on its own to redact some information in its evaluation about the flaws in the computer codes. However, the NRC publicly disclosed the computer code flaws three months before MHI completed its evaluation. In addition, the corrective actions and other statements included in the evaluation make it evident that there were problems with the computer modeling that failed to predict conditions that led to the tube-to-tube wear. SCE has proposed operating Unit 2 at 70 percent to decrease velocity and decrease steam dryness to increase damping, thus preventing the conditions that led to excessive wear. The proposed restart plan was validated using a different computer model and has been reviewed by independent experts." Pete Dietrich of SCE is crying over SCE's grave mistakes and blaming everything on MHI to collect the insurance money by quoting hastily conducted and ongoing NRC AIT investigation and justify his own 2 Million Dollar a Year Edison Package. NRC AIT Team has not completed and finalized its investigation on computer modeling. SCE has not interpreted the MHI Root Cause carefully and correctly. Firstly, AVB Team consisted jointly of SCE and MHI Engineers, who knew what was going on with void fractions and the AVB Design. Secondly, NRC Follow-up AIT Report says that SCE Engineers did not check the work of MHI as required by SONGS Procedures. NRC Chairman has publically stated that SCE is responsible for the work of MHI and all its contractors. Thirdly, It is no longer a secret that SCE encouraged MHI to avoid NRC review of design changes under the false pretense of "like for like" in order to expedite the design, fabrication of replacement steam generators and profits. Even Elmo Collins said that the guts of the machine inside are completely different. All the design changes were made were for only one purpose to maximize the profits for EIX/SCE Officers, Shareholders and Investors and not Rate Payers. Fourth, SCE/MHI Engineers claimed "solid teamwork and alignment" in a joint paper published by SCE and MHI Engineers. Fifth, Pete Dietrich, SONGS Chief Nuclear Officer said in Jan 10 2012, "The plant's largest components — steam generators — are just two years old and represent the safest, most efficient 21st century



machinery [Source: Market Watch]. Sixth, SCE still does not understand concept of fluid elastic instability. ATHOS Models calculate out-of-plane velocities. The concept of in-plane velocities is new to nuclear industry and in-plane velocities at void fractions of 99.6% can be 2.5 times more than the out-of plane velocities. Therefore, the results of computer model calculated by Independent Experts, EPRI and NRC are outdated and incorrect. Seventh, SCE/MHI AVB designed anti-FEI out-of-plane vibration bars do not provide positive restraint against in-plane vibrations, therefore, this concept of better supports and double tube-to-AVB contact forces in Unit 2 is conjecture, based on hideous data and conflicts with the findings of DR. Pettigrew, AREVA and latest research paper published in 2011, of which NRC San Onofre Special Panel was provided a copy.

comment #82040 posted on 2013-03-22 23:14:43 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. San Onofre Billion Dollar Debacle SCE/MHI/NRC Lessons Learnt and Public Awareness Series - HAHN BABA responding to Operational Differences between Units 2 & 3, impact on to SCE CAL ACTION 1 and SCE's new attempt to seek License Amendment for San Onofre Nuclear Plant Unit 2 - The following analysis is applicable to Unit 2 operation between 70 to 100% power. Analysis/Conclusions: As shown below, approximately 34 Million Btu/hour extra heat was produced in Unit 3 RSGs due to higher Unit 3 RCS flows. Approximately 8 Million Btu/hour heat was probably consumed to produce the fatal 99.6 % void fraction steam in hot leg high region of wear and the remainder 26 Million Btu/hour was potentially rejected by the superhot steam generator tubes due to absence of water on tubes and conditions not conducive to nucleate boiling. This extra heat because of reduction in heat transfer coefficient was potentially returned to cold leg. That is why, probably (?) NRC Report stated, "It was noted that Unit 3 ran with slightly higher primary temperatures, about 4°F higher than Unit 2." 34 Million Btu/hour extra heat was available in Unit 3 due to operational differences between Unit 2 & 3. This 34 Million Btu/hour extra heat was much more than amount of heat required (7,924,800 Btu/hour) for raising the void fraction of steam-water mixture to 99.6% to cause FEI in a very small area Unit 3 RSGs (160 tubes experienced TTW out of 9727 tubes). So FEI happened in Unit 3, because of operational differences between Units 2 & 3, numerous untested and unanalyzed design changes to increase 11 % heat transfer area in RSGs and Billion Tons of human performance errors. FEI did not happen in Unit 2 because of what the operating data shows or something else, NRC/NRR Experts (not Region IV NRC AIT Team) will come up a definitive and clear answer to prevent recurrence of this type of Potential Public Safety Fukushima Mistakes. Since SCE and MHI are coming up every day with wrong conclusions and theories to bury their past grave mistakes as customary and restart Unit 2, NRC thermo-hydraulic experts need to figure out exactly what happened? The NRC AIT Report conclusions are unacceptable, because it states, "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." This analysis is consistent with Dr. Pettigrew's Research Paper published in 2006 and his statements in 2013 regarding SONGS RSG AVB Design, AREVA's Operational, John Large's and Arnie Gunderson's Assessments, SONGS Root Cause Members Statements and SONGS Operational Data. SCE/MHI have not determined the exact root cause of the tube-to-tube wear in Unit 3 per CAL ACTION 1, and have not implemented actions to prevent the loss of tube-to-tube wear and demonstrated via a deterministic safety analysis that the AVB structural integrity in the Unit 2 steam generator will be maintained (e.g., Collapse of AVB structure and failure of retainer bars will not occur due to 100% FEI, FIRV and MFE in entire SG U-tube bundle) during a Main Steam Line Break (e.g., Mihama, Turkey Point, Robinson), Station Blackout (Fukushima), SG Tube Ruptures (Mihama, SONGS 3 & 20 other Incidents in US/Europe in the last 20 years) and other anticipated operational transients (stuck open main steam safety valves). It is worthy to note that nuclear power plants have spent billions of dollars in designing, installing and maintaining protective restraints to protect against adverse consequences of steam line breaks throughout the power plant. SCE is unyielding, adamant and persistent to Restart Unit 2 at any cost and keeps on giving the safety message, "If Intertek PRA calculations are incorrect or are not conservative, so what, then, "The differential pressure across the SG tubes necessary to cause a rupture will not occur if operators prevent RCS re-pressurization in accordance with Emergency Operating Instructions." The Operators, If Southern Californians are lucky a third time (First Time, SONGS 3 Tube Leak with 8 tube Failures, 2nd time, a tube with 90% Unit 2 Retainer Bar wear was not publicly announced and Unit 2 was shutdown due to refueling outage before the leak became a reality like Unit 3), can deal with one tube rupture, but not many simultaneous tube ruptures as we observed in SONGS Unit 3. Restart of Unit 2 is a potential road leading to Fukushima, to which the NRC Regulators need to pay very careful attention to fulfill their public safety charter mission and duty despite SCE/Industry Pressures and Anonymous Pressures. Now SCE is making a mockery of the public safety, nuclear industry and NRC rules by seeking License Amendment for San Onofre Nuclear Plant Unit 2 because, "The San Onofre nuclear plant is the largest source of base-load generation and voltage support in the region and is a critical asset for reliability and in meeting California's clean energy goals." The bottom line is that if SCE wants to stay as a base-load generation and voltage support in California and does not want to cause another nuclear accident, it needs to award a sole source contract to Westinghouse to rebuild both San Onofre Units 2 & 3, because MHI and AREVA do not have the skills, tools and technology to build complex CE Replacement Generators as witnessed by tube wear in SONGS and St. Lucie 2 and successful operation of Palo Verde Units 1, 2 & 3 CE RSGs. Consistent with MHI and Westinghouse, High Heat flux in the hot leg region of Unit 3 tube-to-tube wear due to extra heat combined with narrow pitch tube to diameter ratio and extremely tall tube bundle exceeded the critical heat flux. This high heat caused void fraction of 99.6%, created in-plane velocities > 50 feet/sec and excessive hydrodynamic pressures (Mitsubishi Flowering Effect) in a very small portion (0016%) of the Unit 3. The only known flow induced vibration mechanism capable of producing large tube displacements, and in a contiguous group like that of the Unit 3 RSGs, is fluid elastic instability, high dry steam or tube dry-outs. Due to above adverse conditions, large U-bends in Unit 3 pushed the AVBs out of their way and produced large displacements of tubes in the in-plane direction. Tubes moved in the in-plane direction with large amplitudes. Tubes were generally vibrating in their first fundamental in-plane mode, which implies that none of the twelve (12) AVB supports were restraining the tube motion. Yet, it also indicates that the tube-to-AVB gaps are very small and uniform, because none of the tubes exhibited out-of-plane FEI, which is the tube's preferential fluid elastic vibration mode. Since out-of-plane FEI did not occur in Unit 3 and instead only in-plane FEI occurred, it is concluded that the out-of-plane support conditions for the TTW tubes were active (as designed). This leads to the

conclusion that the Unit 3 RSGs 24 tube-to-AVB intersections (AVB on both sides of a tube with 12 locations) have gaps small enough to be effective in the out-of-plane direction, but there were no positive restraints in the-plane direction. Therefore, there were zero tube-to-AVB contact forces to prevent in-plane tube displacement. Notes, Observations and Assumptions: 1. Researchers have said long ago that nucleate boiling on the tube surfaces has a stabilizing damping effect to preclude fluid-elastic instability. At least 1.5 % water or void fraction less than 98.5% in a steam-water mixture and areas without localized tube dry-out conditions are required in a nuclear steam generator to preclude the onset of fluid elastic instability. A review of NUREG-1841 published during the SCE/MHI design stages of San Onofre Replacement Steam Generators indicates that innovative and experienced manufacturers of steam generators (like Westinghouse/CE & BW&I) including with very high steam flows such as the largest steam generators in the world (e.g., Palo Verde) have used a combination of design and operational features [(high circulation ratios(>4), high steam pressures (> 900 psi) and low friction losses] to keep the void fractions at 98.5% or below and have prevented localized tube dry-out conditions and steam blanketing in operating US Steam Generators. 2. A review of the SONGS Power Generation and Supply Records on the internet and SONGS Plant Daily Brief Sheets confirms that SONGS Unit 3 SGs have historically generated more reactor thermal power than Unit 2 SGS because of higher Unit 3 RCS flows, which is consistent with SONGS Procedures and interpretation of NRC AIT and Westinghouse Operational Assessment reports. 3. These preliminary and qualitative calculations are performed for the benefit of NRC Thermal-Hydraulic Experts as a tip to determine the exact root cause for differences between Units 2 & 3. The calculations are based on limited operational data and observations, and NRC Thermal-Hydraulic Experts need to obtain 9 Months data shown below from SCE for 2011 for Units 2 & 3 to arrive at unanimous and clear conclusions. If SCE does not have the data tabulated, NRC Thermal-Hydraulic Experts can accept the computer-generated data & charts by plant monitoring system (PMS), the core operating limit supervisory system (COLSS), backup computer system (CBCS), Crossflow UFM & UTM Systems and Control room Electronic Logs in lieu of the following data. • Reactor Thermal Power, MWt • Reactor Coolant Flow (at cold leg temperature), Million lbs./hour • Reactor Coolant Operating Temperature (Thot), degrees F • Reactor Coolant Operating Temperature (Tcold), degrees F • RSG Operating Pressure (@100% power), psi • Steam mass flow rate, Million lbm/hr • Feed-water mass flow rate, Million lbm/hr • Blow-down mass flow rate, Million lbm/hr • Steam quality at the outlet of SG, fraction • Feed-water temperature 0F • Feed-water pressure, psi • RSG Circulation Ratio A. SONGS Operational Data, Design Assumptions and Trend Calculations: A.1 – Feed-water Operating pressure is assumed to be 50 psi higher than Steam Operating pressure based on input from the SONGS Senior Shift Manager. A.2 – The difference in Reactor Coolant Specific Heat between Units 2 & 3 due to minor RCS temperature variation assumed to be negligible. Since the feed water blow down rate is common for Units 2 & 3, its effect on this calculation has no bearing. A.3 - NRC AIT Report (7/18/2012) pages 22 & 23 state, “Operational Differences: The team performed a number of different thermal- hydraulic analysis of Units 2 and 3 steam generators. The output of the various analyses runs where 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. Other differences were noted in steam and feedwater flow but none of the differences were considered sufficient to significantly affect thermal hydraulic characteristics inside the steam generators. The different analyses included: • Lower bounding thermal hydraulic analysis using the steam generator base design condition, where primary inlet temperature was 598°F, and an upper bound case where primary inlet temperature was 611°F as identified in Mitsubishi Document L5-04GA021, Revision 3 • Varying steam generator pressures from 833 to 942 psi • Steam mass flow rates from 7.59 to 7.62 Mlbm/hr • Primary loop volumetric flow rate from 102,000 to 104,000 gpm, and • Recirculation ratio from 3.2 to 3.5. 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.” A.4 - Ratio of Reactor Thermal Power Ratio between Units 3 and 2 =  $[\text{Unit 3 (79.79 X 56.7)}]/[\text{Unit 2 (75.76 X 58)}] = 1.03$  (See Notes below) NOTES: a. Unit 3 RCS Flow – 79.79 Million lbs/Hour - SONGS Unit 3 RCS Flow per SONGS procedure, used 104,000 gpm value for Unit 3 from NRC AIT Report and Westinghouse Operational Assessment, Attachment 6D, Table 2-7, page 37 (Same Value Reported for Units 2 & 3) b. Unit 3 RCS Temperature Difference between Hot and Cold Legs – 56.7 degrees F - per SONGS procedure and Westinghouse Operational Assessment, Attachment 6D, Table 2-7, page 37 (Same Value Reported for Units 2 & 3) c. Unit 2 RCS Flow – 75.76 Million lbs/Hour - SONGS Unit 2 RCS Flow per SONGS procedure, used 102,000 gpm value for Unit 3 from NRC AIT Report d. Unit 2 RCS Temperature Difference between Hot and Cold Legs – 58 degrees F - per SONGS procedure A.5 – Differences Between SONGS Unit 2 and Unit 3 RSGs Operating Pressures A.5.1 – Case 1 – Unit 3, 833 psi, Steam Flow @ 7.62 Million lbs /hour (Consistent with NRC AIT Report) @ 100 % void fraction (Assumed for the purposes of Qualitative Calculations) A.5.1.1 – Enthalpy, Saturated Vapor, hg – 1,198.2 Btu/lb @ 833 psi (SONGS Procedure & efunda steam tables) A.5.1.2- Feedwater Enthalpy @ 440 0F @ 900 psi ~ 420 Btu/lb (SONGS Procedure) A.5.1.3 – Enthalpy, Extracted by Steam/Water Mixture into SG Evaporated, hfsg = 1,198.2 – 420 = 778.2 Btu/lb A.5.2. – Thermal Reactor Power for Unit 3 RSG = 7.62 X Million lbs./hr X 778.3 Btu/Lb. = 5,930,000,000 Btu/hour/(3,412,141 Btu/MWt) = 1737 Thermal MWt/hour A.5.2.1 – Case 2 – Unit 2, 892 psi, Steam Flow @ 7.59 Million lbs/hour (Consistent with NRC AIT Report No FEI in Unit 2 per Westinghouse, RCE Member Discussions, Industrial Data of several plants with no tube-to-tube wear), @ 100 % void fraction (Assumed for the purposes of Qualitative Calculations) A.5.2.2 – Feedwater Enthalpy @ 440 0F @ 900 psi ~ 420 Btu/lb. (SONGS Procedure) A.5.2.3 – Enthalpy, Saturated Vapor, hg – 1,196.4 Btu/lb @ 892 psi (SONGS Procedure & efunda steam tables) A.5.2.4 – Enthalpy, Extracted by Steam/Water Mixture into SG Evaporated, hfsg = 1,196.3 – 420 = 776.3 Btu/lb A.5.2.5 – Thermal Power Unit 2 = 7.59 Million lbs./hr. X 776.3 Btu/lb = 5,892,000,000 Btu/hour/(3,412,141 Btu/MWt) = 1727 Thermal MWt/hour A.6 – Case 3 – Difference in Heat Flow between Units 2 and 3, which caused tube-to-tube wear (160 tubes out of 9727 tubes) area of the Unit 3 RSG = 1737 MWt – 1727 MWt = 10 MWT/Hour X 3412141 Btu/MWt = 34,121,410 Btu/hour A.7 – Case 4 – Btu/hour required to raise void fraction from 98.5% to 99.6% of 4 percent of the feedwater flow in Unit 3 high region of wear to cause fluid elastic instability = 7.62 Million lbs/hour X 0.04 x 26 Btu/lb (Assumed, needs verification by NRC) = 7,924,800 Btu/hour – Please see Analysis/Conclusions at the top of this article for continuation.



comment #79827 posted on 2013-03-19 16:13:15 by David Greene in response to comment #76660

I am not certain I fully answered all your questions (from the first paragraph (HelpAllHurtNeverBaba; March 15, 2013 at 9:06 pm). BatScan systems have multiple response levels, e.g. cautionary when signals are low and occur spasmodically or continuously. The next level is when signals exceed a level known to have the potential to cause a problem if they exist for an extended period of time, but signal characteristics do not indicate the need for immediate operator action. However the signal is such that it requires watchful waiting while preplanned actions to notify or begin corrective operations are initiated. If the signal characteristics change to the next level, the operator will begin to move the plant to a pre-shutdown condition. This controlled shutdown opportunity may be used to perform diagnostics to obtain further information on the causes for the signal. This is an important step since signal generation causes may disappear when plant operation is shutdown.. At all times a high level signal will be cause for operator or automatic shutdown. You will appreciate this overview of the approach includes many checks and balances, redundancies and other parallel processes to confirm signal validity .(not described here) before the operator shuts down the plant or component. This approach is viable because of the system sensitivity and reliability (low false alarm rate). A planned shutdown is always preferable to rapid shutdown (SCRAM) in terms of minimizing plant component transient shocks. BatScan was designed to prevent significant steam generator damage from a destructive failure mode with a measured and validated timescale of about 20 seconds. The detection time for this damage mode was set to two seconds, with a false alarm rate of better than once in thirty years. The automated response system did include steam generator secondary side water blow-down within seconds. Other damage modes allowed more detection or corrective action timescales. The system was developed and designed to meet requirements rather than "do the best possible". You stated "SCE and NRC Region IV tried in vain to sell this concept to NRC NRR Office but were shot down by the NRC I&C Branch Engineer. " I would appreciate contact information for NRC staff that made this initial decision or are still involved in solving this critical problem. I would like to fully understand what they define as the requirements for protective monitoring of SONGS steam generators. I appreciate your feedback and concerns about SONGS.

comment #70299 posted on 2013-03-10 14:07:31 by James Greenidge

<http://atomicpowerreview.blogspot.com/2013/03/san-onofre-mhi-document-release-by-nrc.html> A thorough professional no-axe-to-grind layman level engineering summary of what occurred at SONGS. James Greenidge Queens NY

comment #82260 posted on 2013-03-23 16:17:27 by CaptD

It is great that the NRC is allowing folks to post very technical comments on these blogs, especially since they are concerning SAFETY. What would even be better is if different people within the NRC, the NRR and or the ACRS actually posted comments about these technical comments, if only to say Thank You, because it is obvious that "SOME" experts are NOT charging (the NRC) the same hourly rate\* of \$274, (soon to become \$277) for their time that the NRC now charges! \* <http://public-blog.nrc-gateway.gov/2013/03/14/looking-to-hear-from-the-public-on-the-fy-2013-proposed-fees/comment-page-1/#comment-82259>

comment #85256 posted on 2013-04-03 21:47:40 by HAHN Baba

Sincere Thanks to the Honorable NRC Chairman, Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. Best of Luck to Mr. Elmo Collins on his retirement. San Onofre NRC/SCE/MHI/Public Awareness Series – Courtesy of DAB Safety Team and SONGS Insiders by Hahn Baba Analysis of Draft SCE License Amendment Small tube bundles and void fractions less than 98.5% in 200 Mitsubishi designed Steam Generators for the last 20 years are responsible for no tube-to-tube wear. A review of the Mitsubishi Root Cause indicates that the normal tube bundle in Mitsubishi Steam Generators was purposely made taller in San Onofre Steam Generators by SCE to achieve 11% additional heat transfer to generate more heat and more profits in the pockets of EIX/SCE officers and Shareholders. SCE intentionally subverted the regulatory process. The fluid elastic instability or void fractions of 99.6% in Unit 3 were caused due to higher reactor coolant flows, high steam flows, high fluid velocities, high dry steam, narrow tube pitch to tube diameter, low tube-to-tube clearances, low frequency in-plane tubes, absence of positive in-plane vibration restraints, inadequate out-of-the-plane restraints design, and operation with low steam generator pressures and poor circulation ratios. These adverse effects destroyed SONGs Unit 3. By making the tube bundle taller without a 10CFR 50.90 License Amendment Process, Public Hearings and CPUC's Blessings, SCE increased the average length of 9727 tubes by 7 inches each to gain additional 7% heat transfer area equivalent to 700 new tubes to generate 120 more thermal megawatts per Steam Generator. Everybody is under the impression that SCE added only 377 tubes, but in reality, SCE added a total of effective 1,077 tubes including 700 tubes by making the tube bundle taller than contemporary successful operating Mitsubishi steam generators. SCE response to NRC RAI #13, states, "The RSGs have more tubes (9,727 versus 9,350) than the OSGs and a smaller value for the maximum number of plugged tubes (779 versus 2,000). RSG tubes have a larger average heated length (729.56 in. versus 680.64 in.) than the OSG tubes. These features result in larger values for the RSG for heat transfer area, tube bundle flow area, and tube bundle water volume. This is beneficial in the short and long term for SBLOCAs, which rely upon the steam generators for RCS heat removal. " Unit 2 better supports and double the contact forces unproven theory is just a conjecture on the part of SCE/MHI based on hideous data and is contested based on the available plant data evidence and review of John Large, MHI and AREVA Reports. Because of the unique flawed SCE replacement steam generator design dictated by profits over safety, dominant San Onofre negative safety culture and Mitsubishi's negligence and complacency, this analysis only applies to Unit 2 and Unit 3 replacement steam generators. No other Mitsubishi Steam Generators and NRC rules for Steam Generator Tube Integrity and NEI Steam Generator Management programs are affected or challenged at this time. The adverse effect of this change is 100% opposite of the benefit what SCE is telling the NRC and Public in RAI # 13 and as we witnessed in SONGS Unit 3. Here is why: 1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated? SCE Response: No Significant Hazards Consideration. There is no significant increase in the probability or consequences of an accident

previously evaluated. Rebuttal: This adverse, unanalyzed and unapproved change involved more than a significant increase in the probability or consequences of a steam generator tube rupture leak due to 100% tube-to-tube wear in one tube in SONGS Unit 3, failure of 8 tubes at MSLB testing pressures and loss of >35% wall thickness in more than 300 tubes. This event was caused due to the unexplained SCE/MHI design changes in the Mitsubishi Root Causes Analysis and misrepresented by SCE in response to NRC RAI #13. What, SCE did not tell the public that besides the leaking tube, there were 2 other additional tubes with a loss of wall thickness > 99%. If these tubes would have also leaked and resulted in SG over-pressurization causing lifting of safety relief valves, operator would not have been able to diagnose, manipulate, control and shutdown the reactor in a timely fashion and SONGS so called Engineered Safety Systems would not have been able to keep with the SG tube rupture LOCA. This would have caused a potential reactor meltdown and Southern Californians in the 10-mile Plume Pathway Zone would have experienced a Fukushima, or Mihama Unit 1 in their Backyards depending upon the direction of the wind and freeway traffic conditions. San Onofre, Interjurisdictional Planning Committee, Offsite Dose Assessment Committee, FEMA, NRC, State of California and Offsite Agencies tested Emergency Plans are totally inadequate to shelter and evacuate the affected transients, families, children, sick and disabled residents in such an event. Therefore, the probability or consequences of these changes are/were more significant than analyzed by SCE in 10CFR 50.59 and seen by the destruction of SONGS Unit 3 than previously evaluated in the NRC Approved FSAR? 2. Does the proposed change create the possibility of a new or different kind of an accident from an accident previously evaluated? SCE Response: No Significant Hazards Consideration. There is no possibility of a new or different kind of accident introduced because of this amendment Rebuttal: The requested SCE proposed License Amendment changes based on the false pretense of running defectively designed and degraded Unit 2 at 70% power to meet Peak Summer Month Power Loads significantly increase the possibility of an accident at normal steady state 70% power operations, during anticipated operational transients and a concurrent steam line break and consequential cascading tube ruptures due to fluid elasticity or high dry steam and jet impingement forces created as a result of 100% void fractions in the generator. Based on benchmarking of SONGS Unit 3, multiple tube leakages and/or ruptures are postulated due to 100% FEI in faulted and un-isolated (Assumed failure of MSIV to close) SG from a MSLB. Potential Collapse of floating AVB structure due to failure of low frequency retainer bars and high energy jet impingement can change multiple tube leakages and/or ruptures into cascading tube ruptures. Current NRC rules consider main steam line break and steam generator tube ruptures as independent events. In addition, steam generator tube ruptures are considered to be a slow occurring event with plant operator able to detect the leak and take timely action to safely shut down reactor. This accident scenario applies and is unique to SONGS RSGs because of design flaws in the degraded AVB structure and is considered beyond design basis event. Consistent with Three Mile Island, Chernobyl, Mihama Unit 1, Fukushima and David-Besse Lessons Learnt, Operators cannot be relied on to control the plant and emphasis for accident controls and risk mitigations should be on defense-in-depth plant safety features. SONGS plant does not have such beyond design basis accident defense-in-depth safety features. Therefore, the proposed changes create: (1) The distinct possibility of a new or different kind of an accident than accidents previously evaluated, and (2) Involves more than significant reduction in the margin of safety previously evaluated in the FSAR and approved by NRC. 3. Does the proposed change involve a significant reduction in margin of safety? SCE Response: No Significant Hazards Consideration. There is no change with this LAR that involves a significant reduction in margin of safety Rebuttal: The proposed License Amendment change operating Unit 2 at 70% power for 5 months involves more than a significant reduction in margin of safety. This is because of the high potential of beyond design basis steam generator tube ruptures caused by a main steam line break resulting in a potential nuclear meltdown beyond operator control, lack of SONGS Defense-in-Depth Features, single equipment and consequential equipment failures, communication problems, sonic booms, radiation/steam environment and access control in accordance with NRC Fukushima Task Force Lessons Learnt and offsite releases exceeding the limits than previously analyzed in the FSAR ? This condition is unique and applicable only to SCE/MHI defectively designed and degraded Unit 2 replacement steam generators. Please see Items 1 & 2 above for details.

comment #79821 posted on 2013-03-19 14:49:37 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog San Onofre NRC/SCE/MHI/ Public Education Series – Statement of facts unless proven wrong otherwise ..... March 18, 2013 - Southern California Edison Submits Operational Assessment Requested by NRC NRR RAI 32 – SCE Putting Production/Profits over Safety - HAHN BABA Response Continued ... See Previous Blogs for more comments John Large, a London-based nuclear engineer for Friends of the Earth, said the report actually shows San Onofre will progressively destroy itself. "If the Intertek analysis is correct, the plant only has a remaining total service life of one year at full power, or 16 months at 70 percent power," Large said. "After this I doubt if any option will exist for Edison to repair the plant's steam generators because the problem lies deep within the tube bundle, being essentially inaccessible by human or machine. There are "enormous uncertainties" with predicting degradation of the tubes." Brilliant NRC Federal Regulators have to be very patient to completely understand the full adverse impact and grave implications of "mind-boggling" fluid elastic instability's unique and controversial concept to prudently perform their charter of ensuring public safety. San Onofre "Defectively Designed" Radiation Steaming Crucibles (RSGs) anti-vibrations and retainer bars even with plugged/staked tubes, and floating tube bundle with excessive and tall tubes, and narrow tube pitch to tube diameter ratio are not designed to handle fluid elastic instability, flow-induced random vibrations and Mitsubishi Flowering Effect for design bases accidents or anticipated operational occurrences at 70% or 100% power without complete replacement of the Tube Bundle and Supports. SCE/MHI does not have the technology or skills to perform the repairs and make these sick RSGs safe because of the unique design of the San Onofre Combustion Engineering Original Steam generators and adverse design changes made to these sick RSGs (e.g., Similar Well Performing, Safe and Money Making, Well Managed and Reliable six Palo Verde Combustion Engineering Replacement Steam Generators built by Westinghouse/ABB/Combustion Engineering since 2000's). A Lot More to Come... Thanks NRC Staff... HAHN BABA

comment #79837 posted on 2013-03-19 17:20:24 by HelpAllHurtNeverBaba

Mind-boggling and twisting drill scenarios, unclear, cumbersome and interpretive procedures and poor-performing San Onofre Shift Managers and Operating Crews SUMMARY: As shown below, SCE is unyielding, adamant and persistent to Restart Unit 2 at any cost and keeps on giving the perception, "If Intertek PRA calculations fail or are not conservative, so what, then, "The differential pressure across the SG tubes necessary to cause a rupture will not occur if operators prevent RCS re-pressurization in accordance with Emergency Operating Instructions." The Operators, If Southern Californians are lucky a third time (First Time, SONGS 3 Tube Leak with 8 tube Failures, 2nd time, a tube with 90% Unit 2 Retainer Bar wear was not publicly announced and Unit 2 was shutdown due to refueling outage before the leak became a reality like Unit 3), can deal with one tube rupture, but not many simultaneous tube ruptures as we observed in SONGS Unit 3. Restart of Unit 2 is a potential road leading to Fukushima, to which the NRC Regulators need to pay very careful attention to fulfill their public safety charter mission and duty despite SCE/Industry Pressures and Anonymous Pressures. Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog San Onofre NRC/SCE/MHI/ Public Education Series – Statement of facts unless proven wrong otherwise ..... March 18, 2013 - Southern California Edison Submits Operational Assessment Requested by NRC NRR RAI 32 – SCE Putting Production/Profits over Safety - HAHN BABA Response Continued ... See Previous Blogs for more comments Last year, I was evaluating/observing for an extended period of time and ways to improve the San Onofre Shift Managers and Operating Crews performance in Drills/Exercises Performance in the simulator. I discussed with several San Onofre Shift Managers and Operating Crews the reason for their consistent poor performance. Here is what they said, "Training Drills/Exercises are designed with, 'Mind-boggling and twisting drill scenarios.' On top of that procedures are unclear, confusing, cumbersome and interpretive with a lot of notes from instructors attached to the procedures. A Shift Manager, Station Technical Advisor, Control Room Supervisor and Operating Crews have only 15 minutes to diagnose, independently verify and declare an emergency event. You think, that we can be 100% successful in 15 minutes under these conditions coupled with communication errors." So after lengthy discussions with the affected organizations looking ways to improve consistently low performance, I wrote a SONGS Nuclear Notification resulting into a Root Cause Evaluation (First in the history of SONGS Operations/Emergency Preparedness Division). The credit goes to a highly dedicated and concerned Ex-NRC Staff Member and SCE Management Nuclear Oversight Board Member, who was sick with SCE's Management poor performance with repeat failures to improve the Shift Managers Performance and perhaps false public safety overriding obligation announcements. Here is the problem statement in verbatim of that Nuclear Notification, unless changed... " SONGS DEP indicator metric value is presently estimated to be approximately 92.3%. Three DEP and one non-DEP indicator failures in the last three weeks have created doubts regarding the ability of SONGS Emergency Response Organization (ERO) to achieve a Site Core DEP Indicator goal for 2012 of 96.1% (3rd Quartile). Previous Cause Evaluations and Corrective Actions (Completed and Planned) have addressed individual performance and technical issues in a piecemeal manner as opposed to smart and sustained actions for improving overall team performance. NOD has concluded that actions taken to date have not solved the performance issues. The planned actions do not systematically address some of the broader organizational and technical issues identified below, which are essential to prevent DEP classification failures by Shift Managers /STA and Operations Crew. With SONGS under NRC, INPO, NOB, Public and Media scrutiny, the Station cannot afford the luxury of dealing with adverse performance and publicity in Emergency Preparedness caused by declining SONGS Drill/Exercise Performance. Insights: 1. Based on review of 1Q12 NTD Data of Control Room Simulator Crew for LOCT/DEP Evaluations (17 Total), the performance deficiency is evident in the areas overall crew competency (UNSAT -1, Needs Improvement -10), Operating Within Limits (Needs Improvement - 5), Control Board Operations (Needs Improvement - 4), Interpret / Diagnose Events (UNSAT -1, Needs Improvement - 8), Technical Specification Use (Needs Improvement -- 4) and Communications (Needs Improvement -5). 2. Below are some of the weaknesses witnessed by the NOD Auditor during review and or observation of LOCT/DEP Evaluations, EP Drills and based on discussions with the Shift Managers. Each weakness may be attributed to one or the other DEP Miss-classifications. Some of these weakness were also identified by NOB Member Jack Martin based on his observation of the August 2011 EP drill. • Unclear and confusing EALs and less than adequate Basis Documents • Too many Priority Reading Assignments to clarify the EALs and Basis Document • Lack of solid teamwork between the Operating Crew, CRS, STA and EC. Crew members confused and concerned about their roles and responsibilities. Crew members held back or failed to provide information, which resulted in SM and CRS to trip the reactor. • Poor communications between the Operating Crew, CRS, STA and EC. Briefs were ineffective at focusing on the crew priorities. Three way communication not used for direction or when providing information relative to plant status. • Poor diagnostics/interpretation of the transient events by the Operating Crew, CRS, STA and EC. Serious omissions, delays, or errors made in interpreting indications resulting in degraded plant conditions. Failed to use, or misused, or misinterpreted indications that resulted in improper diagnosis. • Procedures were not followed correctly which impeded plant recovery or caused unnecessary degradation of plant conditions. Crews did not recognize EOI Entry Conditions. • Failure of the STA to provide consistent & independent check of the EAL by EC. • Lack of Stringent OPS/NTD Evaluation and Remediation Criteria for SM/STA/OPS Crew to achieve excellence and eliminate above shortcomings to prevent DEP Failures • Lack of practice by the Operating Crews, CRS, STA and EC following the coaching/critique provided by the OPS SM Supervisor and NTD Evaluators. This statement was confirmed by NOD during a discussion with a former Shift manager this morning." A Lot More to Come... Thanks NRC Staff... HAHN BABA

comment #83905 posted on 2013-03-30 11:47:31 by HAHN Baba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. San Onofre Billion Dollar Debacle SCE/MHI/NRC Lessons Learnt and Public Awareness Series – HAHN BABA songscommunity.com website states, "SCE's own oversight of MHI's design review complied with industry standards and best practices," said Pete Dietrich, SCE senior vice president and chief nuclear officer. "SCE would never, and did not, install steam generators that it believed would impact public safety or impair reliability. In fact, MHI states in its root cause report (page 41), that its analysis of conditions in the steam generator during the design phase (which calculated void fraction and steam flow velocity) concluded that the thermal hydraulic conditions in the San Onofre steam generators were acceptable, and specifically that there was no need to reduce void fraction. Additionally, SCE never rejected a proposed design change to address void fraction based on its impact on compliance with 10 CFR 50.59. "At no time was SCE informed that the maximum void fraction or flow velocities estimated by MHI could contribute to the failure of steam generator tubes," said Dietrich. "At the time, the design was considered



sound." SCE is disappointed that MHI decided on its own to redact some information in its evaluation about the flaws in the computer codes. However, the NRC publicly disclosed the computer code flaws three months before MHI completed its evaluation. In addition, the corrective actions and other statements included in the evaluation make it evident that there were problems with the computer modeling that failed to predict conditions that led to the tube-to-tube wear. SCE has proposed operating Unit 2 at 70 percent to decrease velocity and decrease steam dryness to increase damping, thus preventing the conditions that led to excessive wear. The proposed restart plan was validated using a different computer model and has been reviewed by independent experts." Pete Dietrich has in the past an enviable management success, public relations and safety conscious work environment record. But now, instead of conducting a through in-house investigation of SCE Engineer's role, he is trying to cover up SCE's own grave mistakes, blaming everything on MHI to collect the insurance money by quoting ongoing NRC AIT investigation to justify his 2 Million Dollar a Year Edison Package. NRC AIT Team has not completed and finalized its investigation on computer modeling. SCE is blaming Senator Barbara Boxer, because Pete has not read and interpreted the MHI Root Cause carefully and correctly. Firstly, AVB Team consisted jointly of SCE and MHI Engineers, who knew what was going on with void fractions and the AVB Design. Secondly, NRC Report says that SCE Engineers did not check the work of MHI as required by SONGS Procedures. NRC Chairman has publically stated that SCE is responsible for the work of MHI and all its contractors. Thirdly, It is no longer a secret that SCE encouraged MHI to avoid NRC review of design changes under the false pretense of "like for like" in order to expedite the design, fabrication of replacement steam generators and profits. Even Elmo Collins said that the guts of the machine inside are completely different. According to former SONGS Manager, "All the design changes were made were for only one purpose to maximize the profits for EIX/SCE Officers, Shareholders and Investors and not Rate Payers. Pete Dietrich has zero public credibility." Fourth, SCE/MHI Engineers claimed "solid teamwork and alignment" in a joint paper published by SCE and MHI Engineers. Fifth, Pete Dietrich, SONGS Chief Nuclear Officer said in Jan 10 2012, "The plant's largest components — steam generators — are just two years old and represent the safest, most efficient 21st century machinery [Source: Market Watch]. Sixth, SCE still does not understand concept of fluid elastic instability. ATHOS Models calculate out-of-plane velocities. The concept of in-plane velocities is new to nuclear industry and in-plane velocities at void fractions can be 2.5 times more than the out-of-plane velocities. Therefore, the computer model used by Independent Experts, EPRI and NRC are outdated. Seventh, SCE/MHI AVB designed anti-FEI out-of-plane vibration bars do not provide positive restraint against in-plane vibrations, therefore, this concept of better supports and double tube-to-AVB contact forces in Unit 2 is a conjecture theory and conflicts with the findings of DR. Pettigrew, AREVA and latest research paper published in 2011, of which NRC San Onofre Special panel was provided a copy. Pete needs to real ascertain the facts before making irresponsible comments about MHI, Senator Barbara Boxer, NRC AIT Team and Environmentalist Groups. This behavior is inconsistent with his past performance and will lead to exit like Ross Ridenoure, who abruptly resigned, because the Senior Leadership Team he appointed did not perform. Pete has still the same inefficient, profit motivated and retaliating Senior Leadership Team.

comment #76660 posted on 2013-03-15 21:06:09 by HelpAllHurtNeverBaba in response to comment #76620

Sir, How is the operation of your Company's Batscan system different from Westinghouse DMIMS-DX™ system to detect tube-to-tube contact and tube leaks in a SG U-Tube bundle during fluid elastic instability conditions due a main steam line break with failure of the main steam isolation valve to close. How will operator use this reliable tool to take timely actions, when the SG is going to be empty in 5 minutes. How is this system tested, verified and validated in a Main Steam Line Break scenario. SCE and NRC Region IV tried in vain to sell this concept to NRC NRR Office but were shot down by the NRC I&C Branch Engineer. Thanks for your help in solving this critical problem. Westinghouse DMIMS-DX™ systems provides fast, reliable detection of loose part impacts within the Reactor Coolant System (RCS), while minimizing the generation of false alarms. This monitoring system is a greatly enhanced version of the previous Westinghouse DMIMS system, employing the latest digital technology and offering significant operational advantages to our customers. Loose parts monitoring is based on listening for the impact of loose parts against fixed components within the primary system as they are propelled by the coolant flow. This application appears simple on the surface, but its effective implementation is not an easy task. The noises typical of an operating plant can generate false alarms that reduce operator confidence, interfere with normal operations, and cause unnecessary expense. The Westinghouse DMIMS System uses a patented algorithm to determine the metallic characteristics typical of loose parts. This algorithm and the associated alarm algorithms, together, minimize the generation of false alarms and have established a reputation for reliability within the industry.

comment #76482 posted on 2013-03-14 23:57:42 by HAHN Baba

Compilation of SCE Retaliation and Fear Free Press, Friends of the Earth and DAB Safety Team Reports - San Onofre Public Awareness Series by HAHN BABA Redacted version of Mitsubishi root cause analysis of San Onofre replacement steam generators uncovers SCE Innocent Safety Role in \$1 Billion Dollar Watergate Ratepayer Fiasco and Number 1 US Nuclear safety Concern. MHI report reads more like an apology than a Root Cause Analysis. Ignorance and False Innovative Claims are no excuse for violation of Federal Regulations and Public Trust. In a statement, Honorable Senator Barbara Boxer and Congressman Ed Markey state the reports "raise serious concerns about whether Southern California Edison and Mitsubishi Heavy Industries rejected safety modifications to avoid triggering the more rigorous license amendment and safety review process. A license change would have required plant operator Edison to go through a judicial-style review before installing the new generators. Boxer asserts that Edison tried — and succeeded — in getting around that review." Last week, Mitsubishi Heavy Industries (MHI) released a report showing that both MHI and Southern California Edison (SCE) knew that replacement steam generators built by Mitsubishi for SCE's San Onofre Nuclear Generating Station had major design problems as far back as 2005. The report further states that the companies chose to not make these findings public out of fear they would lead to costly public hearings and more rigorous oversight by the Nuclear Regulatory Commission. As it turned out, however, burying the information was probably the worst thing SCE could have done, as the faulty steam generators caused vital tubes to vibrate, producing such damage that the plant had to be shut down in January 2012 . A year later, San Onofre remains closed, and the release of MHI's bombshell report last week has only fueled demands it never be allowed to reopen. Yesterday, for example, the environmental-watchdog nonprofit group Friends of the Earth called on SCE to

release its own records on what it knew about the faulty replacement steam generators, when it knew it, and why it chose to bury the information. "The MHI report appears to squarely place the cause of and responsibility for the outages at San Onofre at Edison's feet," S. David Freeman, former head of the Los Angeles Department of Water and Power and a senior adviser to Friends of the Earth, says in the group's announcement yesterday. "It's urgent that the Public Utilities Commission prioritize this phase of the investigation, and the additional documents we've requested from Edison are important to answering these questions." Another group monitoring the disaster at San Onofre is the World Business Academy, whose president, Rinaldo S. Brutoco, insists SCE must not pass on the cost--estimated to run into the hundreds of millions of dollars--of its misconduct to its customers. "The Academy, which believes that companies can generate profits while being good corporate citizens, concludes that Edison's actions, in circumventing federal nuclear-safety regulations and playing radioactive Russian roulette with the health of Californians, represent an unscrupulous way of doing business," he said. And here is what Southern California Edison says, "The anti-nuclear activists have called the MHI report a 'bombshell' which couldn't be further from the truth," said Pete Dietrich, SCE senior vice president and chief nuclear officer. "In fact, the MHI letter explains that SCE and MHI rejected the proposed design changes referenced in the evaluation because those changes were either unnecessary, didn't achieve objectives or would have had adverse safety consequences. Our decisions were grounded in our commitment to safety. SCE did not, and would never install steam generators that it believed would impact public safety or impair reliability. MHI repeatedly reassured SCE that based on their testing, the steam generators met safety requirements and would function for 20 years. The MHI letter specifically confirms that at the time the replacement steam generators were designed, MHI and SCE believed that the "replacement steam generators had greater margin against U-bend tube vibration and wear than other similar steam generators." MHI warranted the steam generators for 20 years. As with all engineering evaluations, the MHI letter and report describe a technical evaluation process and need to be read in their entirety to understand the conclusions reached," said Dietrich. "The activists are taking portions of paragraphs and sentences out of context, and using them as the basis of their allegations that SCE knew of design defects when the generators were installed, but failed to make changes to avoid licensing requirements. That is untrue." Southern California Edison, the utility which operates the San Onofre nuclear power station, had a strict list of requirements for MHI during the design and manufacturing process, specifically created in order that the utility might justify not allowing the Nuclear Regulatory Commission to approve the designs and regulate the replacement process, by using the justifications allowed in 10 C.F.R. 50.59 to claim that it was a "like for like" exchange. Most of these restrictions limited the external physical changes to a minimum by ordering MHI to design replacement steam generators which would fit within the same physical space, rather than inhibit multiple changes from being made to internal components. There is an age-old axiom about what kinds of beauty are only skin deep. Excerpt of a Edison Contract Document received from a SONGS Anonymous Insider states, "The Supplier shall prepare and submit for Edison's approval a ...[Redacted]... demonstrating compliance of the RSG design with all SONGS ...[Redacted].... The report shall include an engineering evaluation, including all necessary analyses and evaluations, justifying that the RSGs can be replaced under the provisions of 10 CFR 50.59 (without prior NRC ...[Redacted]...). The report format shall follow the guidelines of ...[Redacted]... in order to facilitate preparation of the 10 CFR 50.59 evaluation. The 10 CFR 50.59 evaluation shall be performed by Edison. Specifically, the ...[Redacted]... shall include, as a minimum, the following: Description of the RSG impact on the existing systems, structures, and components. Detailed calculations addressing the RSG impact on the UFSAR analyses, ...[Redacted]... The calculations shall include a Summary of Transients Analysis that shall evaluate the RSG impact on each event. When required by the Summary of Transients, event specific calculations shall be performed. All evaluations, analyses, and calculations shall be consistent with the latest SONGS analyses of record, evaluation methodologies, analysis processes and computer codes existing at the time of performance. The Supplier shall achieve acceptable results by minimizing any reduction in operating margins (e.g., increasing Reactor Over Power Margin [ROP] requirements). If the Supplier determines that reduction of operating margins is necessary, it will inform Edison as soon as practical, so that the impact can be mutually agreed to, such that there is no, or minimal, impact on plant operation. All evaluations, analyses and calculations performed by subcontractors shall be provided to Edison for review, and all Edison comments shall be resolved in a manner acceptable to Edison prior to Supplier internal document approval. All evaluations, analyses and calculations, including computer code input and output, in their entirety, will be provided to Edison for future Edison use." The report quickly shoots down this argument, and details a list of changes that were made which the utility felt still fit within the 50.59 process. 1. SCE imposed physical and other constraints on RSG design characteristics in order to assure compliance with 50.59. (RSGs must fit within same space) 2. Increased heat transfer surface area 11% from 105,000 ft<sup>2</sup> to 116,100 ft<sup>2</sup>. a. Higher void fraction (maximum steam quality) – Adverse 50.59 Design Change (Required a 50.90 License Amendment) – Caused Fluid Elastic Instability in Unit 3, one tube leak, failure of 8 tubes at MSLB test pressure and more than 300 tubes experienced > 35% loss in wall thickness. b. Added 377 more tubes (4% heat transfer surface area) and increased the average length of tubes by 50 inches – Adverse 50.59 Design Change (Required a 50.90 License Amendment) c.. Increased U-bend radius d. Added more AVBs - Adverse 50.59 Design Change (Requires a 50.90 License Amendment) e. Required more stringent tube-to-AVB gap requirement f. Distances between AVB tube supports are shorter Notes: A. In 2006, Dr. Pettigrew, the World's Foremost Expert on Fluid Elastic Instability warned about the ineffectiveness of the AVB Flat bars for in-plane vibrations and increased in-plane velocities and told the designer and manufacturers to verify the design of flat bars for in-plane vibrations. B. A review of Arkansas Nuclear one Unit 2 indicates the AVBs in adjacent columns are inserted to different depths (i.e., staggered) to limit the U-bend pressure drop and to discourage the formation of flow stagnation regions. The AVBs are nearly perpendicular to the centerline of the tubes at all locations in the U-bend region to provide support without unnecessary tube contact. These features provide margin against flow stagnation, corrosion, and tube vibration. C. But SCE and MHI missed the boat and are now suffering the adverse financial, political and credibility consequences with both San Onofre Units Shutdown The San Onofre replacement steam generators had more tube vibration margin than comparison replacement steam generators at the Fort Calhoun Nuclear Generating Station, also designed by MHI, which only experienced a small number of tube wear occurrences. But, MHI and SCE decided to change the very alloy the tubes were made out of, for one which is more prone to fluid elastic stability, but was thought to be more resistant to corrosion. The tubes at San Onofre are longer, have thicker walls, and are stiffer, than those in the Fort Calhoun generators. The new replacement design also increased the heat transfer surface area, which increased the steam quality in the generators. On top of that, they elongated and thinner low frequency the retainer bars that are installed around the tubes, which caused an unexpected increase of amplitude vibration contact between tubes and bars causing even more wear (Caused a number of tubes to exceed > 35% loss in wall thickness plugging limit, with one with 90% tube wall thickness wear, almost caused another accident at Unit 2, if Unit 2 would have continued operating, but



people were lucky because Unit 2 was shutdown due to refueling outage. NRC posted on its website, but SCE never told the public. NRC gave SCE a low level violation for not checking the design of the MHI Retainer Bar. Mitsubishi then revealed that in-plane instability like this had never been experienced in the nuclear industry prior to San Onofre, and that none of the predictive models were even capable of including it in their analysis. Even more, none of the 12 AVB supports were found to be restraining this tube motion. Because they did not even know about in-plane fluid elastic instability at time of design or manufacture, let alone preventing it, they never thought to question if with those changes, they would need more contact force to prevent vibration increases. Note: A review of Dr. Pettigrews and other papers between 2006 and 2011, the in-plane velocities are double than the out-of-plane velocities predicted by ATHOS out-of-plane models. See Notes A, & B above. Mitsubishi records two main root causes, and a redacted list of contributing causes. One root cause and all contributing causes are associated with the “decision-making” and “resources” processes. The other root cause and two of the above mentioned contributing causes are associated with standard “work practices”. Essentially, MHI states that the root causes all relate back to a lack of resources, a decision-making process which wasn’t properly regulated or guided, and assumptions made based on common “work practices”. NOTE: The actual causes are lack of “critical questioning & investigative attitude, financial greed over public safety, time pressure, lack of solid team work and alignment between SCE/MHI, complacency, lack of review of academic research papers by Dr. Pettigrew, lack of Industry Benchmarking of in CE Replacement Steam Generator improvements made by Westinghouse and BW&I described in NUREG-1841, Lack of knowledge by MHI in computer modeling, incomplete and inadequate mock-up testing and lack of knowledge in building very unique, complex and large CE Replacement Steam Generator, preparation of defective 10 CFR 50.59 evaluation and avoidance of NRC 50.90 License Amendment process by SCE. It is akin to admitting; first off, we didn’t even know that these particular types of problems existed, we know the general problems which plague our decisions are based on the fact that we do this all the time, we are always limited by a lack of resources, we tend to assume it is no big deal, this is standard operating procedure; except for this time no one stopped us, because no one thought it could go wrong. Maybe if we hadn’t spent so much time trying to get around the rules, had we only required the analyses which would’ve evaluated a little more, if only we hadn’t assumed these were acceptable industry practices. The questions which still need answering are focused if the utility hadn’t pre-determined it would use the 50.59 process to justify the design, would Mitsubishi have acted differently, and are all parties aware of the full implication and repercussions for their actions? Mitsubishi admitted that there were other design changes which could’ve been made, but would’ve had “unacceptable outcomes”, and failed to list what these changes would’ve been. They did however take particular care to point out that other replacement steam generators which had been in operation for longer, did not have the same wear problems witnessed at San Onofre, which is worthy of note. In answer to the second question is a resoundingly no. This appears to be a blatant attempt to manipulate the system to achieve an acceptable outcome and avoid unacceptable alternatives, which undermines the very faith in the system itself; for who could have faith in something which does not do what it claims to do, and has no ability to ensure that it does in the first place? For most people, their perception of the law is based less on what they read, as much as they are by precedent and the way it is carried out before them. What actions can we expect, what hope in the future, when so distracted and led astray the children are, by the examples of the leaders of today? 8.4 Million Southern Californians should request His Excellency President of United States to order a US Justice Department Inquiry of San Onofre is an INPO 4 Plant, with the worst fire safety, cyber security, emergency preparedness, maintenance, configuration control, procedure violations, discrimination, harassment, intimidation and retaliation record. Thanks to the entire NRC staff for conducting a thorough Technical Analysis, determining the exact causes of damages to San Onofre Units 2 & 3 by analyzing the operational data for Unit 2 for 2 Years and Unit 3 for 1 year and posting this blog.

comment #76656 posted on 2013-03-15 20:26:18 by HelpAllHurtNeverBaba

Ted Craver says that SCE has a monopoly franchise agreement with every city to supply electricity. CPUC President is a former officer of SCE and is approving unjustified SCE Secretive Costs and passing it unfairly to customers without any accountability. Southern Californians require safe, reliable, affordable and well managed power. So, here are few things for Ron, Ted and Pete to consider and take appropriate action: 1. San Onofre Unit 2 is not only unsafe for a design basis main steam line break accident but operating at 70% percent reduced power does not make any economic sense. Let SCE and Its Independent Experts prove not by probability and operator action, but by deterministic analysis and proven actions that San Onofre Unit 2 operation is safe during a design basis accident operating at 70% percent reduced power with FEI, FIRV and MFE in the entire U-tube bundle with jet impingement from flashing sub-cooled feed water. Assume that in-plane FEI velocities are double the out-of-plane FEI velocities. 2. It is very clear from a review of the MHI Root Cause report and testing of AVB’s in Japan that MHI is not capable of re-building or repair damaged AVB’s. Please stop wasting time and EIX/SCE Shareholders, Creditors and Customer’s money and give Westinghouse the contract to repair/rebuild both San Onofre Units. 3. Fire the San Onofre retaliatory and inefficient members of the Senior Leadership Team. These leaders are paid a lot of money, perks, performance bonuses and stocks, but SONGS performance has not improved under these leaders since 2007 and now both Units are shutdown with undetermined future, political, financial, safety culture and negligence consequences. 4. Even if NRC gives permission and CPUC approves the funds to Restart Unit 2, Ron, Ted and Pete are still on the hook, because, "If an accident happens, Ron, Ted and Pete will lose their face and Million Dollar Jobs & Stock Portfolio. Additionally, EIX/SCE Shareholders, Workers, Creditors and Customers will lose money invested in San Onofre and Transmission & Distribution Infrastructure." 5. Ted Craver, The ultimate decision and risks are yours. NRC Moderator and San Onofre Public Affairs officer Mr. Victor Dricks is requested to send this Public Safety message to Ted Craver, Pete Dietrich and Ron Litzinger.... Thanks to NRC for posting this blog. Hahn Baba

comment #82611 posted on 2013-03-25 08:17:37 by Moderator in response to comment #76801

Mr. Greene: Robust, proven designs and conservative operation of steam generators have historically prevented severe vibrations from occurring. NRC regulations do have requirements associated with maintaining the reactor coolant system pressure boundary, including steam generator tubes. Per the Standard Review Plan, rapid wear mechanisms are not allowed to occur, including designing against fluid elastic instability. As part of the design process, SCE and MHI did conduct numerous engineering calculations, including

modeling, that at the time showed no concerns with abnormal vibration and no threat of damage to the reactor coolant pressure boundary. The technical specifications require SONGS (as well as all other pressurized water reactors) to conduct periodic inspections of the steam generator tubes. These inspections are done to identify and minimize any chemical or mechanical wear issues that could lead to loss of tube integrity. As part of the NRC's review of the SONGS steam generator tube leak, the NRC is and will continue to look at changes to existing requirements. Victor Dricks

comment #85263 posted on 2013-04-03 23:27:11 by HAHN Baba

Sincere Thanks to NRC Chairman, Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. San Onofre NRC/SCE/MHI/Public Awareness Series – by Hahn Baba Albert Einstein, “Insanity: doing the same thing over and over again and expecting different results.” NRC, INPO, CPUC, NEI and Scientists expect a responsible nuclear utility to supply safe and reliable power at a reasonable cost and not conduct unsafe experiments at the expense of public safety and charge ratepayers for its mistakes. First Strike – 1992 - Decaying generator tubes helped push San Onofre's Unit 1 reactor into retirement in 1992, even though it was designed to run until 2004. Second Strike – 2001 Power Uprate – To generate more power, Edison Engineers increased the steam flows and lowered the steam generator pressures, which increased vibrations, and shortened the life of Rate Payers Paid Original Steam generators. Third Strike – 2011 - SONGS Unit 3 - To generate more power, believing that Unit 3 anti-vibration structure was built better than Unit 2, Edison Engineers tested the new supports by increasing the reactor coolant flows, steam flows and lowered the steam generator pressures, which increased vibrations, and destroyed the Rate Payers Paid brand New Replacement Steam generators. Edison has said that because of manufacturing differences, Unit 2's generators did not suffer the extent of deep tube wear witnessed in its sister plant. Unit 2 was not operating in the test mode and did not experience fluid elastic instability because of lower reactor coolant flows, lower steam flows and higher steam generator pressures. Unit 2 better supports and double the contact forces unproven theory is just a conjecture on the part of SCE/MHI based on hideous data, faulty computer simulations and an excuse to start defectively designed and degraded Unit 2. Unit 2 better supports and double the contact forces unproven theory is just a cheap SCE scheme to charge insurance money from MHI and more money from ratepayers. This bogus and unconvincing theory is contested and challenged based on the available plant data and review of Dr. Pettigrew's research papers and testimony, John Large, MHI, Westinghouse and AREVA Reports. Fourth Strike – 2013 - Edison officials are also preparing long-range plans under which the plant might run for years, even though some of Edison's own research has suggested tube damage could cut short its life span. Precise projections about the future are dependent on a restart — Edison engineers need to study how the reactor behaves at 70 percent power before being able to sharpen longer-range calculations. The plant could be started then shut down, as many as five times during a trial run to assess its operation and safety. "To propose an experiment in which the damaged reactor is repeatedly turned on and off shows a disgraceful contempt for public safety," said Kendra Ulrich, a spokeswoman for the Friends of the Earth. Unit 2 restart without complete and thorough review by NRC Brilliant Engineers and Public Hearings on the basis of meeting peak summer electricity demands is an unapproved experiment and just a cheap SCE scheme to charge more money from ratepayers. Last Strike – Albert Einstein, “Any intelligent .... can make things bigger, more complex, and more ..... It takes a touch of genius -- and a lot of courage -- to move in the opposite direction.” Ted Craver needs to tell Ron, Pete, Tom, Rich, John, Mike, Vic, Doug and others to stop wasting NRC and Public's time and money and award a turnkey contract to Westinghouse and Bechtel to repair or replace both Units Steam generators. This will be expensive, but wise for Ted, Ron, Pete, Tom, Rich, John, Mike, Vic, Doug and EIX/SCE shareholders, and will be in the best interests of NRC, INPO, NEI, Nuclear Industry, CPUC and the Public.

comment #81348 posted on 2013-03-21 00:43:09 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog - HAHN BABA responding to MHI Root Cause – Part 1 SUMMARY: The Original San Onofre CE steam generators with high steam flows did not suffer fluid elastic instability. Dr. Pettigrew warned about the ineffectiveness of Flat Bars against in-plane vibrations in a paper published in 2006 during the early design stages of the San Onofre RSGs. He said in 2013 again that San Onofre RSGs do not provide a positive restraint against in-plane vibrations. AREVA states, “After instability develops, the amplitude of in-plane motion continuously increases and the forces needed to prevent in-plane motion at any given AVB location become relatively large. Hence shortly after instability occurs, U-bends begin to swing in Mode 1 and overcome hindrance at any AVB location.” Can MHI or NRC explain, how contact forces in an anti-vibration structure designed for out-of-plane vibrations can prevent in-plane vibrations in a CE replacement steam generators with high steam flows, when the tubes only moved in the in-plane direction and in-plane velocities were more than double than the out-of-plane velocities. How will MHI design an in-plane anti-vibration floating structure to prevent tube-to-tube wear caused by 100 % void fractions, high-in-plane velocities, flow-induced random vibrations and Mitsubishi Flowering Effects. May be NRC should ask Westinghouse/Combustion Engineering before they approve the new MHI anti-vibration bar design, because these companies have successfully designed 6 CE replacement steam generators with high steam flows at Palo Verde and these generators have not experienced in-plane vibrations in almost 10 years of operation? Westinghouse/Combustion Engineering can say no, or charge MHI a very high fee to help Desperate SCE get out of the San Onofre Billion Dollar Radiation Jam and potential exit as a base-load plant. What is the harm in asking? Mitsubishi explanation of low contact forces as the reason for Unit 3 FEI does not make sense. To get the right answers, MHI as a supplier of new APWR's, its ambition to capture the US Commercial Nuclear Market and justify its technological superiority claims over Westinghouse and NEI Qualification of “US Power Plant designer”, MHI really needs to dig very deep in SCE's Secret Caves of hidden data and operational differences between Units 2 & 3. Combination of careful analysis of minute operational differences between Units 2 & 3 and in-depth questioning scrutiny of SCE created design flaws (11% increase in heat transfer area without a 50.90 License Amendment, Refusal to make changes to reduce void fractions) to make more thermal megawatts out of the RSGs will provide the MHI..... Mitsubishi states in its Root Cause, Document UES-20120254, Rev 0, Page 20, Section 5.5, Discussion of Tube to Tube Contact Force, “During the fabrication of the AVBs and the tubing and assembly of the tube bundle, MHI's manufacturing

practices achieved dimensional control that resulted in smaller tube-to-AVB gaps and smaller tube-to-AVB contact forces. It was not recognized at the time that a certain amount of tube-to-AVB contact force was required to prevent in-plane FEI under high steam quality (void fraction) conditions, because the contact force serves to increase the in-plane natural frequency of the tube. The technical investigations after the tube leak incident determined that the amount of contact force necessary to prevent in-plane FEI depends on the localized thermal-hydraulic conditions (steam quality (void fraction), flow velocity and hydro-dynamic pressure). As the steam quality (void fraction) increases, the amount of contact force necessary to prevent vibration increases. This increase in required contact force occurs because as the steam quality (void fraction) becomes higher, the damping provided by the liquid phase in the form of a liquid film decreases. The reduced in-plane contact force due to the SONGS "effective zero gap" design and the avoidance of "excessive preload" resulted in lowering the tubes' natural frequency in the in-plane direction. The combination of the localized high steam quality (void fraction) and reduced tube to AVB contact force resulted in exceeding the in-plane critical velocity, which created a condition that led to tube to tube contact. The dominant role played by the low contact force is reflected by the differences in the tube-to-tube wear that was observed in the Unit 2 and the Unit 3 RSGs. Each of the Unit 3 RSGs had approximately 160 tubes that experienced tube-to-tube wear whereas only one of the Unit 2 RSGs experienced tube-to-tube wear in just two tubes, even though the Unit 2 RSGs have operated twice as long as the Unit 3 RSGs. MHI did a comprehensive statistical evaluation of the contact forces between the tubes and the AVBs of the two units and concluded, based on the manufacturing data, that the contact force between the tubes and the AVBs in the Unit 2 RSGs is approximately double the contact force in the Unit 3 RSGs. Thus, the lower contact forces in Unit 3 are consistent with the conditions determined necessary to permit in-plane FEI to occur and with the fact that tube-to-tube wear occurred almost exclusively in Unit 3."

comment #69062 posted on 2013-03-08 15:34:52 by richard123456columbia

Who is paying for the tests by NRC, is it the owners, designer, manufacture, contractors or public? Probably the owner because they can raise rates so public will end up paying for it all.

comment #79693 posted on 2013-03-19 01:12:26 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog San Onofre NRC/SCE/MHI/ Public Education Series by HAHN BABA– Statement of facts unless proven wrong otherwise ..... Southern California Edison Submits Operational Assessment Requested by NRC NRR RAI 32 - Putting Production/Profits over Safety 1. BACKGROUND: ROSEMEAD, Calif., March 18, 2013 — A new technical evaluation of San Onofre Nuclear Generating Station Unit 2 demonstrates that the Unit 2 steam generators could be operated safely at 100 percent power and reinforces Southern California Edison's (SCE) more conservative plan to begin operating Unit 2 at 70 percent power for five months. SCE submitted the operational assessment of potential Unit 2 steam generator tube wear to the Nuclear Regulatory Commission in response to NRC questions. The new evaluation determined Unit 2 could operate at full power for 11 months with full tube integrity. The assessment was performed by Intertek APTECH of Sunnyvale, CA, and supplements Intertek's earlier assessment of Unit 2 operation at 70 percent power. Intertek performs operational assessments relating to steam generators for many nuclear power plants around the U.S. "This evaluation confirms the structural integrity of the Unit 2 steam generators at 100 percent power, as requested by the NRC," said Pete Dietrich, SCE senior vice president and chief nuclear officer. "While we have no intent to restart Unit 2 at full power, this demonstrates the amount of safety margin we have built into our analyses. We welcome this additional safety analysis but remain steadfast in our commitment to restart Unit 2 at only 70 percent power." 2. Facts to Dispute/Refute SCE Claim A. San Onofre Unit 3 operation @100 Power – 11 Months- SONGS Unit 3 Failed In-situ Wear Data - Unit 3 SG 3E088 (www.nrc.gov). The following tube wear data is based on a result of actual tube degradation in SONGS Unit 3 SG 3E088 caused by fluid elastic instability. Row 106 Column 78, 100 percent through wall wear, length of wear – 29 inches Row 102 Column 78, 99 percent through wall wear, length of wear – 23 inches Row 104 Column 78, 99 percent through wall wear, length of wear – 27 inches Row 100 Column 80, 81 percent through wall wear, length of wear – 28 inches Row 107, Column 77, 80 percent through wall wear, length of wear – 34 inches Row 101, Column 81, 78 percent through wall wear, length of wear – 26 inches Row 98, Column 80, 72 percent through wall wear, length of wear – 29 inches Row 99, Column 81, 72 percent through wall wear, length of wear – 27 inches B. Mitsubishi Root Cause Document UES-20120254, Rev 0, page 13 of 64, Item 1, "Tube to Tube Wear due to in-plane FEI" states, "Tube to tube wear was found in the U-bend region, located between AVBs, in the free span. Many of the tubes exhibiting tube to tube wear also exhibited wear at the AVBs and TSPs, in particular at the top tube support plate. For tubes with wear at the top tube support plate, it is considered that the entire tube, including its straight region, is vibrating. Tube to tube wear occurs when there is tube in-plane motion (vibration) with a displacement (amplitude) greater than the distance between the tubes in the adjacent rows, resulting in tube-to-tube contact. Some of the tubes with tube-tube wear did not experience large amplitude vibration but were impacted by tubes that did experience large amplitude vibration. Also the two tubes in Unit 2 with tube-to-tube wear had different wear characteristics than the Unit 3 tube-to-tube wear." C. Based on Dr. Pettigrew's Research and other papers published between 2006 -2011 on fluid elastic instability experimental data, "The high dry steam velocities differ in the in-plane and out-of-plane directions. For the SONGS RSG tube geometry, based on experimental data, it is conservatively estimated that the high dry steam velocities for in-plane FEI are at least at least 200 % of the high dry steam velocities for out-of-plane FEI." D. The SONGS Unit 2 SG tube wear rates calculated by AREVA, Westinghouse and Intertek Operational Assessments and Work Rates are based on the results of out-of-plane velocities, which are under conservative based on FEI Observations in SONGS 3 and Dr. Pettigrew's Research acknowledged by MHI and NRC Chairman and Commissioners. E. Deterministic Analysis – Uniform Linear Tube-to Tube Wear Rate in Unit 2 based on Unit 3 Benchmarking = 100%/11 months = 9%/month, consistent with item D and Actual Observations in SONGS 3 F. Westinghouse in SONGS Unit 2 Return to Service Report, Attachment 6, Appendix D, (www.songs.community.com), page 91 states, "Table 3-2. Wear Projection Results for Active Tubes with Limiting AVB Wear Indications" shows the following active tubes in Unit 2 SG E089 with the following data: Row 119 Column 89, 28 percent ECT reported through wall wear, Row 121 Column 91, 28 percent ECT reported through wall wear Row 131 Column 91, 21 percent ECT reported through wall wear Row 129 Column 93, 22 percent ECT



reported through wall wear Row 126 Column 90, 21 percent ECT reported through wall wear G. Calculate SGE E-089 tube rupture time @ 9% wear/month for 100% Tube wear @ full power operation Row 119 Column 89, 28 percent wall wear + 72 % in 8 months = 100 % wear = Tube Rupture Row 121 Column 91, 28 percent wall wear + 72 % in 8 months = 100 % wear = Tube Rupture Row 131 Column 91, 21 percent wall wear + 81 % in 9 months = 101 % wear = Tube Rupture Row 129 Column 93, 22 percent wall wear + 81 % in 9 months = 102 % wear = Tube Rupture Row 126 Column 90, 21 percent wall wear + 81 % in 9 months = 102 % wear = Tube Rupture H. Intertek APTECH Operational Assessment referenced in item 1 above, page I-iv states, "Two OA analysis cases were evaluated based on the sizing techniques used to define the Unit 3 TTW depths. Case 1 evaluated the situation where voltage based sizing for Eddy Current Testing Examination Sheet (ETSS) 27902.2 was used to establish the TTW depth distributions and the correlated wear rate with wear index. The results for Case 1 indicate that the Structural Integrity Performance Criteria (SIPC) margin requirements are satisfied for an inspection interval length of 0.94 years (11.5 Months) at 100% power level. For Case 2, where the TTW depths were resized by AREVA using a more realistic calibration standard, the SIPC margins will be met for an inspection interval length of 1.04 years at 100% power level. The plan for Unit 2 is to operate for an inspection interval of 5 months at a 70% power to provide additional margin to the industry requirements for tube integrity. Tube burst at 3xNOPD (Normal Operating Pressure Differential) is the limiting requirement for inspection interval length. Therefore, the accident-induced leakage requirements will be satisfied provided that burst margins at 3xNOPD are maintained during the inspection interval. I. Deterministic Analysis results shown in item G shows that all the five tubes can rupture in 9 months or less than shown by Intertek in Probabilistic Analysis of 11 months. This Probabilistic Analysis does not meet the intent of NRR RAI 32, in which SCE promised to provide an OA that includes an evaluation of steam generator TTW for operation up to the RTP. CONCLUSIONS: SCE is once again trying to circumvent and gaming the NRC RAI #32, just like avoiding 10 CFR 50.90 for the Brand New \$570 Million RSGs. MHI Anti-vibration bar structure, designed for out-of plane vibrations, is incapable of preventing the adverse effects of tube-to-tube wear or fluid elastic instability (high dry steam) at 100% power operation or main steam line break. We saw the destruction of SONGS Unit 3 RSGs due to tube-to-tube wear or fluid elastic instability (high dry steam) at 100% power operation or Main Steam Line Break Testing. According to the analysis of Unit 2 Plant Operational Data/Procedures and Westinghouse Operational Assessment, fluid elastic instability (high dry steam, high fluid velocities, in-plane vibrations) conditions did not occur in Unit 2. Therefore, this insufficient contact tube-to-AVB forces in Unit 3 causing the FEI is based on hideous data and unreliable MHI Computer Modeling once again. Taking credit for double contact tube-to-AVB forces (Better supports), which prevented in-plane vibrations or Tube-to-tube wear in Unit 2 by NRC Region IV AIT Team/SCE/MHI directly contradicts and conflicts with statements made by Dr. Pettigrew, Westinghouse, AREVA, John Large and is consistent with Unit 2 Operational data. This analysis by SCE does not meet the intent of Federal Regulations, NRC Steam Generator Tube Structural Integrity Criteria, SONGS NRC Approved Technical Specifications, NRC Reasonable Assurance Criteria, NRC Chairman's Standards and SCE's Overriding Obligation for Public Safety. A Lot More to Come... Thanks NRC Staff... HAHN BABA

comment #81796 posted on 2013-03-22 14:45:40 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. HAHN BABA responding to MHI Root Cause – Part 3 – Responding to SCE CAL ACTION 1 A. Conclusions: As shown below, the Root Cause determined by SCE and MHI for both Units 2 & 3 RSGs does not address the exact reason for RSG design and operational flaws. Root Cause is defined as the exact reason (e.g., hardware, process, or human performance) for a problem, which if corrected, will prevent recurrence of that problem. Therefore, SCE/MHI have not determined the exact root cause of the tube-to-tube wear in Unit 3 per CAL ACTION 1, and have not implemented actions to prevent the loss of tube-to-tube wear and demonstrated via a deterministic safety analysis that the AVB structural integrity in the Unit 2 steam generator will be maintained (e.g., Collapse of AVB structure and retainer bars failure due to FEI, FIRV and MFE) due to Main Steam Line Break (e.g., Mihama, Turkey Point, Robinson), Station Blackout (Fukushima), SG Tube Ruptures (Mihama, SONGS 3 & 20 other Incidents in US/Europe in the last 20 years) and other anticipated operational transients at power operation between 70 to 100% power. NRC Chairman has publicly stated that SCE is responsible for the work of MHI. Therefore, NRC/NRR San Onofre Special Members have to be extremely careful (to fulfill their mission of public safety) of all the false claims and wishy-washy Unit 2 Return to Service Reports, which are based on flawed statistical data, unreliable computer models, irrational logic and are nothing, but garbage, smoking mirrors, full of holes and contradictions. B. Background: B.1 - On March 27, 2012, the NRC issued a CAL to SCE describing actions that the NRC and SCE agreed would be completed prior to returning Units 2 and 3 to service. The purpose of this report is to provide detailed information to demonstrate fulfillment of Actions 1 and 2 of the CAL, which are required to be completed prior to entry of Unit 2 into Mode 2. The actions as stated in the CAL are as follows: CAL ACTION 1: "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." B.2 - John L. Geesman, Council for Alliance For Nuclear responsibility (A4NR) states in a Letter to Dr. Robert B. Weisenmiller, Chairman California Energy Commission, states, "NRC's Augmented Inspection Team report ("AIT Report"), certain "blind spots" continue to plague the assessment of Unit 2's prospects. I believe it imperative that you demand a more robust, empirical analysis than either SCE or the NRC staff has performed to date. A4NR criticized the analytic sloppiness of the AIT Report's abrupt dismissal of 10,854 indications of wear at the anti-vibration bars ("AVB wear") and 3,315 at the tube support plates ("TSP wear") based on vague and undocumented reliance on purported industry operating experience. The absence of any reference to actual data to support this conclusion ("the wear indications found are similar to those found at other replacement steam generators after one cycle of operation") is peculiar." B.3 - John Large States, "SCE's assertion that reducing power to 70% will at the best alleviate, but not eliminate, the TTW and other modes of tube and component wear is little more than hypothesis - the supporting Operational Assessments and analyses have not proven it to be otherwise. I am of the opinion that trialling this hypothesis by putting the SONGS Unit 2 back into service will, because of the uncertainties and unresolved issues involved, embrace a great deal of change, test and experiment. The terms of the Confirmatory Action Letter of March 11 2012, are versed such that to meet compliance the response of SCE via its Return to Service Report, 11 must include considerable changes of conditions and procedures that are outside the reference bounds of the present FSAR

– this is because the physical condition of the RSGs, and the means by which this is evaluated and projected into future in-service operation, have substantially and irrevocably changed since the current FSAR was approved. The fact that SCE fails to satisfy the requirements of the CAL is neither here nor there, although it illustrates the scope and complexity of the response required. At the time of preparing the CAL, the NRC being well-versed in the failures at the San Onofre nuclear plant, surely must have known that the only satisfactory response to the CAL would indeed require considerable changes, tests and experiments to be implemented. Put another way, the extensive and rapid rates of tube wear experience at the SONGS Unit 2 and Unit 3 RSGs, have necessitated an extensive raft of analysis, assessments and projections to qualify, or otherwise, that Unit 2 is fit for purpose. Not only is this prequalifying work unique to the San Onofre nuclear plant, much of it has never been undertaken before so, it follows, its inclusion in safety considerations must be a new and hitherto unconsidered component now required to be incorporated into an updated version of the FSAR. Hence, I am of the opinion that, on a technical basis alone, the CAL must be considered to have been at the time of its preparation, a de facto license amendment.” B.4.1- MHI Root Cause - Thus, the organizational and programmatic Root Cause for the in-plane FEI as set forth in this RCA is the insufficient programmatic requirement to assure effective AVB contact force to control in-plane FEI under high localized thermal-hydraulic conditions (steam quality (void fraction), flow velocity and hydrodynamic pressure). The underlying reason for this insufficiency is that the MHI SONGS RSG design did not consider the phenomenon of in-plane FEI because contemporary knowledge and industry U-tube SG operation experience did not indicate a need to consider in-plane FEI. The design control process did not provide sufficient direction to assure that an evaluation of the need for an analysis of flow induced vibration of the retainer bar was performed and verified. C. Background: Researchers have said long ago that nucleate boiling on the tube surfaces has a stabilizing damping effect to preclude fluid-elastic instability. At least 1.5 % water or void fraction less than 98.5% in a steam-water mixture and areas without localized tube dry-out conditions are required in a nuclear steam generator to preclude the onset of fluid elastic instability. A review of NUREG-1841 published during the SCE/MHI design stages of San Onofre Replacement Steam Generators indicates that innovative and experienced manufacturers of steam generators (like Westinghouse/CE & BW&I) including with very high steam flows such as the largest steam generators in the world (e.g., Palo Verde) have used a combination of design and operational features [(high circulation ratios(>4), high steam pressures (> 900 psi) and low friction losses] to keep the void fractions at 98.5% or below and have prevented localized tube dry-out conditions and steam blanketing in operating US Steam Generators. D. SONGS Operational Data, Design Assumptions and Trend Calculations: D.1 - Feedwater Operating pressure is assumed to be 50 psi higher than Steam Operating pressure based on input from the SONGS Senior Shift Manager. D.2 - The difference in Reactor Coolant Specific Heat between Units 2 & 3 due to minor RCS temperature variation is negligible is negligible. D.3 -Ratio of Reactor Thermal Power Ratio between Units 3 and 2 = [Unit 3 (79.79 X 56.7)]/[Unit 2 (75.76 X 58)] = 1.03 (SONGS Procedure) D.4 - Differences Between SONGS Unit 2 and Unit 3 RSGs Operating Pressures D.4.1 - Case 1 - Unit 3, 833 psia, Steam Flow @ 7.6 X 106 Pounds/hour (Consistent with NRC AIT Report) D.4.1.1 - Enthalpy, Saturated Vapor, hg – 1,198 Btu/Lb @ 850 Psi (SONGS Procedure) D.4.1.2- Feedwater Enthalpy @ 440 0F @ 900 psia ~ 420 Btu/ lb. (SONGS Procedure) D.4.1.3 - Enthalpy, Extracted by Steam/Water Mixture into SG Evaporated, hfsg = 1,198 – 420 = 778 Btu/lb. D.4.1.4 - Thermal Power Unit 3 = 7.588 X Million lbs./hr X 778.6 Btu/Lb.= 775 Million Btu/Hour = 5,908,000,000 Btu/Hour = 1729 Thermal MWt/Hour D.4.2 - Case 2 - Unit 2, 892 ~ 900 psi, Steam Flow @ 7.6 X 106 Pounds/hour (Consistent with NRC AIT Report) D.4.2.1 - Feedwater Enthalpy @ 440 0F @ 900 psia ~ 420 Btu/ lb. (SONGS Procedure) D.4.1.2 - Enthalpy, Saturated Vapor, hg – 1,196.2 Btu/Lb @ 900 Psi (SONGS Procedure) D.4.2.3 - Enthalpy, Extracted by Steam/Water Mixture into SG Evaporated, hfsg = 1,196.2 – 420 = 776.2 Btu/lb. D.4.2.4 - Thermal Power Unit 2 = 7.6 Million lbs./hr. X 776.2 Btu/lb = 1728 Thermal MWt/Hour D.4.3 - Case 3 – Difference in Heat Flow between Units 2 and 3, which caused tube-to-tube wear in 1.5 percent Area of the Unit 3 = 0.015 X 7.6 Million lbs./hr. X 778.8 - 776.2 Btu/lb ~ 0.25 Million Btu/Hr D.4.4 – Analysis: 0.25 Million Btu/Hr extra heat was rejected by Unit 3 RSGs produced due to higher Unit 3 RCS flows. Therefore, heat flux in the hot leg in the high region of tube wear due to narrow pitch tube to diameter ratio and extremely tall tube bundle exceeded the critical heat flux. This phenomena caused void fraction of 99.6%, created in-plane velocities > 50 feet/sec and excessive hydrodynamic pressures (Mitsubishi Flowing Effect). The only known flow induced vibration mechanism capable of producing large tube displacements, and in a contiguous group like that of the Unit 3 RSGs, is fluid elastic excitation. Due to void fractions of 99.6%, in-plane steam velocities > 50 feet/sec and excessive hydrodynamic pressures, large U-bends in Unit 3 pushed the AVBs out of their way and produced large displacements of tubes in the in-plane direction. Tubes are known to have moved in-plane because of the locations and magnitudes of their wear scars. The wear scars indicate that the tubes were generally vibrating in their first fundamental in-plane mode, which implies that none of the twelve (12) AVB supports were restraining the tube motion. Yet, it also indicates that the tube-to-AVB gaps are very small and uniform, because none of the tubes exhibited out-of-plane FEI, which is the tube’s preferential fluid elastic vibration mode. Since out-of-plane FEI did not occur in Unit 3 and instead only in-plane FEI occur, it is concluded that the out-of-plane support conditions for the TTW tubes were active (as designed). This leads to the conclusion that the Unit 3 RSGs 24 tube-to-AVB intersections (AVB on both sides of a tube with 12 locations) have gaps small enough to be effective in the out-of-plane direction, but there were no positive restraints in the in-plane direction. Therefore, there were zero tube-to-AVB contact forces to prevent in-plane tube displacement. This analysis is consistent with Dr. Pettigrew’s Research Paper published in 2006 and his statements in 2013 regarding SONGS RSG AVB Design, AREVA’s Operational, John Large’s and Arnie Gunderson’s Assessments, SONGS Root Cause Members Statements and SONGS Operational Data. SCE/MHI have not determined the exact root cause of the tube-to- tube wear in Unit 3 per CAL ACTION 1, and have not implemented actions to prevent the loss of tube-to-tube wear and demonstrated via a deterministic safety analysis that the AVB structural integrity in the Unit 2 steam generator will be maintained (e.g., Collapse of AVB structure and retainer bars failure due to FEI, FIRV and MFE) due to Main Steam Line Break (e.g., Mihama, Turkey Point, Robinson), Station Blackout (Fukushima), SG Tube Ruptures ( Mihama, SONGS 3 & 20 other Incidents in US/Europe in the last 20 years) and other anticipated operational transients at power operation between 70 to 100% power .

comment #84873 posted on 2013-04-02 23:53:36 by HAHN Baba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. San Onofre NRC/SCE/MHI/Public Awareness Series – Courtesy of DAB Safety Team Comparing Davis- Besse Nuclear Power Plant with San Onofre Unit 2 Davis-Besse Nuclear Power Station is a nuclear power plant in Oak Harbor, Ohio. On



March 5, 2002, maintenance workers discovered that corrosion had eaten a football-sized hole into the reactor vessel head of the Davis-Besse plant. Although the corrosion did not lead to an accident, this was considered to be a serious nuclear safety incident. Some observers have criticized the NRC's Commission work as an example of regulatory capture [See Note 1] and the NRC has been accused of doing an inadequate job by the Union of Concerned Scientists. The Nuclear Regulatory Commission kept Davis-Besse shut down until March 2004, so that First Energy was able to perform all the necessary maintenance for safe operations. The NRC imposed its largest fine ever—more than \$5 million—against First Energy for the actions that led to the corrosion. The company paid an additional \$28 million in fines under a settlement with the U.S. Department of Justice. The NRC closely monitored First Energy's response and concluded in September 2009 that First Energy met the conditions of the 2004 order. From 2004 through 2009 the NRC reviewed 20 independent assessments conducted at the plant and verified the independent assessors' credentials. The agency also conducted its own inspections and reviewed First Energy's reactor vessel inspections conducted in early 2005. NRC inspectors paid particular attention to the order's focus on safety culture and safety conscious work environment to ensure there were no new signs of weakness. The NRC task force concluded that the corrosion occurred for several reasons: • NRC, Davis-Besse and the nuclear industry failed to adequately review, assess, and follow up on relevant operating experience at other nuclear power plants; • Davis-Besse failed to ensure that plant safety issues received appropriate attention; and • NRC failed to integrate available information in assessing Davis-Besse's safety performance. Southern California Edison wants to restart unsafe Unit 2 nuclear reactor at 70% power under false pretenses, just for profits, and as an unapproved risky experiment by subverting the NRC and Federal regulatory process. The true Root Cause (See Note 2) of the unprecedented tube-to-tube wear in Unit 3 has NOT been established, as required by NRC Confirmatory Letter Action 1 for restarting the defectively designed and degraded Unit 2. NRC has not even completed their review of Unit 2 Return to Service Reports, nor have they finished Special Unit 2 Tube Inspections, nor have they (publicly?) reviewed SCE's Response to NRC's Requests for Additional Information (RAIs). Now, SCE wants the NRC to approve a new shady License Amendment, undermining public safety and do it without the involvement of Public Safety Experts/Attorneys and Citizens/Ratepayers. After the review of the Mitsubishi Root Cause Evaluation and the Draft SCE License Amendment, it is crystal clear that the NRC needs to follow the example of their own enforcement at David Besse together with the lessons learned from Fukushima, when it comes to approving this new Shady License Amendment for restarting San Onofre Unit 2's defectively designed and degraded replacement steam generators. In light of the unanticipated/unprecedented tube leakage at SONGS 3, the health and safety, along with the economic concerns/objections of 8.4 million Southern Californians' MUST OVERRIDE and PREVENT the restarting of Unit 2 at 70% or ANY power level. In a Democratic Society, truth must prevail over profit motivations, misleading propaganda of electricity service disruption and/or projected probabilistic temporary inconveniences to the public based on phony data, because America cannot afford a trillion dollar nuclear eco-disaster! Notes: 1: Regulatory capture occurs when a regulatory agency, created to act in the public interest, instead advances the commercial or special concerns of interest groups that dominate the industry or sector it is charged with regulating. Regulatory capture is a form of government failure, as it can act as an encouragement for firms to produce negative externalities. The agencies are called "captured agencies". 2. Human performance errors resulting from the negative safety culture of production (profits) goals overriding public safety obligations.

comment #69506 posted on 2013-03-08 23:54:15 by Fred Stender

It is sad to see Edison so disrespecting the NRC with their lies, putting the public at risk, and making a mockery of the regulatory process. The Government needs to come down hard on this one, or forever lose the respect of those they regulate and those they protect.

comment #69518 posted on 2013-03-09 00:14:01 by joy cash

The public has been & will continue to call for an adjudicated review of So. Cal. Edison's actions. We are rightly concerned, San Onofre plants hold the worse safety records of all 104 US nuclear plants. And of course, its location between 2 active earthquake vaults in unthinkable.

comment #69078 posted on 2013-03-08 15:52:20 by CaptD

Good News for everyone in Southern California! It has been said before but it bears repeating, HOW CAN PUBLIC OVERSIGHT OCCUR, when documentation is with head from the public... The NRC is wasting valuable time and money enabling SCE attempt to justify restarting their already damaged Unit 2 in a test mode to see what happens, instead of telling them to replace its defective poorly designed replacement steam generators! This matter will not be "swept under the rug" since the safety of about 8 million people hangs in the balance of this 1.3 Billion Dollars debacle! Note: The NRC just assessed San Onofre 2 & 3 "as needing to resolve one or two items of low safety significance," WHICH IS A BAD NUCLEAR JOKE, considering Unit 3 has failed and can't be operated! <http://www.nrc.gov/reading-rm/doc-collections/news/2013/13-013.pdf> San Onofre Unit 2 and Unit 3 have given the NRC (and the nuclear industry) a pair of BLACK EYES! It is time for the NRC to restrict any restart discussion until every allegation has been answered completely and all 9,737 tubes of each steam generator have been inspected visually, using the most modern techniques for both external and internal fatigue/wear damage, which has not been done to date, instead SCE has used Bobbin-coil inspection methodology which is not as effective. To help readers learn more about how Steam Generators (SG) can "fail" here is a link to an amazing accurate animation that was done to illustrate San Onofre's Replacement Steam Generators (RSG) problems (which included MULTIPLE SG tube failures) and the animation even illustrates a Main Steam Line Break (MSLB): <http://www.acehoffman.org/sano/SanOnofreRSGsbyAceHoffman.swf> Note: By scrolling over the animation a large number of additional animations can be viewed!

comment #69099 posted on 2013-03-08 17:40:13 by CaptD in response to comment #69062

Rebates may be issued... But the ratepayers are, as of now, still paying \$54 million dollars a month for no energy!

comment #83466 posted on 2013-03-28 13:28:38 by Moderator in response to comment #79837

We apologize for the delay in posting this comment. We asked our allegations staff to review it first. Once they cleared it, we were able to post it. Moderator

comment #79663 posted on 2013-03-18 20:41:34 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog As a part of San Onofre Public Awareness and SCE/MHI Lessons Learnt Series, Brilliant NRC Staff should summarize for the benefit of General Public an Unbiased Gap Analysis on San Onofre Degradation before Unit 2 restart based on the plant data and a review of following reports: 1. NRC AIT and follow up reports 2. SCE Root Cause Analysis Evaluations (Safety Short Cuts and Avoidance of 10 CFR 50.90) 3. Westinghouse Operational Assessment 4. AREVA Operational Assessment 5. MHI Root Cause Analysis & Technical Reports (Safety Short Cuts and Avoidance of 10 CFR 50.90) 6. SCE Enclosure 2 and Remaining Operational Assessments 7. Internationally Known Chartered Engineer and Nuclear Scientist John Large Technical ASLB Paper 8. Internationally Known Nuclear Engineer Arnie Gunderson's Technical Papers 9. Professor Daniel Hirsch's Report 10. Mitsubishi AVB Testing for San Onofre RSG Repairs 11. Dr. Pettigrew's and other research papers published between 2016 and 2011 on FEI & FIRV 12. SONGS Special Tube Inspections & Insider Reports 13. NUREG 1841- Comparison of CE Replacement Generators with San Onofre 14. SCE Response to NRR RAI's 15. Fluid Elastic Instability, AVB Contact Forces and risks of Design Bases Accidents at 70% reduced power, Accuracy of Thermal-Hydraulic Computer Modeling and Reliability of SCE Operator Actions 16. Analysis of San Onofre Units 2 & 3 Operational Data and its impact on Units 2 & 3 Cause Root Cause Evaluations and how it relates to Fluid Elastic Instability, Flow-induced Vibrations, Mitsubishi Flowering Effect and AVB Contact Forces 17. SCE's Compliance with NRC CAL and NRC Justification of SCE 10CFR 50.59 and Assurance to 8.4 Million Southern Californians based on Scientific Facts and Operating Experience Thanks.... HAHN BABA

comment #79652 posted on 2013-03-18 20:00:15 by David Greene in response to comment #76660

In answer to your question on the difference between the DMIMS-DX Loose Parts Monitors (LPM) and the BatScan Acoustic Monitoring system; LPMs are optimized for monitoring the reactor primary circuit, specifically to warn the Operator when foreign bodies (e.g. broken parts) which are being carried around the primary loop, impact with the vessel wall or piping. Its installation is mandated by NRC. In contrast, the BatScan system is designed to both monitor for and locate localized noise sources inside a SG, and notify Plant Operators in sufficient time to take appropriate action to mitigate damage propagation, e.g. that caused by a broken part. Monitoring from the outside of the SG, BatScan detects noise sources within 2 seconds, and locates to within a few centimeters inside the steam generator tube bundle even when totally masked by full power, background noise (-20 dB S/N), and has a false alarm rate of less than 1 false alarm in 30 years of continuous operation. BatScan algorithms, components and performance have been fully tested, verified and validated from detection of micro leaks to full SG tube bursts. The system was installed and operated successfully for two years on a full size SG, validating its performance characteristics. During operation, it detected and monitored an unexpected H2O leakage across the pressure seal of the SG head; the leak was equivalent of a shot glass of water per day. Its use is not limited to NPP steam generation monitoring; it also successfully monitors the exhaust noise from subsonic and supersonic jets engines, and can detect and locate fault operation in rotating machinery. It would seem from all reports that NRC has both failed to recognize that vibration technology is available today nor has it required its installation on current operating NPP SGs. A technology with performance characteristics such as the BatScan system offers would not only protect current SGs but could lead to broader and deeper knowledge of flow induced vibration issues in future. This can result in plant requirements and design enhancements.

comment #79648 posted on 2013-03-18 19:37:04 by David Greene in response to comment #76801

Thank you for your reference to the Allegation/Violation submitted to the Office of Chairman of NRC. It appears to be a comprehensive review of the steam generator tube/retainer bar vibration issues and seven possible violations that need to be addressed. I believe that aggressive questioning of any possible safety implications or responses by regulatory organizations is a very necessary and essential part of the safety process for safe nuclear power. I admire and encourage the oversight and dedication of individuals and organizers to ensure all possible efforts are made to ensure safety and reliability across the whole nuclear industry, including the seven issues documented. I want to again state that my concerns are at a higher level. NRC must have been aware that fluid flow induced vibration was considered an issue in the SG design, not only at SONGS but also with most SG designs. Even knowing this, NRC did not require continuous vibration monitoring of the SGs during all levels of power operation. It is this omission on NRC's part that needs to be addressed and rectified. How did the NRC, our ultimate safety agency fail to require a vibration monitor? A report was posted today "Audit of NRC's Safety Training and Development for Technical Staff (OIG 13-A-14, March 14, 2013). This audit report suggests a possible contributing reason for lack of vibration monitoring. However, this does not remove the need for NRC to provide information of how they have already missed requiring vibration monitors, or how they plan to prevent other future deficiencies.

comment #79645 posted on 2013-03-18 19:30:31 by in response to comment #79120

Thanks, the animations are great!

comment #76801 posted on 2013-03-16 13:38:04 by CaptD in response to comment #76620

Perhaps you might change your opinions after reading this: San Onofre Retainer Bar Problems  
[https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1\\_4KqtyVbshD9IQKN2S2KpWVW2AdU5pGAKv-YyB7bIDs](https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1_4KqtyVbshD9IQKN2S2KpWVW2AdU5pGAKv-YyB7bIDs)

comment #70328 posted on 2013-03-10 17:45:34 by CaptD

SCE's statement is premature and that it is best to wait until ALL the experts review MHI's documents in detail, along with their implications to the NRC "handling" of SCE and their restart plan. + Ask yourself why did Senator Boxer and the NRC sit on this information for so long? Many think it is part of a larger delaying PLAN to make the SCE (and their Regulators [both the CPUC & the NRC]) look good while MHI redesigns the Anti Vibration Bars for Unit 2 which will be installed soon after the restart "testing".

comment #79811 posted on 2013-03-19 14:05:05 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog San Onofre NRC/SCE/MHI/ Public Education Series – Statement of facts unless proven wrong otherwise .....  
 March 18, 2013 - Southern California Edison Submits Operational Assessment Requested by NRC NRR RAI 32 – SCE Putting Production/Profits over Safety - HAHN BABA Response Continued ... See Previous Blogs for more comments Background: On March 27, 2012, the NRC issued a CAL to SCE describing actions that the NRC and SCE agreed would be completed prior to returning Units 2 and 3 to service. The purpose of this report is to provide detailed information to demonstrate fulfillment of Actions 1 and 2 of the CAL, which are required to be completed prior to entry of Unit 2 into Mode 2. The actions as stated in the CAL are as follows: "CAL ACTION 1: 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.", and, "CAL ACTION 2: Prior to entry of Unit 2 into Mode 2, SCE will submit to the NRC in writing the results of your assessment of Unit 2 steam generators, the protocol of inspections and/or operational limits, including schedule dates for a mid-cycle shutdown for further inspections, and the basis for SCE's conclusion that there is reasonable assurance, as required by NRC regulations, that the unit will operate safely." EXECUTIVE SUMMARY: HAHN Baba and DAB safety Team has shown you previously in numerous San Onofre Papers, Press Releases, Media Alerts and Allegations submitted to NRC and US Congress that Southern California Edison Company (SCE) has not determined the exact Root Cause of the tube-to-tube interactions that resulted in steam generator tube wear in Unit 3, and has not implemented actions to prevent loss of integrity due to these causes in the Unit 2 steam generator tubes. Southern California Edison submittal to NRC on March 18, 2013 of Intertek Operational Assessment Requested by NRR RAI 32 does not meet CAL Actions 1 & 2. This analysis does not meet the intent of the Federal Regulations, NRC Steam Generator Tube Structural Integrity Criteria, SONGS NRC Approved Technical Specifications, NRC Emergency Preparedness Reasonable Assurance Criteria, NRC Chairman's Standards, NEI 97-06, "Steam Generator Integrity Assessment Guidelines", Electric Power Research Institute, Steam Generator Management Program, and SCE's Overriding Obligation for Public Safety. A. First Strike – SCE shortened the life of San Onofre Original Combustion Steam Generators (OSGs) due to accelerated tube wear and increased tube plugging by increasing the reactor thermal power/SG output in 2001 from 1705 MWt to 1729 MWt. B. Second Strike, SCE destroyed 4 brand new replacement steam generators (RSGs) by specifying numerous unanalyzed and untested design changes to generate 1729 MWt by not performing review of Academic Literature (e.g., Dr. Pettigrew, 2006, etc.) and not industry benchmarking their own World's Largest Palo Verde CE Replacement Steam Generators installed between 2001-2005 with > 2% power uprate. Arizona Power Service, majority owner and operator of Palo Verde CE Replacement Steam Generators resolved the problems with Palo Verde OSGs, made with more design and operational changes than San Onofre OSGs and followed NRC's Blessed 10CFR 50.90 License Amendment Process (SCE owns 20% of these generators, but complacent SCE Engineers did not contact their Palo Verde Counterparts to inquire how they performed the safety analysis to justify design changes). In addition, SCE Engineers, prepared defective 10 CFR 50.59, took safety short cuts and did not implement the MHI Recommendations to reduce void fractions, and subverted the NRC 50.90 regulatory process (Honorable Senator Barbara Boxer and Congressman Ed Markey). SCE/MHI Engineers did not design the San Onofre RSGs tubes for protection in-plane vibrations. In-plane vibrations, fluid elastic instability or high dry steam problems did not exist in the San Onofre OSGs, that is why these OSGs tubes lasted for 28 years even with severe corrosion problems, out-of-plane vibrations tube/support wear, increased tube plugging rate and frequent inspections. C. Third Strike, New Intertek Operational Assessment, with so many previous failed attempts by SCE's World's First Class Expert Team Panel\* including three NEI Qualified "US Nuclear Plant designers", Westinghouse, AREVA & MHI. 1. An Operational Assessment (OA) of a prudently designed well operated and thoroughly inspected steam generator is a forward-looking evaluation of the steam generator (SG) tube conditions that is used to ensure that the structural integrity and accident leakage performance will not be exceeded during the next inspection interval. The acceptance performance standard for structural integrity is: (1) The worst-case degraded tube shall meet the Structural Integrity Performance Criteria (SIPC) margin requirements with at least a probability of 0.95 at 50% confidence. The worst-case degraded tube is established from the estimation of lower extreme values of structural performance parameters (e.g., burst pressure) representative of all degraded tubes in the bundle for a specific degradation mechanism, and (2) The acceptance performance standard for Accident Leakage Performance Criteria (ALPC) integrity is, "The probability for satisfying the limit requirements of the AILPC shall be at least 0.95 at 50% confidence For SONGS, the accident-induced leak rate is 0.5 gallons per minute (gpm) per generator cumulative for all degradation mechanisms." These margins are compared and managed with the structural integrity and leakage performance criteria requirements of Nuclear Energy Institute (NEI) 97-06, "Steam Generator Integrity Assessment Guidelines, Revision 3," Electric Power Research Institute, Steam Generator Management Program, EPRI Report 1019038, (November 2009)." 2. Emergency Preparedness for adequate protection of public health and safety from radiological doses and offsite release due to potential of radiological accident due to defectively designed and degraded steam generator tubes such as San Onofre should be implemented as a matter of prudence, deterministic analysis and defense-in-depth actions rather than in response to a quantitative analysis of accident probabilities. The effectiveness of



an emergency plan is independent of probability. When periodic reviews or new information indicates the potential for conditions that could significantly reduce safety margins or exceed current design assumptions, a timely, formal, and comprehensive assessment of the potential for substantial consequences should be conducted. An independent, cross-functional safety review should also be conducted to fully understand the nuclear safety implications. Plant design features and operating procedures alone cannot completely mitigate the risk posed by a beyond-design-basis event. 3. The NRC places a high priority on ensuring that possible steam generator tube degradation is carefully addressed through inspections, strict repair criteria and the monitoring of water chemistry to detect radiation leaking from the primary to the secondary side of the plant. In addition, tubes must have an extremely low probability of abnormal leakage and must be periodically inspected and tested. To obtain an operating license, applicants must show that the consequences of a steam generator tube rupture would not exceed the NRC's conservative limits for radiation doses offsite or outside the plant (described in the agency's regulations in Title 10 of the Code of Federal Regulations, Part 100). Plant operators also are required to have emergency procedures for mitigating steam generator tube ruptures and leaks. 4. There are more than 100 operating commercial nuclear reactors in USA, with more than 200 steam generators. These steam generator tubes have very little damage compared with San Onofre, (a) Fairewinds states, "Using NRC publicly available data, Fairewinds compared the replacement steam generator plugging at both San Onofre Units 2 and 3 to the replacement steam generator plugging history for all other replacement steam generators at US nuclear power plants. Fairewinds concludes that San Onofre's has plugged 3.7 times as many steam generator tubes than the combined total of the entire number of plugged replacement steam generator tubes at all the other nuclear power plants in the US", and (2) Professor Daniel Hirsch in his report, "Far Outside The Norm: The San Onofre Nuclear Plant's Steam Generator Problems in the Context of the National Experience with Replacement Steam Generators" states, "This report assembles national data from inspections of similar replacement steam generators after one cycle of operation. The conclusion is that both San Onofre Unit 2 and Unit 3 have experienced damage greatly in excess of the typical reactor: (a) The median number of steam generator tubes nationally showing wear after one cycle of operation is—FOUR. San Onofre Unit 2 had 1595 damaged tubes, approximately 400 times the median; San Onofre Unit 3 had 1806, (b) The median number of indications of wear on steam generator tubes nationally after one cycle of operation is—FOUR. San Onofre Unit 2 had 4721, greater than a thousand times more. San Onofre Unit 3 had 10,284, and (3) The median number of steam generator tubes that were plugged after one cycle of operation is—ZERO. San Onofre Unit 2 had 510; Unit 3 had 807.' 'Additionally, the replacement steam generators at San Onofre Unit 2 and 3 suffer from the same fundamental design errors. Indeed, the number of damaged tubes in each unit is approximately the same. The conclusion is clear: San Onofre Unit 2 and Unit 3 are both very ill nuclear plants. Unit 3's fever is slightly higher, but both are in serious trouble. What they are experiencing is not just normal wear due to "settling in" purportedly experienced with similar replacement steam generators. They are far, far outside the norm of national experience. And Unit 2 cannot be said to be acceptable for restart, any more than Unit 3. Unit 2 has hundreds of times more bad tubes and a thousand times more indications of wear on those tubes than the typical reactor in the country with a new steam generator, and nearly five times as many plugged tubes as the rest of the replacement steam generators, over a comparable operating period, in the country combined. Restarting either San Onofre reactor with crippled steam generators that have not been repaired or replaced would be a questionable undertaking at best." 5. The above rules and experience applies only to steam generators, which are expected to operate for the licensed life of the reactor for 40 years in which SG tubes, anti-vibration bars and other supporting structures have been designed to ensure extremely low probability of abnormal tube leakage. With 5 potential tube ruptures projected in less than 9 months based on deterministic analysis and linear benchmarking of Unit 3 SG E-088 tubes failures, San Onofre defectively designed and degraded Unit 2 replacement generators are outside the NORM of the Federal Emergency Preparedness Rules, and Steam Generator Tube Design Regulations. SCE/Intertek APTECH Operational Assessment does not meet the intent of the Federal Regulations, NRC Steam Generator Tube Structural Integrity Criteria, SONGS NRC Approved Technical Specifications, NRC Emergency Preparedness Reasonable Assurance Criteria, NRC Chairman's Standards, NEI 97-06, "Steam Generator Integrity Assessment Guidelines", Electric Power Research Institute, Steam Generator Management Program, and SCE's Overriding Obligation for Public Safety. \*John Large Report critiquing Westinghouse, SCE, MHI and AREVA Reports - His Conclusions: "Whereas the OAs commissioned by SCE broadly agree that the wear mechanics comprises two phases, there are strong differences over the cause of the first phase comprising in-plane AVB wear: AREVA claim this is caused by in-plane FEI whereas, the contrary, Mitsubishi (and Westinghouse) favor random perturbations in the fluid flow regime to be the tube motion excitation cause. Put simply: (i) if AREVA is correct then reducing the reactor power to 70% will eliminate FEI, AVB effectiveness will cease to decline further and TTV will be arrested; however, to the contrary, (ii) if Mitsubishi is right then, even at the 70% power level, the AVB restraint effectiveness will continue to decline thereby freeing up longer free-span tube sections that are more susceptible to TTV; or that, (iii) the assertion of neither party is wholly or partly correct. SCE's assertion that reducing power to 70% will at the best alleviate, but not eliminate, the TTV and other modes of tube and component wear is little more than hypothesis - the supporting Operational Assessments and analyses have not proven it to be otherwise. I am of the opinion that trialling this hypothesis by putting the SONGS Unit 2 back into service will, because of the uncertainties and unresolved issues involved, embrace a great deal of change, test and experiment. The terms of the Confirmatory Action Letter of March 11 2012, are versed such that to meet compliance the response of SCE via its Return to Service Report, must include considerable changes of conditions and procedures that are outside the reference bounds of the present FSAR - this is because the physical condition of the RSGs, and the means by which this is evaluated and projected into future in-service operation, have substantially and irrevocably changed since the current FSAR was approved. The fact that SCE fails to satisfy the requirements of the CAL is neither here nor there, although it illustrates the scope and complexity of the response required. At the time of preparing the CAL, the NRC being well-versed in the failures at the San Onofre nuclear plant, surely must have known that the only satisfactory response to the CAL would indeed require considerable changes, tests and experiments to be implemented. Put another way, the extensive and rapid rates of tube wear experience at the SONGS Unit 2 and Unit 3 RSGs, have necessitated an extensive raft of analysis, assessments and projections to qualify, or otherwise, that Unit 2 is fit for purpose. Not only is this prequalifying work unique to the San Onofre nuclear plant, much of it has never been undertaken before so, it follows, its inclusion in safety considerations must be a new and hitherto unconsidered component now required to be incorporated into an updated version of the FSAR. Hence, I am of the opinion that, on a technical basis alone, the CAL must be considered to have been at the time of its preparation, a de facto license amendment." A Lot More to Come... Thanks NRC Staff... HAHN BABA

comment #73522 posted on 2013-03-12 01:53:58 by richard123456columbia in response to comment #69099

Canadian law puts liability on the contractors and equipment manufacture and if manufacture goes under its all on contractors shoulders. It maybe different for nuclear plants though.

comment #79120 posted on 2013-03-17 19:09:54 by CaptD

==> New Ace Hoffman San Onofre Nuclear animation <http://goo.gl/uyWUA>

comment #82648 posted on 2013-03-25 12:04:49 by HelpAllHurtNeverBaba

Sincere Thanks to Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC posting this blog. San Onofre Billion Dollar Debacle SCE/MHI/NRC Lessons Learnt and Public Awareness Series – HAHN BABA – Please see the previous blog - The following analysis is applicable to San Onofre Units 2 & 3, unless proven otherwise by NRC

Conclusions: Steam generator tubes have a very important safety role because they constitute one of the primary barriers between the radioactive and non-radioactive sides of the plant. For this reason, the integrity of the tubing is essential in minimizing the leakage of water between the two “sides” of the plant. There is the potential that if a tube bursts while a plant is operating, radioactivity from the primary coolant system – the system that pumps water through the reactor core – could escape directly to the atmosphere in the form of steam. Steam generators designers, specification writers and manufacturers have a fiduciary duty to the public and NRC to continuously keep up with the experimental academic research and industry benchmarking pertaining to steam generator tube vibrations during design, manufacturing and testing of steam generators. The MHI-supplied replacement SGs (RSGs) had a number of differences from the OSGs provided by Combustion Engineering. One of the main differences was the substitution of Inconel 690 for Inconel 600 as the tube material. Inconel 690 is more resistant to corrosion than Inconel 600. However, Inconel 690 has a thermal conductivity approximately 10% less than that of Inconel 600. The requirement that the SG’s thermal performance be maintained, in conjunction with maintaining a specified tube plugging margin, necessitated increasing the tube bundle heat transfer surface area from 105,000 ft<sup>2</sup> to 116,100 ft<sup>2</sup> (an 11% increase). The Certified Design Specification SO23-617-01, Rev. 3 stated that SCE intended to use the provisions of 10 C.F.R. §50.59 as the justification for the RSG design, which imposed physical and other constraints on the characteristics of the RSG design in order to assure compliance with that regulation. The RSGs were also required to fit within the same space occupied by the OSGs. The Certified Design Specification issued by SCE also required that MHI incorporate many design changes to minimize degradation and maximize reliability. The fundamental problem was created by the addition of 11% heat transfer surface area (to maintain the same level of thermal performance of 1729 thermal megawatts as OSGs) and high void fraction of 99.6% in the replacement steam generators (RSGs). Reducing the high void fraction of 99.6% would have meant increasing the circulation ratios and reducing the thermal megawatts in the RSGs and profit margins for SCE. If both SCE and MHI would have kept up with experimental academic research and industry benchmarking, they could have foreseen the adverse safety consequences of not making these changes, as we saw what happened to the RSGs. Instead, they rejected these changes by stating, “But each of the considered changes had unacceptable consequences and the AVB Design Team agreed not to implement them. Among the difficulties associated with the potential changes was the possibility that making them could impede the ability to justify the RSG design under the provisions of 10 C.F.R. §50.59. An analysis of the cumulative effects of the design changes including the departures from the OSG’s design and MHI’s previously successful designs would not have resulted in a design change that directly addressed in-plane FEI.” When a NEI Qualified, “US Nuclear Plant Designer” like MHI issues public statement and a Root Cause analysis stating, “The underlying reason for this insufficiency is that the MHI SONGS RSG design did not consider the phenomenon of in-plane FEI because contemporary knowledge and industry U-tube SG operation experience did not indicate a need to consider in-plane FEI”, that is a blatant violation of the US Federal Regulations and Public Trust. Furthermore, it is an admission of negligence, and an insult to manufacturers like Westinghouse/Combustion Engineering and its subcontractors, who build the largest 6 CE replacement generators with the highest steam flows in the world for Palo Verde in 2000 and resolved the problems with Palo Verde Original CE Steam Generators by a combination of design and operational changes. These generators are running fine for more than 8 years with very few reported problems. Based on a review of Item 1, paragraph A through F, HAHN BABA concludes that SONGS Unit 3 RSG AVB restraints were built better than Unit 2 and in conformance with defective SCE specifications. The MHI “effective zero gap” and AVB restraint assembly design concept was effective only against “out-of-plane FEI”. Unit 3 in-plane FEI occurred prior to the out-of-plane FEI, because of high void fractions and high steam flows. However, the MHI designed tube-to-AVB contact force in 2005 to provide restraint in the in-plane direction were ineffective against the required undetermined tube-to-AVB contact forces to generate friction that was necessary to inhibit the large in-plane tube displacements due to more than the double the in-plane velocities than the out-of plane velocities created by void fractions of 99.6%. The high void fractions were created due to very high Unit 3 steam flows, narrow tube pitch to diameter ratio, low tube clearances and a very tall tube bundle. The way the RSGs tube bundle and restraint system was designed (to accommodate extra 11% heat transfer area by change of Tube Alloy Material and RSGs physical restraints imposed at the request of SCE), the untested and unanalyzed out-of-plane FEI restraint system was incapable of restraining in-plane movements created by void fractions of 99.6% or higher irrespective of the zero gaps, small gaps or amount of contact forces generated by the restraint system in the hot and pressurized conditions. The double the Tube-to-AVB contact forces, better supports in Unit 2 created due to manufacturing difference compared with Unit 3 Tube-to-AVB insufficient contact forces, loose supports based on statistical simulations, visual observations and ECT results/ding signals is a conjecture on part of SCE/MHI, because FEI did not occur in Unit 2 based on SONGS Procedures and Westinghouse Operational Assessment. Based on results of NRC AIT reports/inspections, it does not appear that MHI has the skills, technology or tools to build a new anti-vibration restraint system in 2013 for San Onofre RSGs capable of handling FEI at RSGs 100% RTP of 1729 MWts. No wonder, SCE/MHI AVB team could not have done it in 2005? SCE/MHI states, “Tube wear patterns similar to those observed at SONGS Unit 2 were reported at the St. Lucie Unit 2 large U-bend steam generators that were replacements for CE manufactured OSGs. St. Lucie Unit 2 steam generators were designed by AREVA.” According to Professor Daniel Hirsh, “NRC’s Advisory Committee on Reactor Safety concluded that the St.



Lucie 2 tube wear is “different than the form of degradation reported to have occurred at San Onofre. There are a number of design differences between the SGs installed at San Onofre and those at St Lucie 2. Thus, the problems at St. Lucie 2 are not standard “settling in” but due to a serious manufacturing error and unrelated to San Onofre’s problems. It shows you that the SCE/MHI are making misleading statements to confuse NRC/Public and justify restart of damaged Unit 2 with hundreds of damaged and plugged/staked tubes in Unit 2 and an anti-vibration structure not designed for FEI. This damaged anti-vibration structure will most likely collapse during a MSLB due to 100% FEI, flashing feedwater and cause cascading tube ruptures resulting in a nuclear meltdown with devastating radiological effects for Southern California like Fukushima. HAHN Baba has shown you previously, that Unit 2 and Unit 3 RSGs had different operating and thermal hydraulic conditions causing FEI in Unit 3 and No FEI in Unit 2. These conclusions were based on the operating data from SONGS procedures, which is consistent with the data shown in the NRC AIT Report. No FEI in occurred in Unit 2, which is consistent with Westinghouse Operational Assessment. I have discussed in detail previously the impact of FEI, or tube-to-tube wear in Unit 3 and why it happened. To summarize, due to higher RCS pump flows, Unit 3 RSGs were producing 10 MWt more than Unit 2 (1737 MWt versus 1727 MWt) and only 2.5 MWt was required to raise the void fractions from 98.5 to 99.6% in the hot leg side high region of the wear to cause FEI in Unit 3. Unit 2/3 RSGs are rated for 1729 MWt with an instrument error of plus minus 0.58%, meaning if there is a calibration error, RSGs could be actually producing between 1719-1739 MWt. Therefore higher 2.5 MWt in unit 3 is within the upper bound tolerance limit of the instrument error and is consistent with higher Unit 3 RCS flows. This pattern is also consistent with the electricity generation records based on the generator outputs for Units 2 & 3 (SONGS Plant Daily Brief Sheets, Unit 3, 1186 MWt, Unit 2, 1183 MWt, Internet Survey, Unit 3, 1178 MWt, Unit 2, 1172 MWt). It is further assumed, that the balance of 7.5 MWt increased the void fractions in the entire Unit 3 U-tube bundle between 98.5 and 99% increasing the intensity of flow-induced random vibrations, fluid velocities and hydrodynamic pressures compared with Unit 2. SCE and MHI consistently has stated in various reports, that thermal-hydraulic conditions [high steam flows, higher void fractions (99.6%), maximum steam quality (87.6%), higher fluid velocities (28 ft/sec), Maximum Dynamic Pressure (4140 N/m<sup>2</sup>)] in all the RSGs were the same. MHI states that an explanation for the difference severe damage due to FEI in Unit 3 can be attributed to the manufacturing assessment, which concluded that the tube to AVB contact forces in Unit 3 were less than half those in Unit 2. NRC AIT Team states, “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.” I along with and DAB Safety Team and their Expert Panel have discussed the fallacies and inconsistencies of SCE/MHI/NRC AIT Reports in numerous NRC Blogs, San Onofre Papers, Press Releases and Media Reports. Today, for the benefit of NRC Staff, 8.4 Million Southern Californians, various Congressional Committees, and Other/Independent Experts, I will summarize and clarify again the following subjects: 1. Tube to Tube Wear due to in-plane FEI – See Below 2. Tube to AVB Wear (for tubes without free span wear) due to random vibration –To be continued in the NRC Blog 3 Wear at the TSPs (small bend radius tubes and tubes at the tube bundle periphery) –To be continued in the NRC Blog 4. Retainer Bar to Tube Wear due to Flow Induced Vibration–To be continued in the NRC Blog 5. St. Lucie Steam Generators and other topics ... To be continued in the NRC Blog 1. San Onofre Unit 3, Tube to Tube Wear due to in-plane FEI - In-plane FEI in Unit 3 had no precursor, which is based on a review of NRC AIT, MHI, SCE, Westinghouse, AREVA and John Large’s Reports and is summarized below: A. Type 1, tube-to-tube wear occurs when there is tube in-plane motion (vibration) with a displacement (amplitude) greater than the distance between the tubes in the adjacent rows, resulting in tube-to-tube contact. Some of the tubes with tube-tube wear did not experience large amplitude vibrations, but were damaged by tubes that did experience large amplitude vibrations. These tubes also exhibited significant wear at the AVBs and TSPs in addition to the free-span wear. The Type 1 wear pattern was found in the tube free-span sections between or crossing over the AVBs. Type 1 wear can be differentiated from the Type 2 wear by its location on the circumference of the tube. Type 2 wear is located on the sides of the tube that are adjacent to the AVBs while Type 1 wear is located on the extrados or intrados of the tube (the top or bottom of the tube cross section). Type 1 and Type 2 wear can be distinguished from each other by rotating ECT. 160 tubes in each steam generator in Unit 3 with long free-span indications were similar to that found on the leaking tube. The tubes containing the free-span indications were grouped together in a tightly packed zone near the center of the tube bundle. More than half of the free-span indications in each steam generator had maximum measured depths exceeding the 35 percent plugging limit in the technical specifications, and ranged to as much as 99 percent (for the non-leaking tubes). B. Tubes move in synchronous oval orbits, with a major in-plane component and a minor out-of-the plane component. Tubes are assumed to have mostly moved in the in-plane direction because of the observed locations and magnitudes of their wear scars. The wear scars indicate that the tubes were generally vibrating in their first fundamental in-plane mode, which implies that none of the twelve (12) AVB supports were capable of restraining the tube motion. However, either the tubes were not touching the AVBs because of the small out-of-the plane movement, or wear scars at AVB locations may have been too shallow to be evaluated properly and that possible undetected TTW would be less than 5 %TW. C. Based on Dr. Pettigrew’s (2006) and other research papers published in 2011, at the start of the U-bend SGs, the in-plane FEI critical velocity can vary 2.0-2.7 times more than the out-of-plane FEI critical velocity. In 2006 during the early design stages of the San Onofre RSGs, Dr. Pettigrew warned about the ineffectiveness of flat bars against in-plane vibrations. He said in 2013 again that San Onofre RSGs do not provide a positive restraint against in-plane vibrations. AREVA states, “After instability develops, the amplitude of in-plane motion continuously increases and the forces needed to prevent in-plane motion at any given AVB location become relatively large. Hence shortly after instability occurs, U-bends begin to swing in Mode 1 and overcome hindrance at any AVB location” D. While the number of tubes with tube-to-AVB wear without in-plane TTW is greatest at the top of the tube bundle, the number of TTW tubes with tube-to-AVB wear is almost uniformly distributed along the different AVB intersections. If random vibration wear were a precursor for in-plane FEI TTW, then the pattern of AVB wear for TTW tubes should resemble the tube-to-AVB wear pattern (i.e. be concentrated at the top of the tube bundle). However, this is not observed for tubes with TTW. E. While the tube-to-AVB wear depth for tubes without in-plane TTW is greatest at the top of the tube bundle, the tube-to-AVB wear depths for tubes with in-plane TTW is almost uniformly distributed along the AVB intersections. If random vibration wear were a precursor for in-plane FEI wear, then the AVB wear for the tubes with in-plane FEI would be greatest at the top of the U-bends. But for TTW tubes, the average wear depth is almost the same in all AVB support locations and there is no tendency to concentrate at the top of the tube bundle. F. The average 10% of AVB wear depth in Unit 2 and Unit 3 excluding TTW tubes is almost the same. Therefore, if random vibration were a precursor to in-plane FEI one would expect to see a similar number of tubes

with tube-to-tube wear in the two RSG units. G. The primary source of tube-to-AVB contact forces is the restraint provided by the retaining bars and bridges, reacting against the component dimensional dispersion of the tubes and AVBs. Contact forces are available for both cold and hot conditions. Contact forces significantly increase at normal operating temperature and pressure due to diametric expansion of the tubes and thermal growth of the AVBs. H. There are several potential manufacturing considerations associated with review of the design drawings based on Westinghouse experience. The first two are related to increased proximity potential that is likely associated with the ECT evidence for proximity. Two others are associated with the AVB configuration and the additional orthogonal support structure that can interact with the first two during manufacturing. Another relates to AVB fabrication tolerances. These potential issues include: • The smaller nominal in-plane spacing between large radius U-bend tubes than comparable Westinghouse experience. • The much larger relative shrinkage of two sides (cold leg and hot leg) of each tube that can occur within the tubesheet drilling tolerances. Differences in axial shrinkage of tube legs can change the shape of the U-bends and reduce in-plane clearances between tubes from what was installed prior to hydraulic expansion. • The potential for the ends of the lateral sets of AVBs that are attached to the AVB support structure on the sides of the tube bundle to become displaced from their intended positions during lower shell assembly rotation. • The potential for the 13 orthogonal bridge structure segments that are welded to the ends of AVB end cap extensions to produce reactions inside the bundle due to weld shrinkage and added weight during bundle rotation. • Control of AVB fabrication tolerances sufficient to avoid undesirable interactions within the bundle. If AVBs are not flat with no twist in the unrestrained state they can tend to spread tube columns and introduce unexpected gaps greater than nominal inside the bundle away from the fixed weld spacing. • The weight of the additional support structure after installation could accentuate any of the above potential issues. There is insufficient evidence to conclude that any of the listed potential issues are directly responsible for the unexpected tube wear, but these issues could all lead to unexpected tube/AVB fit-up conditions that would support the amplitude limited fluidelastic vibration mechanism. None were extensively treated in the SCE root cause evaluation. I. AVB assembly, which features strongly in the onset of TTW, is clearly designed to cope only with out-of-plane tube motion since there is little designed-in resistance to movement in the in-plane direction - because of this, it is just chance (a virtually random combination of manufacturing variations, expansion and pressurization, etc.) that determines the in-plane effectiveness of the AVBs.

comment #74322 posted on 2013-03-13 21:13:13 by HelpAllHurtNeverBaba

Unit 3 experienced FEI in ~ 1.5% of each RSG tubes due to high heat flux in the hot leg, high steam flows, high void fraction (high dry steam), high velocities, mitsubishi flowering effect, low steam generator pressures, more tubes, narrow tube pitch to tube diameter ratio (Low tube clearances), poor circulation ratios and increase in average length of heated tubes. SCE/MHI and their hired consultants AVB Team as discussed in MHI Root Cause Report due to financial/time pressures and complacency did not benchmark NUREG-1841 (Palo Verde, ANO 2 RSG AVB Designs and Operational Improvements in Circulation ratios for similar CE Replacement Generators as San Onofre) and Dr. Pettigrews warnings in a 2006 research paper warnings about the ineffectiveness of flat bars in preventing in-plane vibrations or fluid elastic instability. SCE/MHI AVB team jointly rejected safety modifications to reduce void fractions for reasons (Avoid NRC Review, Delay in Installation of RSGs, Financial Considerations...) left to the imagination of the readers. Now SCE is bad mouthing MHI, Honorable Senator Barbara Boxer and Congressman Ed Markey plus unnamed Brave NRC Staff for revealing the dark inner secrets of \$1 Billion Dollar RSG Debacle. Unit 2 did not experience FEI due to operational differences. The double contact force Tube-AVB bogus and unconvincing theory in Unit 2, which is attributed to less damage in Unit 2 propagated by SCE with the backing of some Sympathetic NRC Region IV Staff and put forward by pressured MHI is based on hideous testing data to defend restart of "defectively designed and degraded RSGs" for SCE to justify SONGS stay as a base-load and grid voltage stabilizer plant. Rumors are Edison's Obvious Cabinet Connections are adamant on Restart of Unit 2 irrespective of Public Safety Questions and Pressures for Transparency and Accountability in violation of His Excelency, President of United States's Open Government Initiative. This is unacceptable in Democratic America. SCE needs to release 2 years operational data for Unit 2 and one years Operational Data for Unit 3 to independent experts to determine the exact cause of damage in Units 2 & 3. It is easy to preach Public Safety Sermon by SCE but difficult to pass the Public Safety Truth Test. To cover one truth, you have to introduce and invent a new controversy, contradiction and blame everyday. Edison can influence a few with its political connections and money but has to co-exist in harmony and respect with 8.4 Million Southern Californians. Time will tell whether safety and people win, or power and money win in a democratic society, but truth always wins, may be at some undetermined expense.. HAHN Baba Thanks to Honorable Senator Barbara Boxer and Congressman Ed Markey plus unnamed Brave NRC Staff for revealing the dark inner secrets of \$1 Billion Dollar RSG Debacle and NRC for posting this blog.

## Two years after Fukushima: Enhancements to U.S. Nuclear Plants Continue

posted on Mon, 11 Mar 2013 16:02:32 +0000

*David Skeen*  
*Director, Japan Lessons-Learned Directorate*



Today is the second anniversary of the terrible earthquake, related tsunami and the resulting nuclear accident in Japan. Two years ago, the world watched in horror as the tragedy unfolded. Almost from those very first days, the NRC began to focus on learning from the incident to enhance our reactor safety – and to make sure such an incident would never happen here at home. For example, U.S. nuclear power plants are using existing programs to address issues identified during last year's [walkdowns](#), which examined each plant's earthquake and flooding protection features. Our resident inspectors are watching over that work using our Reactor Oversight Process, and we expect to audit approximately 20 plants (10 for earthquake walkdowns and 10 for flooding) in the spring and early summer to ensure the plants remain protected from such hazards. We also continue to work with the plants on their re-analysis of flooding and earthquake hazards. We prioritized the flooding re-evaluations last year, examining several factors to give plants one, two or three years to submit their work. The first set of plants should have their responses in by tomorrow, and we'll review the re-evaluated hazards before issuing a safety assessment for each site. The first set of earthquake hazard re-evaluations, for plants in the central and eastern United States, will be due in September. We'll give those documents a similar review and resulting safety assessment for each plant. The plants have also obtained additional equipment that can help keep the reactor and spent fuel pools cool if normal power sources are lost for extended periods of time, as was the case at Fukushima. This work responds to one of three Orders we issued to U.S. nuclear power plants in March 2012. Every plant provided a status report on complying with those Orders in October 2012, and we've found that all plants appear to be on track to meet the Orders' requirements by the required deadlines. The plants have also recently submitted their integrated approaches to comply with the Orders, and we're reviewing those plans. By the end of April we're also expecting the plants to provide their assessments of how many staff a plant needs to have on hand to respond to a loss of power involving every reactor at a given site. The staff's [latest update](#) to the Commissioners on Fukushima-related activities provides a more detailed look at how each of the NRC Near-Term Task Force's recommendations is being implemented. While all of the Fukushima-related items are important, we've made sure U.S. reactors are paying proper attention to maintaining plant safety, any ongoing work of greater safety benefit or other existing high-priority actions protective of safety.

### Comments

comment #76797 posted on 2013-03-16 13:21:06 by CaptD in response to comment #73432

James, I guess that Germany does not qualify, since they are keeping their lights on, while also phasing out their Nuclear ASAP! Why, because they don't want the RISK of a Trillion Dollar Eco-Disaster like Fukushima and/or the nuclear waste & Health implications nuclear poses... Even the NRC is concerned about San Onofre, since it's almost new replacement steam generators have failed due to their poor in-house design... More here: I think you missed the point that San Onofre's replacement steam generators have major design flaws, they now have more damage than the rest of the US "fleet" combined and one is less than a year old and the other is less than two years old! Edison told ratepayers they would last 18+ years and save them over a Billion Dollars and now about two years later we have PAID 1.3 BILLION DOLLARS (and are still paying 54 million dollars a month) while Edison tries to figure out how to not get stuck with the bill! Edison has sold US a phony bridge, A Bridge To N☛ Energy! So save your rants and name calling for another topic, since there has been a huge amount of Expert comments on this subject, which you seem to ignore.

comment #73678 posted on 2013-03-12 18:08:55 by James Greenidge in response to comment #73583

Gee, my name's no phoney "personna", it's ME! And Google must be funkng on the data-mining front because I've lots more interests online than just spamming nuclear! The anti-nuke hysteria and prejudice here is something to behold. But let's get down to brass tacks about biases vs facts, okay? At the very least ask yourselves that were the anti-nuclear rants of Greenpeace or Arnie and Helen were so factual and true, how come they NEVER come to debate on highly regarded pro-nuclear sites the likes of [atomicinsights.com](#) or [atomicpowerreview.com](#) or [HiroshimaSyndrome.com](#)? Better -- ASK your anti-nuclear champions why not. You'll get crickets. The door's been long open to them to trip pro-nuclears in a lie or untruths. No takers. Their and your move. James Greenidge Queens NY

comment #73614 posted on 2013-03-12 12:25:34 by joy cash in response to comment #73432

More is being revealed about the cozy relationship between NRC & nuclear energy industry. The public's well founded concerns are viewed as bothering nuisances. The abject arrogance in our tax-funded regulatory agency & energy industry is duly noted. The public will not back down from guarding our children's future. This is a new era that has just begun to rock long hidden safety issues.



comment #73583 posted on 2013-03-12 09:44:20 by in response to comment #73432

The NRC is a public agency who is accountable to the public that funds them. Asking for detailed progress reports on tangible changes is a reasonable request. This is an issue between the public and the regulator. BTW, if one google's James Greenidge it shows this screen persona is used solely to spam the internet on news stories and the like with nuclear industry propaganda. It would be more useful if people stuck to the actual regulatory issues rather than harping on whatever philosophical bias they have or calling people names. But this is a tried and true tactic of many industries to try to troll or derail online comments and discussions. If you devolve something into name calling and banal nonsense then the actual issue at hand is no longer being discussed and they hope people will be turned off and not participate in the conversation. The oil industry is well known for employing this tactic.

comment #73523 posted on 2013-03-12 02:07:54 by Aladar Stolmar

A typical whitewashing by NRC, circumventing the real key process of stagnant steam bubble extending down to the core and igniting a firestorm of zirc-water reaction. Zircaloy Mass in Fuel Cladding [kg / lb] 16,465/ 36,300 in the PWR and 40,580 /89,500 in BWR from NRC-2012-0022-0002 and NRC-2012-0022-0003.  $Zr(91) + 2 H_2O(36) = ZrO_2(123) + 2 H_2(4) + 5 MJ/kgZr$  Water required for complete reaction for the PWR  $16,465 * 36/91 = 6513,6$  kg or about 6.5 m3 (available), it produces  $16,465 * 123/91 ZrO_2 = 22,255$  kg zirconium dioxide and  $16,465 * 4/91 = 723.7$  kg Hydrogen and 82,325 MJ heat. For a 10 second firestorm duration it gives 8GW power... or twice the full power of the reactor... Water required for complete reaction for the BWR  $40,580 * 36/91 = 16053,6$  kg or about 16 m3 (available), it produces  $40,580 * 123/91 ZrO_2 = 54,850$  kg zirconium dioxide and  $40,580 * 4/91 = 1784$  kg Hydrogen and 204,250 MJ heat. For a 10 second firestorm duration it gives 20GW power... or five-six times the full power of the reactor... Considering that NRC does not require a top of the reactor depressurization vent to prevent the zirconium firestorm in the reactor, the above back of the envelope calculated worst case scenario should be considered. What I am proposing is a direct rapid depressurization vent allowing the operators to vent the steam directly out of the upper part of the reactor before a stagnant steam bubble would extend down into the core. In the PWR the accumulator injection (ECCS) ports connected to the hot leg side could be utilized for such vent, in the BWR the existing safety relief lines could be rerouted to the vent stack. The use of this rapid depressurization vent is proposed in three cases:(1) the state of the reactor is unknown, (2) the forced circulation through the core is lost or (3) the heat transfer to the ultimate heat sink is severed And please, add these to the existing plants too with sufficient gravity water reserves. And here is my December 15, 2011 letter, a serious answer I'm still waiting for... Dear Director Skeen, Considering the TMI-2, Fukushima Daiichi 1, 2 and 3 reactor severe accidents and the Paks-2 fuel washing vessel incident, also the SFD and other related nuclear reactor fuel severe damage experiments it is evident that the ignition and firestorm of the Zirconium-steam reaction occurs several hours after the severe reduction in cooling capability arises. The attached solution utilizes this time gap and proposes the equipment and response modifications aiming the elimination of ignition of Zirconium-steam reaction in PWR and BWR reactors. Also the same solution deals with the results of such ignition and Zirconium-steam reaction in the maximum extent, in case the ignition despite the efforts occurs. Aiming the public safety in presence of nuclear power plant two questions have to be answered: Do You prevent the ignition of Zirconium in the steam? And Do You protect the surrounding of the plant from radioactive releases in case the entire Zirconium inventory burned in a firestorm? The presented here solution gives positive answers to both questions. The key element of this solution is the rapid reactor depressurization using a top vent from the reactor head. The same will provide a controlled routing for the Hydrogen generated in case the ignition of Zirconium-steam reaction still occurs. Regards, Aladar Stolmar astolmar@gmail.com

comment #73504 posted on 2013-03-11 23:43:34 by joy cash

When we see NRC decommissioning & removing nuclear waste from densely populated areas, we will believe we have learned the lessons Fukushima taught us. Simple enough.

comment #73771 posted on 2013-03-13 08:26:28 by Aladar Stolmar in response to comment #73614

I filed my Safety Concern against the installation of useless Hydrogen re-combiners, based on the erratic computer model of the zirc-water reaction in Westinghouse, with NRC knowledge (and objection) about 25 years ago. Yes. It is a long suppressed (hidden?) safety issue... And the stress tests were conducted after Fukushima concluded that the installed re-combiners can handle the calculated by the same erratic codes Hydrogen releases... How many more severe accidents NRC wants, before allows the consideration of the real process?!

comment #73459 posted on 2013-03-11 18:22:52 by Fred Stender in response to comment #73074

I agree, I request a detailed and specific report on what has actually been completed, and timelines for the rest of the requirements. I am feeling like a long tailed cat in room full of Carrington events.

comment #73432 posted on 2013-03-11 17:59:51 by James Greenidge

Re: "This is all really not acceptable." Nothing nuclear will EVER be "acceptable" to implacable idealistic greens with pitchforks and torches out for nuclear plants, so why come here if one doesn't intend on constructive criticism but really to slur and dump on the efforts and projects of hard working administrators and engineers with families they care about to hone proven clean and reliable and safe a power source that has -- even in its worst accidents worldwide over sixty years -- a mortality and damage score light-years from any other industry? You all act as though no one else sees the "Doomsday" kinks and flaws you do and are happily glossing over them solely for old man profit, which is pretty disingenuous toward the talents and intelligence and humanity of nuclear workers and

engineers. I tire of carping critics with philosophical anti-nuclear beefs and who don't have a wilt of responsibility for keeping the lights on and factories running and homes warm. The NRC and nuclear "industry" have their moments, but my hat's off toward their professionalism and record of accomplishment and vigil on cleanly delivering real-life vital goods despite adversaries of fear, ignorance and prejudice. James Greenidge Queens NY Thanks atomicinsights.com! And no, I don't get a penny from anyone or anything nuclear. Wish I did!

comment #73093 posted on 2013-03-11 13:00:20 by CaptD

Since the NRC is in Nuclear Denial and shrugs off the realization that all land based reactors are at risk, the American people are left holding their breath, hoping they will continue to be "LUCKY" that nothing bad happens, just so the nuclear Industry can profit! The USA should be "racing" Germany toward a non nuclear future and decommissioning our oldest reactors instead of giving them 20 year life extensions! \* <http://is.gd/XPjMd0> The illogical belief that Nature cannot destroy any land based nuclear reactor, any place anytime 24/7/365!

comment #73074 posted on 2013-03-11 12:33:13 by Lilly

This is all really not acceptable. The detailed report shows no actual physical changes have been done anywhere. Has any equipment been retrofitted yet? Additional equipment brought on site at a plant? What and where? A specific list of physical safety implementations for each plant as a progress report would be much more useful than updates about meetings and throwing things into long term consideration rather than actually doing something.

## Fort Calhoun: A Status Update

posted on Tue, 12 Mar 2013 17:02:12 +0000

*Lara Uselding*  
Public Affairs Officer, Region IV

The NRC will hold a public meeting March 27 to discuss the status of the [Fort Calhoun nuclear plant](#), located 19 miles north of Omaha. As many know, the plant has been shut down since April 9, 2011, for a refueling outage. The outage was extended due to historic flooding along the Missouri River followed by an electrical fire that led to an "Alert" declaration and further restart complications. We'd like to bring readers up to speed on where we are since January's [blog update](#) and share four new updates. First, the NRC recently revised the [Confirmatory Action Letter](#) (CAL) we originally issued in June 2012, outlining actions Omaha Public Power District (OPPD) had agreed to do before restarting the plant. The revisions added three categories to the restart checklist – OPPD will address containment internal structure issues, the use of Teflon seals on electrical cables passing through containment, and several event reports involving recently identified equipment problems. This was followed by an update to the detailed 450+ action item list known as the basis document to reflect the three new CAL categories. After conducting independent verification of OPPD's work, the NRC has closed more than 100 items on the basis document list, although none of the 18 restart checklist categories have been closed. The third update is that a 15-member NRC inspection



team led by a veteran Senior Resident Inspector Greg Warnick, stationed at another plant, has been on site conducting a thorough inspection and independent verification of Fort Calhoun's current safety status. The team inspection will provide the NRC a real sense on how much progress OPPD has made in preparing plant systems, structures, components, people and processes for restart. The inspectors are using the basis document's 450+ items as their guide. Fourth, an [inspection report](#) issued yesterday, lists two NRC-identified issues, including a failure by OPPD to get NRC approval before making changes to the plant's flood protection strategy. Inspectors also identified that OPPD failed to address a 2012 violation involving six sluice gates and motors that control the flow of water from the Missouri River into the plant's cooling system. By not following the process to classify these sluice gates as safety related, the intake structure may not properly protect the cooling water system and pumps during a flood. The public is encouraged to join us in Omaha for the [meeting](#) where the NRC staff will be available to answer questions about these topics.

### Comments

comment #79773 posted on 2013-03-19 10:26:31 by john bowers

What was the cooling water level and cooling water temperature of the spent fuel pool during the electrical problem? Was there release of any radioactive pollution as a result of the problem? Are the pumps for the cooling system submersible pumps? Is the electrical system submersible? Why was there a keep out radius for the public during the electrical problem aftermath? Were any citizens allowed within the radius to make independent measurements for radioactivity? Please answer these questions. The Fort Calhoun NPP and its spent fuel pool are a great danger to the entire Corn Belt.

comment #79555 posted on 2013-03-18 14:11:51 by in response to comment #79538

This does not explain why the NRC and OPPD are both keeping the 2nd geo-testing report from the public. People were not asking for the NRC's final determination on the issue, they were asking for the actual report that both NRC and OPPD have in their possession and seem unwilling to share with the public.

comment #79538 posted on 2013-03-18 13:27:35 by Moderator in response to comment #76564

The Karst formations are part of the ongoing geotechnical review by the NRC. Geotechnical is one of over 450+ items on the CAL that must be closed out prior to restart. This information is still being reviewed by senior geotechnical experts at the NRC and will be used to determine if that item can be closed on CAL. Lara Uselding

comment #76347 posted on 2013-03-14 12:26:24 by LillyMunster in response to comment #73905

The public KNOWS OPPD and the NRC are just outright lying about this second report not being available. It is done and in the possession of both OPPD and the NRC. There is absolutely no reason for it not to be made public. It is bound by OPPD & state open records laws to be on their end. It is bound by US open records laws and the existing FOIA Beyond Nuclear has on the NRC's end. One of the two parties needs to give the public a copy of this report. The NRC's mandate is public safety, not industry promotion/protection. Provide a copy of the report. We don't need the NRC's final opinion of the report in order to be allowed to look at it.

comment #76564 posted on 2013-03-15 09:22:38 by

I would like to know if the Karst formations (limestone crumbling into gravel) - where the pillars of the plant are anchored - we are lead to believe - have in fact gotten worse with the flooding. This is only natural to assume since hydrological conditions play a big factor in the creation of those formations. The chosen build site was significantly worse than the original site and now we apparently have a cover up on the second report - what gives? NRC - post a link to that report on this BLOG!!!!!!!!!!!!!!!!!!!!!!

comment #81141 posted on 2013-03-20 10:33:57 by Moderator in response to comment #79773

In answer to your questions: The spent fuel cooling pool level was in its normal range. The temperature was approximately 80 degrees. There was an approximate 5 degree increase in temperature in the approximately 4 hours the cooling pumps were without power. There was no release of radiation. No, neither the pumps nor the electrical system are submersible. I am unfamiliar with the term "keep out radius," but there were no restrictions for public access before or after the event. As you may know, there is main Highway 75 running in front of the plant and the site is visible from the road. The electrical fire did not prevent the public from normal access in any radius around the Owner Controlled Area, nor prevent citizens from independently measuring radiation. Lara Uselding

comment #76265 posted on 2013-03-14 08:03:50 by SafetyAdvocate

Anonymous, you are mistaken. The latest NRC inspection report cites OPPD's continued, long-standing failure to come into compliance regarding Fort Calhoun's current design-basis external flooding event—protection up to 1,014 feet mean sea level. As early as June 2010, the NRC cited Fort Calhoun's failure since 2003 to take appropriate corrective actions to maintain its external flooding design basis. See IR 2010007, reported July 15, 2010, ML101970547. Several NRC inspection reports since have continued to point out this deficiency at Fort Calhoun in its various permutations.

comment #76385 posted on 2013-03-14 15:44:25 by Anonymous

To SafetyAdvocate: Please reread my comment, I am talking about the \*original\* design basis flood level, not the 1014 feet which was developed well after the plant was constructed. Even back in 1967 we were not so foolish as to establish the plant grade (near 1004 feet, as I recall) at ten feet below the flood elevation. Once the plant is sited and built, the Army Corps of Engineers may revise or update their studies, but you can't jack the plant up. Adopting new procedures and other temporary measures to deal with a changing design basis should not be penalized.

comment #73625 posted on 2013-03-12 13:25:36 by LillyMunster

Is the NRC going to address the geo-testing issues? Will the second geo-testing report that looked under the reactor building and aux building foundations be made public? The public deserves some real answers about this.

comment #73666 posted on 2013-03-12 16:59:03 by Fred Stender

I am sick and tired of these nuclear operators totally disrespecting the NRC

comment #73905 posted on 2013-03-13 18:56:35 by Mike Ryan

On October 30, 2012 I requested both the first and second geo-tech reports from OPPD as I am allowed to do under our Nebraska Open Records Act. We were told at the April 2012 NRC meeting in Blair by the Ft. Calhoun plant manager that the first report, done by HDR, was in and that it showed the flood of 2011 did no harm. Later, at the July 2012 NRC meeting this same individual denied that this first report was completed. At the September 2012 meeting in Blair, OPPD stated that the first geo-tech report would be available on September 18 with the second report due on September 28. Around the first or second week in October I was informed by a NRC whistle-blower that both reports were finished and the long awaited second report was currently being reviewed by staff engineers at the Region 4 office in Texas. On November 5, 2012, I received an email from OPPD saying that the HDR report was available for inspection along with the following comment about the second report--"While that was scheduled to be issued on September 28th, there has been a delay from the vendor. We expect the report to be issued in final form in the near future. Once



OPPD receives the final report we will contact you so you can review that document as well." They said this even though I told them that I knew the second report was done and was being reviewed by Region 4. So why is everyone who has a copy of this second report trying to keep the public from seeing it? I understand that it is on a disc, so send me the CD and I'll give you 2 blank ones in return. I don't need to hear that the NRC can't do it--just send it. You can send it to Paul Gunter at Beyond Nuclear if you prefer, because it falls within his FOIA request to the NRC from last May or June for all materials that relate to the 2011 flooding at FCS. So far the NRC FOIA folks at NRC headquarters have not honored his request. We in the public know that we have been lied to and are still being lied to. What are you trying to hide from us? We don't need for you to waste our tax dollars feeding us a bunch more bureaucratic BS about how you can't deliver the report. Just provide the public with the second report--PERIOD!

comment #73824 posted on 2013-03-13 14:13:44 by Moderator in response to comment #73797

You would need to ask the plant directly for a copy of the report, as it's not the NRC's report. But be assured that we will release our independent inspection results as soon as we've completed the work. Lara Uselding

comment #73797 posted on 2013-03-13 10:41:41 by in response to comment #73793

The second report is done and both OPPD and NRC have copies of it yet this information is still not being shared with the public. The public has a right to see the actual second report from the geo-testing firm.

comment #73788 posted on 2013-03-13 09:59:17 by Anonymous

The way I read that inspection report, the NRC is beating OPPD up for making improvements to their strategy for responding to flooding that exceeds the original design basis flood for the plant. That just doesn't make sense to me.

comment #73793 posted on 2013-03-13 10:32:01 by Moderator

The NRC has discussed this topic at previous public meetings and videos of these discussions are available online here: <http://www.nrc.gov/info-finder/reactor/fcs/special-oversight.html>. Also, geotechnical studies are an item in the Confirmatory Action Letter and must be addressed before restart. The licensee has completed nearly 18 months of extensive geotechnical studies to thoroughly analyze the effects from the 2011 floods at the site. A third-party review of this information has been completed and supports the professional consulting firm's report. It has also received an extensive review by geotechnical experts in the NRC. A second professional firm has been hired by OPPD to do some additional analysis. This information is still being finalized by the consultant and will be reviewed by senior geotechnical experts at the NRC. The information on the NRC inspections and findings will be publicly available. Lara Uselding

## Looking to Hear From the Public on the FY 2013 Proposed Fees

posted on Thu, 14 Mar 2013 16:10:22 +0000

*Arlette Howard*  
*Fee Policy Analyst*  
*Office of the Chief Financial Officer*

It's that time of the year, when we ask the public for their comments about proposed changes to our fees. The NRC is required by law to



recover approximately 90 percent of our budget through fees. Each year, the NRC publishes a proposed regulation establishing fees for the upcoming year to recoup the costs of regulatory services performed by the NRC. There are two types of fees the NRC charges. One is an hourly rate and flat application fees, and the other is an annual fee. Both types of fees recover the costs of regulating the commercial use of radioactive materials. Hourly fees recover the costs of providing specific services to individual licensees (or potential licensees) such as reviewing applications and performing inspections. Annual fees recover all costs associated with regulatory activities that benefit all licensees. For fiscal year 2013, the NRC's estimated budget is about \$1 billion. Based on this amount, the NRC must recover about \$925 million through fees by Sept. 30. In our regulations, approximately 40 percent of the fees will be billed for licensee-specific services and the remaining 60 percent will be billed as annual fees. The proposed fee rule includes several changes. First, we are proposing to change the current hourly rate from \$274 to \$277. Secondly, we would revise the flat license application fees (found in our federal guidelines 10 CFR Parts [170.21](#) and

[170.31](#)) to reflect the new hourly rate. And, finally, we propose to revise the annual fees to recover the costs of providing regulatory services that benefit all classes of licensees. The annual fees would increase for spent fuel storage facilities, research and test reactors, fuel facilities, most material users and uranium recovery facilities licenses and would decrease for operating reactors and U.S. Department of Energy transportation licenses. We will continue to keep our fees as low as possible by ensuring our programs are conducted efficiently and effectively, and requesting from Congress only resources necessary to perform our mission. We're taking comments through April 8. To do so, go to [www.regulations.gov](http://www.regulations.gov) and use Docket ID NRC-2012-0211. For more information, go here: [NRC Plans, Budget and Performance](#).

### Comments

comment #81151 posted on 2013-03-20 12:10:29 by Moderator in response to comment #76344

Yes, the \$277 hourly rate does include agency overhead, which includes hours spent responding to FOIA requests. The hourly rate does not affect FOIA rates, which are established by our agency in compliance with Office of Management and Budget policy, Freedom of Information Reform Act of 1986 and Title 10 of the Code of Federal Regulations Part 9, "Public Records," which allows federal agencies to collect fees for duplication, search and review time spent on FOIA requests. Arlette Howard, Fee Policy Analyst

comment #82261 posted on 2013-03-23 16:20:00 by CaptD in response to comment #81151

Arlette, Could you please post a link that list those fees and how they are calculated. Thanks in Advance!

comment #82259 posted on 2013-03-23 16:16:38 by CaptD

It is great that the NRC is allowing folks to post very technical comments on these blogs, especially since they are concerning SAFETY. What would even be better is if different people within the NRC, the NRR and or the ACRS actually posted comments about these technical comments, if only to say Thank You, because it is obvious that "SOME" experts are NOT charging (the NRC) the same hourly rate of \$274, (soon to become \$277) for their time that the NRC now charges!

comment #76344 posted on 2013-03-14 12:16:30 by Garry Morgan

Does the \$277 per hour fee include research required for Freedom of Information Act (FOIA) requests? Could you please explain how this fee rate will affect FOIA requests.

comment #76361 posted on 2013-03-14 13:14:25 by garyheadrick

How much of these fees are paid by the licensee vs ratepayer (or does it all come back to the ratepayer eventually)?

comment #76366 posted on 2013-03-14 13:34:04 by CaptD

The problem is that when the public submits an allegation it is too often completely ignored despite being factual and well researched. Since the NRC can "pick and choose" what they decide to "work" on, this leaves the NRC able to "work" on the easy things and get paid for doing it, from the Industry they are supposed to regulate. Here is a great example: The NRC just assessed San Onofre 2 & 3 "as needing to resolve one or two items of low safety significance," WHICH IS A BAD NUCLEAR JOKE on US, considering Unit 3 has completely failed in less than a year by leaking radiation and can't be operated again because of the unprecedented 8 tube failures during in-situ pressure testing along with other damage and Unit 2 replacement steam generator less than 2 years old is the subject of the biggest technical investigation in modern times due to its SCE's design and operation! Even the NRC and now subsets within the NRC like the NRR and others are still trying to understand exactly what happened to cause the damage. BTW: One of its tubes had 90 wear and it was found because it just happened to be shut down for refueling! <http://www.nrc.gov/reading-rm/doc-collections/news/2013/13-013.pdf> San Onofre Unit 2 and Unit 3 have given the NRC (and the nuclear industry) a pair of BLACK EYES, yet the NRC rates them as just having a few "Low safety" issues! How about the NRC charging 10 Million Dollars for each safety violation giving 1% to the person that identified the issue ,then we might see some real enforcement instead of just more "good old boy meetings" where everyone eats good and then smiles for the cameras...

comment #79498 posted on 2013-03-18 12:02:35 by Moderator in response to comment #76361

Based on the Omnibus Budget Reconciliation Act of 1990 (OBRA-90), as amended, the NRC is required to collect 90 percent of its appropriation through the collection of fees assessed to licensees and not ratepayers. Since the NRC is a regulatory agency, the NRC does not determine factors such as NRC fees that utility companies may use to establish utility rates for customers; therefore, we suggest you contact your local utility company for this information. Arlette Howard, Fee Policy Analyst

## Inspector General Report Identifies Ways to Improve NRC's Occupational Training Program

posted on Mon, 18 Mar 2013 17:31:12 +0000

*Stephen Dingbaum*  
Assistant Inspector General



The NRC's [Office of the Inspector General](#) (OIG) is an independent, objective office tasked with auditing NRC programs and operations with a focus on -- among other things -- detecting fraud, waste, abuse and mismanagement. The office's most recent [report](#) -- an Audit of NRC's Safety Training and Development for Technical Staff -- is now available to the public. The audit set out to determine if NRC's process for identifying safety training needs efficiently and effectively prepares staff members to perform their regulatory oversight activities. OIG found that NRC rarely conducted occupational training needs assessments for staff positions responsible for performing safety oversight activities. And, the needs assessments that the agency had prepared were not formally reviewed on a defined basis. By conducting occupational training needs assessments on a defined basis, the NRC can provide safety training to staff in a more efficient and effective way. OIG's audit report makes recommendations to improve the agency's safety-related training program. NRC management stated their general agreement with the audit report and recommendations. The audit report, including recommendations, can be found [here](#).

#### Comments

comment #81680 posted on 2013-03-22 08:27:35 by

Clarification of what constitutes a NRC "safety oversight activity" is necessary to understand the scope of the OIG finding/recommendation. Please provide details on specific staff positions impacted, a list of excluded staff functions, or a definition of "safety oversight activity", to help me (and those like me) better understand the scope and potential impact of the OIG finding. Thank you.

comment #82673 posted on 2013-03-25 13:00:10 by Moderator in response to comment #81680

The scope of this report is NRC's workforce overseeing licensee performance. Please see page 1 of the report for additional information. Also, beginning on page 12 of the report, we describe our objective, scope and methodology. Stephen Dingbaum

## NRC Commission Approves More Post-Fukushima Upgrades to Nuclear Plants

posted on Tue, 19 Mar 2013 20:10:46 +0000

*Scott Burnell*  
Public Affairs Officer



The NRC has already ordered numerous upgrades to nuclear power plant safety based on what we've learned about the Fukushima nuclear incident in 2011. Now, the NRC's Commission is doing more. They have just approved a two-track approach for additional improvements to systems at 31 U.S. reactors that would vent pressure during accidents. The Commission's decision is outlined in a [Staff Requirements Memorandum](#). It provides details about the decision, but this is the bottom line: the NRC will issue an Order requiring stronger venting systems and will use the agency's rulemaking process to consider the best approach by which these 31 reactors can keep radioactive material from the environment during a severe accident. Some background: Some of the U.S. reactors that are similar to the Fukushima Dai-ichi plant have [vents](#) that reduce pressure during an accident and keep water flowing to the reactor to cool the fuel. The venting systems at Fukushima played a role in their nuclear crisis, and the NRC, last March, issued an [Order](#) to the 31 plants with similar



designs to take action. The plants either had to install vents or improve their existing venting system. The goal was to make sure the vents can operate during the early phases of an accident, even if the plant lost all power for an extended time. In their latest decision, the NRC Commission votes to further strengthen these vents. The NRC staff has 60 days to finalize an Order for these enhancements. Generally speaking, these additional requirements mean the vents could handle the pressures, temperatures and radiation levels from a damaged reactor, and that plant personnel could operate the vents under these conditions. As part of the same decision, the Commissioners directed the staff to begin a formal rulemaking on filtering methods that would prevent radioactive material from escaping containment in an accident, either through new filter systems or a combination of existing systems. The staff will develop the technical analysis, a proposed rule and then a final rule. Throughout this process, the public and various stakeholders will have opportunities to submit comments and attend meetings to ask questions. And there will be many future posts about the progress!

## Comments

comment #82927 posted on 2013-03-26 11:24:03 by Moderator in response to comment #82786

The NRC's actions regarding vents are currently limited to the 31 U.S. reactors with designs most similar to those at Fukushima. These designs have smaller structures for containing the effects of an accident, and the agency's actions will enhance the ability of these structures to safely release pressure and maintain their ability to keep radioactive material out of the environment. Other U.S. reactor designs have larger containment structures that allow more time for nuclear plant operators to prevent radioactive material from getting out into the environment if an accident occurs. Even so, the NRC plans to review these other containment designs when our technical experts have completed their work on the plants that are similar to the Fukushima units. Scott Burnell

comment #79828 posted on 2013-03-19 16:29:38 by Diane

Is Diablo Canyon in CA one of the 31 plants on the list to receive the new vents?

comment #79830 posted on 2013-03-19 16:53:45 by Gary Headrick

This is a step in the right direction but it also leaves a bigger question. If the NRC's first priority is safety, then why would you allow any plant to continue operating when you know that it is not adequately protected? Does the NRC have an obligation to keep plants running or do you operate specifically on the basis of safety? In a similar line of thinking, why are things taking so long to move spent fuel from pools to Hardened On Site Storage? One would hope that preventing a Fukushima-like disaster would be your only consideration. Isn't this something that staff recommended to take place ASAP? I understand it will not even be considered for another 6 years. At San Onofre in particular, 8.5 million people live within harms way if we get the long overdue mega-quake that everyone is expecting. I'm sure that there are tremendous financial pressures for the status quo, but they must be weighed against the unimaginable impact for generations to come on public health and economy of California and the rest of the country for that matter. I know that if it was my responsibility to act in ways to protect the public and the environment for generations to come, I would not allow for any such risk regardless of what the utilities say or do. This is a race against time. Let's not waste the opportunity to do something about this before it is too late.

comment #79834 posted on 2013-03-19 17:00:54 by CaptD

One would think that the Industry itself would be trying to "fact track" these safety improvements rather than waiting to see how they can getaway with spending less of their ratepayers money when the cost of a Fukushima is about a Trillion Dollar Eco-Disaster, which the Country and the Industry cannot afford! For all those in Nuclear Denial\* that think a Trillion Dollar Eco-Disaster is too high, check out what the latest French report says: French Nuclear Disaster Scenario Was So Bad The Government Kept It Secret <http://www.businessinsider.com/potential-cost-of-a-nuclear-accident-so-high-its-a-secret-2013-3> snip: Catastrophic nuclear accidents, like Chernobyl in 1986 or Fukushima No. 1 in 2011, are, we're incessantly told, very rare, and their probability of occurring infinitesimal. But when they do occur, they get costly. So costly that the French government, when it came up with cost estimates for an accident in France, kept them secret. But now the report was leaked to the French magazine, Le Journal de Dimanche. Turns out, the upper end of the cost spectrum of an accident at the nuclear power plant at Dampierre, in the Department of Loiret in north-central France, amounted to over three times the country's GDP. Hence, the need to keep it secret. The study was done in 2007 by the Institute for Radiological Protection and Nuclear Safety (IRSN), a government agency under joint authority of the Ministry of Defense and the Ministry of Environment, Industry, Research, and Health. With over 1,700 employees, it's France's "public service expert in nuclear and radiation risks." This isn't some overambitious, publicity-hungry think tank. It evaluated a range of disaster scenarios that might occur at the Dampierre plant. In the best-case scenario, costs came to €760 billion—more than a third of France's GDP. At the other end of the spectrum: €5.8 trillion! Over three times France's GDP. A devastating amount. So large that France could not possibly deal with it. Remember as of today: 1 Euro equals 1.29 US Dollars \* <http://is.gd/XPjMd0> The illogical belief that Nature cannot destroy any land based nuclear reactor, any place anytime 24/7/365!

comment #81739 posted on 2013-03-22 10:28:56 by Aladar Stolmar in response to comment #81678

I did submit my concern, again. I'm concerned that the NRC is not accepting the real processes of rapid heat-up and ignition of firestorm of zirconium-steam reaction once a stagnant steam volume descends down into the core and pushes instead for Hydrogen re-combiners and filtered vents which could be useful only after the damage of the fuel. I want to change the NRC thinking and prevent the core damage with a rapid depressurization vent directly from the upper volume of the reactor - in order to prevent the stagnant steam volume to ever extend down into the reactor core -, and provide passive staged water injection reserves all the way down to the gravity injection - in order to provide continuous cooling all the way until a secure cold shutdown is achieved. This

injection should flow from below the reactor core toward the top volume opened to environment. (Through filtration, indeed...)

comment #81678 posted on 2013-03-22 08:18:19 by Moderator in response to comment #81010

Our actions regarding Fukushima's lessons learned have further reduced the already very small possibility of accident conditions leading to a steam/zircaloy reaction. All of our new venting-related requirements for Mark I/II BWRs help ensure that water can get to the reactor core during an accident from a variety of engineered safety systems. In addition, the NRC's "mitigating strategies" requirements will ensure that portable pumps and other equipment necessary to provide cooling water to a reactor, even after a major quake or flooding event, are available to support every U.S. reactor's installed safety equipment. The NRC staff will follow the Commission's latest direction in further exploring ways of limiting the release of radioactive materials during venting, even after core damage has occurred. If you have further concerns, please submit your letter to [JLD\\_Public.Resource@nrc.gov](mailto:JLD_Public.Resource@nrc.gov) for consideration. Scott Burnell

comment #81677 posted on 2013-03-22 08:16:42 by Moderator in response to comment #79830

As the NRC considers all the systems and procedures in place both to prevent accidents and mitigate them if they do occur, we continue to conclude U.S. reactors can operate safely. The Commission's decision involves enhancing what's already acceptable at Mark I and II designs, not only through filtration but also by enhancing the plants' capabilities to deal with other aspects of a nuclear accident. We're taking the necessary time to seek input on that comprehensive approach from the public, nuclear industry, and other key stakeholders through our comprehensive rulemaking process. The staff continues its examination of the issues involved in a potential accelerated transfer of spent fuel to dry casks. The staff updated the Commission on that topic and the remainder of the Fukushima lessons-learned activity on Feb. 14 (<http://www.nrc.gov/reading-rm/doc-collections/commission/secys/2013/2013-0020scy.pdf> -- spent fuel transfer is discussed in Enclosure 1, page 14 of the PDF). Scott Burnell

comment #81010 posted on 2013-03-20 06:42:09 by Aladar Stolmar

Another whitewashing attempt by NRC, circumventing the real key process of stagnant steam bubble extending down to the core and igniting a firestorm of zirc-water reaction. Zircaloy Mass in Fuel Cladding [kg / lb] 16,465/ 36,300 in the PWR and 40,580 /89,500 in BWR from NRC-2012-0022-0002 and NRC-2012-0022-0003.  $\text{Zr (91)} + 2 \text{ H}_2\text{O (36)} = \text{ZrO}_2 (123) + 2 \text{ H}_2 (4) + 5 \text{ MJ/kgZr}$  Water required for complete reaction for the PWR  $16,465 * 36/91 = 6513,6 \text{ kg}$  or about 6.5 m3 (available), it produces  $16,465 * 123/91 \text{ ZrO}_2 = 22,255 \text{ kg}$  zirconium dioxide and  $16,465 * 4/91 = 723.7 \text{ kg}$  Hydrogen and 82,325 MJ heat. For a 10 second firestorm duration it gives 8GW power... or twice the full power of the reactor... Water required for complete reaction for the BWR  $40,580 * 36/91 = 16053,6 \text{ kg}$  or about 16 m3 (available), it produces  $40,580 * 123/91 \text{ ZrO}_2 = 54,850 \text{ kg}$  zirconium dioxide and  $40,580 * 4/91 = 1784 \text{ kg}$  Hydrogen and 204,250 MJ heat. For a 10 second firestorm duration it gives 20GW power... or five-six times the full power of the reactor... Considering that NRC does not require a top of the reactor depressurization vent to prevent the zirconium firestorm in the reactor, the above back of the envelope calculated worst case scenario should be considered for designing the filtered vents. What I am proposing is a direct rapid depressurization vent allowing the operators to vent the steam directly out of the upper part of the reactor before a stagnant steam bubble would extend down into the core. In the PWR the accumulator injection (ECCS) ports connected to the hot leg side could be utilized for such vent, in the BWR the existing safety relief lines could be rerouted to the vent stack. The use of this rapid depressurization vent is proposed in three cases:(1) the state of the reactor is unknown, (2) the forced circulation through the core is lost or (3) the heat transfer to the ultimate heat sink is severed And please, add these to the existing plants too with sufficient gravity water reserves. And here is my December 15, 2011 letter, a serious answer I'm still waiting for... Dear Director Skeen, Considering the TMI-2, Fukushima Daiichi 1, 2 and 3 reactor severe accidents and the Paks-2 fuel washing vessel incident, also the SFD and other related nuclear reactor fuel severe damage experiments it is evident that the ignition and firestorm of the Zirconium-steam reaction occurs several hours after the severe reduction in cooling capability arises. The attached solution utilizes this time gap and proposes the equipment and response modifications aiming the elimination of ignition of Zirconium-steam reaction in PWR and BWR reactors. Also the same solution deals with the results of such ignition and Zirconium-steam reaction in the maximum extent, in case the ignition despite the efforts occurs. Aiming the public safety in presence of nuclear power plant two questions have to be answered: Do You prevent the ignition of Zirconium in the steam? And Do You protect the surrounding of the plant from radioactive releases in case the entire Zirconium inventory burned in a firestorm? The presented here solution gives positive answers to both questions. The key element of this solution is the rapid reactor depressurization using a top vent from the reactor head. The same will provide a controlled routing for the Hydrogen generated in case the ignition of Zirconium-steam reaction still occurs. Regards, Aladar Stolmar

comment #82975 posted on 2013-03-26 16:41:58 by Diane in response to comment #81130

Thanks for the answer, Scott.

comment #81130 posted on 2013-03-20 09:45:50 by Moderator in response to comment #79828

No, it is not. It is a pressurized water reactor. Scott Burnell

comment #81136 posted on 2013-03-20 10:14:35 by William

As go the banks, so goes the nuclear Industry. Regulating in the service of public protection and public safety is trumped by the industries' economic health and survival. The NRC is just another regulatory agency influenced, captured and controlled by the

industry it's supposed to regulate. Not filtering the vents rationalized by a "cost benefit analysis" weighing public safety against the black ink on a corporate balance sheet says it all. Accidents on the order of Fukushima are acceptable risks. Easy to say when the profits are privatized and the risks are socialized.

comment #82786 posted on 2013-03-25 20:01:50 by Canon

If these new vents are so helpful then why aren't all the plants going to be upgraded to using them?

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## Taking an Updated Look at a Potential Accident's Economic Consequences

posted on Wed, 20 Mar 2013 20:13:46 +0000

*Rich Correia*  
*Director, Division of Risk Analysis*  
*Office of Nuclear Regulatory Research*

The NRC's review of new reactor licenses, renewal of existing licenses or major changes to our safety regulations involves an analysis of the impacts of potential accidents. Long before the 2011 accident at Fukushima, these analyses included the possibility of radioactive contamination causing economic harm, such as by making land unusable. Now, the Commission -- after considering recommendations from the agency's technical and legal staff -- has [directed](#) the NRC staff to update our guidance on considering economic consequences. Property damage, business losses and other accident effects were a regular part of our public conversations last year as the NRC began implementing the lessons learned from the Fukushima accident. Subsequently, we decided to review the agency's current economic consequence analysis and consider options for possibly changing the process. In following this Commission-directed update, the agency will examine the information used in comparing the costs and benefits of a potential safety rule change or nuclear power plant modification. For example, we'll revise the costs of replacing a damaged reactor's electricity output, since generation and transmission markets have been deregulated in some cases. We'll also consider how changes in Federal Energy Regulatory Commission rules have affected transmission costs. We'll revise our guidance for economic consequences costs based on up-to-date data and what we've learned from recent and ongoing accident analysis (such as last year's State-of-the-art Reactor Consequences Analyses). Following the Commission's direction, we're going to develop a follow-on paper that describes and assesses for Commission consideration potential changes to our cost-benefit analysis guidance. We'll be holding a public meeting in the near future as part of this process, so members of the public and other interested parties can hear the staff's plans, ask questions and provide comments to the staff. The Commissioners' individual [votes](#) on this decision are available on the NRC website.

### Comments

comment #81523 posted on 2013-03-21 19:14:03 by john bowers

Nuclear power takes lands of milk and honey, and turns them into lands of radioactive milk and radioactive honey which will kill people who ingest them, and cause birth defects in children for generations. How close did the U.S. Corn Belt come to being Fukushima'ed in June 2011? The public has the idea plants can't explode, but so far the two supercatastrophes of Chernobyl and Fukushima both involved explosions, the latter with a dirty brown mushroom cloud with what appeared to be fuel rods falling back out. Sooner or later a supercatastrophe happens so the risk is 100%. The cost is beyond price, as 'they are not making land anymore'. Then there is the 'routine emission' of radioactive pollutants. I quit buying apple cider from a press in southeast Kansas after learning how close it is to Wolf Creek. I did not buy watermelons originating from a particular grower, after finding out the farm area was within 70 miles of Fort Calhoun. I don't drink milk or buy dairy products if they are from the West Coast. How many cases of cancer and death resulted from salads made from vegetables grown downwind of Semi Valley? How many still are? Nuclear engineers and executives ought to convert their skills to scientific and political/industrial breakthroughs in photovoltaics and battery storage of electrical power. Or in replicating the work of those who have split water at an energy profit. We could be desalinating ocean water and pumping it to wherever farmers need it, if we could do that, and it instead of putting whole breadbaskets at risk and slowly polluting them up between major accidents. I think eyes have to be closed and inmost being blinded, to be able to put a price on the value of an area the size of a large western state and justify the continuing risk.

comment #82249 posted on 2013-03-23 15:44:12 by CaptD in response to comment #81523

John, You are part of a growing number of Americans (and other Globally) that now see Nuclear Power for what it is: Costly, Waste Making and so RISKY that if the USA has even one Fukushima type nuclear accident, it will destroy our fiscal system and change the World as we now know it! Left unsaid is that the Utilities are trying every trick in the book to protect their market share and as they become more desperate they will fight any additional safety measures that they have to pay for, which makes all reactors even more RISKY...

comment #82254 posted on 2013-03-23 15:58:57 by CaptD in response to comment #81265

To Mr. Rich Correia, Director, Division of Risk Analysis Sir I truly hope that you have been getting copies of all the technical documents that the DAB Safety Team has been sending to the NRC, NRR and ACRS because I think you should be aware of the RISK that a restart of San Onofre at any power level actually poses to SoCal. If you have not, and are interested in getting your name added to our email listing for future documents, please either post it here or use the contact phone number listed on any of the



documents... Here are just a few samples from the complete DAB Safety Team listing:  
<https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1> Analysis: Faulty computer modeling and unreasonable operator expectations indicate San Onofre is unsafe to restart.  
[https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1LubfalVDvQy8zHYpSSLiVYD\\_n-wl6m20csRWOVhiwF4](https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1LubfalVDvQy8zHYpSSLiVYD_n-wl6m20csRWOVhiwF4) NRC failing its due diligence role at San Onofre  
[https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=15\\_tAT8g7UM2NXigoDJ9iQzmBaPQt1K5SgLaKdIXsJ9w](https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=15_tAT8g7UM2NXigoDJ9iQzmBaPQt1K5SgLaKdIXsJ9w) San Onofre Retainer Bar Problems  
[https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1\\_4KqyVbshD9IQKN2S2KpWVW2AdU5pGAKv-YyB7bIDs](https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1_4KqyVbshD9IQKN2S2KpWVW2AdU5pGAKv-YyB7bIDs)

comment #82256 posted on 2013-03-23 16:00:31 by CaptD in response to comment #81265

I hope that Mr. Rich Correia, Director, Division of Risk Analysis will comment on the above document and its implications to a what a US nuclear incident/accident might cost US.

comment #81951 posted on 2013-03-22 18:19:23 by Patricia Gracian

I have yet to see the NRC and the utilities involved add the potential cost of lawsuits associated with the 100% destruction of land and house values from the millions of property owners within the fallout area of a nuclear catastrophe at San Onofre. I for sure will sue when we have a catastrophe that lets out ANY radioactivity from San Onofre upon my properties in San Diego County, and I will expect to get the present-day market value of said properties, which I am documenting NOW. My little set of holdings is about 1 million, and I am not considered to be wealthy by any means. Multiply THAT by all of the other properties that stand to go to ZERO value upon contamination from a radioactive misfortune. As businessmen, these foolhardy owners of this threat known as SONGS, should be scrambling to shut down the threat and REMOVE any and all radioactive spent and active materials currently stored anywhere close to MILLIONS of valuable California properties. A responsible owner of such a threat should be scrambling to remove said detritus to some much-less costly and much-less populated area where their liability can be controlled to some manageable amount.

comment #81265 posted on 2013-03-20 16:45:16 by CaptD

You should start with this one: French Nuclear Disaster Scenario Was So Bad The Government Kept It Secret  
<http://www.businessinsider.com/potential-cost-of-a-nuclear-accident-so-high-its-a-secret-2013-3> via @bi contributors snip  
 Catastrophic nuclear accidents, like Chernobyl in 1986 or Fukushima No. 1 in 2011, are, we're incessantly told, very rare, and their probability of occurring infinitesimal. But when they do occur, they get costly. So costly that the French government, when it came up with cost estimates for an accident in France, kept them secret. But now the report was leaked to the French magazine, Le Journal de Dimanche. Turns out, the upper end of the cost spectrum of an accident at the nuclear power plant at Dampierre, in the Department of Loiret in north-central France, amounted to over three times the country's GDP. Hence, the need to keep it secret. The study was done in 2007 by the Institute for Radiological Protection and Nuclear Safety (IRSN), a government agency under joint authority of the Ministry of Defense and the Ministry of Environment, Industry, Research, and Health. With over 1,700 employees, it's France's "public service expert in nuclear and radiation risks." This isn't some overambitious, publicity-hungry think tank. It evaluated a range of disaster scenarios that might occur at the Dampierre plant. In the best-case scenario, costs came to €760 billion—more than a third of France's GDP. At the other end of the spectrum: €5.8 trillion! Over three times France's GDP. A devastating amount. So large that France could not possibly deal with it. Yet, France gets 75% of its electricity from nuclear power. The entire nuclear sector is controlled by the state, which also owns 85% of EDF, the mega-utility that operates France's 58 active nuclear reactors spread over 20 plants. So, three weeks ago, the Institute released a more politically correct report for public consumption. It pegged the cost of an accident at €430 billion. "There was no political smoothening, no pressure," claimed IRSN Director General Jacques Repussard, but he admitted, "it's difficult to publish these kinds of numbers." He said the original report with a price tag of €5.8 trillion was designed to counter the reports that EDF had fabricated, which "very seriously underestimated the costs of the incidents." Both reports were authored by IRSN economist Patrick Momal, who struggled to explain away the differences. The new number, €430 billion, was based on a "median case" of radioactive releases, as was the case in Fukushima, he told the JDD, while the calculations of 2007 were based more on what happened at Chernobyl. But then he added that even the low end of the original report, the €760 billion, when updated with the impact on tourism and exports, would jump to €1 trillion.

comment #82743 posted on 2013-03-25 15:55:37 by Hiddencamper in response to comment #82249

Its a shame for your argument, that polls in most countries including the US show nuclear power as favorable, with a majority stating they would be ok with new nuclear plants being built.

## NRC's Waste Confidence Scoping Report: What's It All About?

posted on Fri, 22 Mar 2013 14:02:20 +0000

*Andy Imboden*  
 Chief, Communications Branch, Waste Confidence Directorate



The NRC's [Waste Confidence Directorate](#) has issued its [scoping summary report](#) – based on the 1,700 comments we received on the question of what issues we'll consider in the environmental review of the agency's policy on long-term spent fuel storage. As you can imagine, there was tremendous public interest in this report. The Generic Environmental Impact Statement (GEIS) and a related regulation will be the NRC's response to last year's U.S. Appeals Court ruling. That ruling directed the agency to analyze the environmental effects of never having a permanent repository for the nation's spent nuclear fuel, as well as further analyses of spent fuel pool leaks and fires. The scoping report does what its name implies – it defines the scope of the environmental review. The report lists comments and subject areas that will be covered in the GEIS ("in scope") and explains why other subjects – such as defense waste, reprocessing facilities, and site-specific safety concerns – will not ("out of scope"). This report also describes how the upcoming GEIS will be structured. We anticipate publishing the draft GEIS in September, with a series of public meetings across the country to present the draft and receive public comments. During the scoping process, Waste Confidence Directorate staff reviewed some 700 comment submissions with 1,700 individual comments. Staff grouped and responded to the comments according to common concerns and issues. All comments, regardless of who submitted them or how they were submitted, received equal consideration. In addition to the summary report, the NRC has compiled and listed all 1,700 comments in a [separate comment document](#). The NRC is sending a copy of the scoping summary report to each person and organization who participated in the scoping process. The Waste Confidence Directorate holds monthly public teleconferences to discuss the status of the Waste Confidence GEIS and rulemaking. There will be more opportunities for the public to participate and comment on waste confidence as the process goes on. The draft GEIS and proposed rule are scheduled to be issued later this year, and the NRC is planning to conduct regional public meetings to discuss these documents. Stay tuned for more details!

### Comments

comment #82641 posted on 2013-03-25 11:31:53 by dennisearl baker

In my opinion We need to replace the fossil fuel power plants, the primary source of GHG. Now! At a scale required to accomplish this task : Ethanol starves people : not a viable option. Fracking releases methane : not a viable option. Cellulose Bio Fuel Uses Food Land : not a viable option Solar uses food land : Not a viable option Wind is Intermittent : Not a viable option All Human and Agricultural Organic Waste can be converted to hydrogen, through exposure intense radiation!  
[http://www.huffingtonpost.com/social/DennisearlBaker/2012-a-breakthrough-for-r\\_b\\_1263543\\_135881292.html](http://www.huffingtonpost.com/social/DennisearlBaker/2012-a-breakthrough-for-r_b_1263543_135881292.html) The Radioactive Materials exist now, and the Organic waste is renewable daily. Ending the practice of dumping sewage into our water sources. Air, Water, Food and Energy issues, receive significant positive impacts . Reducing illness / health care costs as well ! Dennis Baker

### Working Together to Keep Radioactive Materials Safe

posted on Tue, 26 Mar 2013 13:53:08 +0000

*Kim Lukes  
 Health Physicist  
 Office of Federal and State Materials and Environmental Management Programs*

Occasionally the Department of Energy makes news when it picks up radioactive materials from users who no longer want them. DOE plays an important role when it secures these sources pending final disposal — often prompting headlines about keeping “[dirty bomb](#)” materials away from bad guys. These headlines overlook the many layers of protection that keep radioactive materials secure every day. The NRC and [Agreement State](#) co-regulators require licensees with materials that could pose the biggest hazard to store them securely. When no longer needed, they can be securely stored on site, safely moved to a commercial disposal site or turned over to the federal government for disposal. The NRC and Agreement State regulators inspect licensees periodically to make sure they are meeting the requirements. These requirements provide adequate protection against theft or misuse of radioactive materials in the U.S. Earlier this month the [National Nuclear Security Administration](#) (NNSA), an arm of DOE, picked up a source that was no longer needed for medical research at Temple University in Pennsylvania. By law, DOE is responsible for disposing of this type of waste, although DOE does not yet have an approved disposal site or method. The department will store the source — in this case, an old irradiator containing cesium-137 — until a disposal site is available. Before NNSA picked up the source, it was protected as all risk-significant radioactive sources are. (These materials are also known as International Atomic Energy Agency [Category 1 and Category 2 quantity of sources](#)). The NRC and its Agreement State partners put measures in place after Sept. 11, 2001, to protect high-risk radioactive materials against theft. Today, these measures protect more than 75,000 sources used in medical, commercial and research activities. The NRC just updated and expanded these security requirements, adding them to a new section of our regulations — [10 CFR Part 37](#). The security requirements include: • Background checks and fingerprinting to ensure that people with access to radioactive materials are trustworthy and reliable; • Controls on who can access areas where radioactive materials are stored or used; • Security plans and procedures to monitor, detect, assess and respond to unauthorized access attempts; • Coordination and response planning between licensees and local law enforcement; • Coordination and tracking of radioactive materials shipments; and • Security barriers to discourage theft of portable devices. Besides its Offsite Source Recovery Project, NNSA has a Global Threat Reduction Initiative to help improve the security of nuclear and radioactive materials internationally. NNSA also provides voluntary security enhancements domestically. Licensees who meet NRC or Agreement State security requirements can choose to work with NNSA to put additional security enhancements in place. The NRC cooperates with NNSA on this voluntary program. Security of these materials is a top priority for the NRC. We continue to assess and improve our security requirements as needed.

### Comments

comment #83250 posted on 2013-03-27 17:28:55 by David Andersen. in response to comment #82918

Garry Morgan Check this document, <http://www.fas.org/nuke/guide/usa/doctrine/national/frerp.htm>, you need only look at section I which appears to place responsibility on State and Local authorities for actions outside the boundaries of the facility.

comment #82928 posted on 2013-03-26 11:33:59 by joy cash

Columbia River, Washington state? We must do better than this for our children's future.

comment #82924 posted on 2013-03-26 11:04:00 by Myla Reson

The repeated use of the word "safe" by the Nuclear Regulatory Commission and the nuclear power industry may lull some people into a false sense of security about the imminent threat posed by the accumulation of radioactive waste piling up - primarily at the over one hundred reactors around our country. My concern is not just about Temple University's old irradiator - but closer to home - the decades of high level radioactive waste crammed into over-crowded cooling pools sitting outside of Southern California Edison's twin San Onofre containment domes on our fragile shoreline between San Diego and Los Angeles - threatening the lives and property of millions upon millions of people. Edison's damaged nuclear plant is situated in a tsunami zone riddled with earthquake faults - it's my understanding that there are over four million pounds of radioactive trash on site. Is this an accurate figure? Where can we find information about the inventory of radioactive waste at this nation's nuclear power plants? Why on earth do we allow the nuclear industry to continue to churn out this dangerous material when we still have no idea how to safely isolate it from the accessible environment for as long as it is lethal? Two years after the events that triggered the ongoing nuclear catastrophe in Fukushima it's my understanding that the NRC is most likely an additional two years away from addressing earthquake and tsunami lessons learned from Fukushima. Will earthquake and tsunami risks be factored in when the NRC decides whether or not to agree that Edison restarting its damage Unit 2 San Onofre reactor poses "no significant hazard"? I hope Kim Lukes or someone from the NRC can respond with specific answers to my questions. Thank you, From the San Onofre Danger Zone, Myla Reson

comment #83400 posted on 2013-03-28 10:02:07 by Garry Morgan in response to comment #83250

Thank you for the reference document. The "Training and Exercises" subject area is one of the shortest areas within the document. It completely ignores preparedness and the necessity of training. The document was prepared in 1996 and requires updating. If this is the plan to be currently followed relating to an emergency response it is inadequate. Quote from the plan regarding training: "Federal agencies, in conjunction with State and local governments, will periodically exercise the FRERP." The current plan as it relates to nuclear facilities does not take into consideration the lessons learned from Fukushima; the 10 mile exclusion zone is not realistic. The only training or preparedness exercises are conducted with agencies and local entities within the 10 mile zone. Ignoring the areas outside the 10 mile zone. There are no indications of any requirement to brief or train first responders and local law enforcement along transportation routes. Recent events involving security failures at NNSA controlled sites does not insure public confidence regarding response and security of radiological materials. There is also a problem with some Federal Agencies attempting to decrease the requirement for secure transport of Plutonium MOX nuclear fuel. To expensive says some, some cannot see further than the financial bottom line of a spread sheet.

comment #82918 posted on 2013-03-26 10:47:21 by Garry Morgan

Local law enforcement, fire and rescue in Scottsboro, Alabama have stated to me they have never been briefed on radiological hazards; whether a transportation hazard or fixed hazard such as a nuclear power plant presents. Evacuation plans are lacking and deficient involving counties and first responders in those counties surrounding the counties where nuclear power plants are located. Recent radiological disaster events have demonstrated that hazardous radiation levels will reach far beyond the 10 mile ring, up to 120 miles away and greater from the radiation source is likely depending on weather conditions. Preparedness will save lives and prevent leadership chaos during any disaster. Counties and cities surrounding a radiation disaster are the ones which will support the initial emergency response and may have to initiate a radiation response themselves. There is no training in area involvement and response. 3) There have been no coordination, training or emergency response drills/exercises relating to a radiological disaster in Northeast Alabama. There are several major transportation corridors across Northeast Alabama which could be utilized to transport radiological materials. Proactive management, planning and training are important prior to transportation events or to boost disaster readiness in the event of any radiological disaster, particularly in areas less than 100 miles from a nuclear reactor or nuclear fuels facility. Governmental leadership hiding from the unexpected catastrophe is not part of readiness nor defense in depth

comment #83040 posted on 2013-03-27 02:07:43 by Myla Reson in response to comment #82966

Dear Kim Lukes, Thanks for your reply - I will have additional questions - but for starters I'm wondering if you can tell us which other NRC staff members contributed to the response to my query.

comment #82974 posted on 2013-03-26 16:40:47 by Diane in response to comment #82966

Along the same lines....Kim, can you please comment regarding Diablo Canyon's storage & also about the danger of tsunamis and/or earthquakes coming from the 13 faults around it? Thanks!

comment #82966 posted on 2013-03-26 15:41:57 by Moderator in response to comment #82924

As this comment about waste and SONGS are out of my area of expertise, I asked other staff members to weigh in on the issues

raised. Your comment links two issues the federal government is wrangling with: Disposal of unwanted radioactive sources no longer serving their function in industry, academia or medicine (e.g., the Temple University irradiator), and the storage and ultimate disposal of spent nuclear fuel from the nation's commercial nuclear power reactors. While the federal government moves toward creating consolidated storage facilities for spent fuel, and ultimately a repository for permanent disposal, the spent fuel does need to remain at the reactor sites until alternatives are available. According to Department of Energy figures, San Onofre had about 1,460 metric tons of spent fuel stored onsite at the end of 2010 – most of this in pools. Spent-fuel storage, both in pools and dry casks, has an excellent safety record and is successfully isolated from the environment. Even at Fukushima, the spent fuel storage pools and casks performed their safety function well, despite early concerns about the pool in Unit 4. Tsunamis like the one that devastated Fukushima are caused by earthquakes along "subduction zones," where the force of the earth's movement shoves one tectonic plate under another rather than the more common horizontal movement of two plates rubbing against each other. The only subduction zone along the U.S. West Coast is the Cascadia zone, stretching from northernmost California and along the Oregon and Washington coasts and northwards to British Columbia. Earthquake and tsunami risks will not be factored into the NRC's staff's pending decision on the restart of the San Onofre Unit 2 reactor. That decision will be based solely on the NRC staff's determination of whether Southern California Edison's can safely operate the plant at 70 percent power for five months. In its decision to grant an operating license to San Onofre, the NRC carefully considered the geologic history of the site as well as its potential vulnerability to tsunamis and concluded that the robust design of the facility afforded adequate protection against both hazards. Kim Lukes

comment #83101 posted on 2013-03-27 09:09:29 by Moderator in response to comment #82918

As this comment is out of my area of expertise, I asked staff from the Office of Nuclear Security and Incident Response to provide a response. Here it is: For each U.S. nuclear power plant site, there is a defense-in-depth strategy for protection that consists of an approved onsite and offsite emergency plan (that includes Emergency Planning Zones) and a strategy for expanding protective actions beyond the 10-mile EPZ, if conditions warrant. These plans and strategies are reviewed and assessed periodically by the NRC and the Federal Emergency Management Agency. FEMA provides oversight of offsite response plans that support nuclear plants, while the NRC reviews and approves the onsite plans. Licensees are also required to exercise their emergency plans with offsite authorities biennially. These exercises allow reliable and consistent coordination between nuclear power plants, federal partners, and state and local governments so that there can be an accurate assessment of the public safety impacts of a nuclear accident. These plans must be in place and the nuclear power plant and local/state authorities must demonstrate that they can successfully implement the emergency plans prior to the facility receiving a license from the NRC to operate. Much of Scottsboro, Alabama is located within the 10 mile EPZ of TVA's proposed Bellefonte site and before operation of the plant, the first responders will be trained to deal with radiological hazards that could result from an accident at the Bellefonte site. Kim Lukes

comment #83128 posted on 2013-03-27 10:46:50 by Garry Morgan in response to comment #83101

Thank you for your reply. Unfortunately, in typical governmental bureaucratic form you skirt the issue. We know Bellefonte is not an active plant but that is not the issue. The issue is training and readiness either as a response to an event involving transportation of Radiological Hazardous materials along transport corridors in NE Alabama and/or training for a radiological response either as a result of a transport accident or a disaster event at a nuclear facility such as Browns Ferry. One of the weaknesses identified post Fukushima is a lack of a readiness response at the disaster site. Your bureaucratic answer does not promote training which results in increased readiness. To say the "10 mile zone" is the extent of a radiological hazard is ridiculous and an example of denial and capitulation at the hands of an industry whose primary concern is that of the financial bottom line, not human health and welfare. In that area you are either part of a solution or part of the problem. In this case it appears there are those at the NRC that have not learned the lessons of Fukushima. When will the NRC staff and leaders learn the Lessons of Fukushima concerning radiological disaster response as it relates to local governmental entities and the civilian populace?

comment #83103 posted on 2013-03-27 09:16:18 by Moderator

These comments are becoming increasingly unrelated to the blog topic written by Kim Lukes about source security. Per the Comment Guidelines, we'll be answering those questions in the Open Forum section of this blog. Moderator

comment #83102 posted on 2013-03-27 09:11:57 by Moderator in response to comment #82966

Victor Dricks and David McIntyre worked with the relevant program staff to answer the question submitted above.

## New Web Pages Illustrate NRC's Post-Fukushima Activities

posted on Thu, 28 Mar 2013 13:21:00 +0000

*Matthew Mitchell*  
*Chief, Projects Management Branch*  
*Japan Lessons-Learned Directorate*





When you talk about something over and over again, you sometimes end up with a verbal shorthand to keep conversations moving. The NRC has certainly done that in discussing “Tiers,” “Mitigating Strategies” and some of the other language describing our work to implement the lessons learned from the 2011 nuclear accident at Fukushima. But we’re taking steps to keep our verbal shorthand understandable. Each of the three Fukushima-related Orders we issued to U.S. reactors in March 2012 has a fairly long title, and over time we’ve condensed those titles into two- or three-word phrases. Now the NRC website includes a quick [summary](#) for each Order, complete with a visual icon. We expect to incorporate those icons onto other pages to help you follow the actions plants are taking to comply with the Orders. Since one of the Orders (and a lot of recent discussion and news coverage) focuses on the 31 U.S. reactors with designs similar to Fukushima, we’ve listed all those [plants](#) on one page. A few months after Fukushima, the senior managers that made up NRC’s Near-Term Task Force provided several dozen individual recommendations for the agency to consider. The staff, with the Commission’s approval, created a three-level approach to prioritize the task force’s findings, and we’ve created a [summary](#) of the prioritization effort. You’ll find printed versions of these two summaries at meetings the NRC holds near U.S. nuclear power plants. As always, if you have any questions about our Fukushima lessons-learned effort, please e-mail [JLD\\_Public.Resource@nrc.gov](mailto:JLD_Public.Resource@nrc.gov).

## Comments

comment #83493 posted on 2013-03-28 15:36:27 by CaptD

Bottom Line: Industry Money Rules NRC Decisions NOT Safety Studies and Investigations only delay taking steps that might otherwise make US reactors MUCH safer! Question, how many items have been delayed for years before being finally done by Utilities just by asking for another delay period? The USA cannot afford a Fukushima-Type Trillion Dollar Eco-Disaster, yet our Utilities live in Nuclear Denial\* because their regulators NEVER put their foot down, which is exactly what happened in Japan! \* <http://is.gd/XPjMd0> The illogical belief that Nature cannot destroy any land based nuclear reactor, any place anytime 24/7/365!

comment #83446 posted on 2013-03-28 11:50:47 by Myla Reson

This blog post pointing the public to the new web pages illustrating the NRC's post-Fukushima activities may serve as a bitter reminder to many readers of the disappointing March 19, 2013 four-to-one vote by NRC commissioners to disregard a recommendation from its own Japan Lessons Learned Task Force and professional staff that nuclear reactor operators should be ordered to install high-capacity radiation filters at 23 Mark I and 8 Mark II nuclear power reactors in the United States. I for one am grateful to NRC Chair Allison Macfarlane for her dissenting vote. It's my understanding that now, two years after the events that triggered the ongoing nuclear catastrophe in Fukushima the NRC may well be an additional two years away from addressing beyond design basis events like earthquakes of greater magnitude than plants are designed to withstand. As a resident of the San Onofre nuclear plant danger zone in southern California I am keenly aware of the fact that NRC senior staff will not take into consideration beyond design events like tsunamis and great quakes when they make their final decision about SoCal Edison's plan to restart its badly damaged Unit 2 San Onofre reactor. And I fear that a potential ruling by senior NRC staff to reject Edison's restart plan may be reversed by a nuclear industry captured Nuclear Regulatory Commission.

comment #83408 posted on 2013-03-28 10:23:25 by Garry Morgan

Unfortunately the NRC did not see fit to place filters into the venting systems. Seems the financial bottom line of the nuclear industry has priority over human health and welfare. You are playing the odds that a disaster will not occur at aging and defective nuclear facilities. That is not the concept of "Defense in Depth," it is the concept of save the nuclear industry dollars at the expense of human health.

comment #83469 posted on 2013-03-28 13:44:36 by hiddencamper in response to comment #83408

If you read the actual voting records and any actual reports on the issue you can see that the NRC didn't say "no" to filtered vents, they instead demanded a developed technical basis for multiple options including vents, and put it through the rulemaking process. This doesn't mean "no" to vents, instead it means it will go through the formal process.

comment #83470 posted on 2013-03-28 13:46:41 by hiddencamper in response to comment #83446

You should read the voting records. Only one commissioner fully dissented to filtered venting, and that was due to inadequate technical basis and use of qualitative factors in the analysis, which is not typical. The other commissioners either supported filters or felt that a stronger technical basis needed to be created through the rulemaking process.

comment #83709 posted on 2013-03-29 11:30:01 by Garry Morgan in response to comment #83469

Call it "macaroni" if you like, none the less the vent systems will not have filters. This is another ploy by the nuclear industry, and supported by the NRC, to cut costs - not save lives. When the filters are installed in the venting system then I'll say, "yes, the nuclear industry and the regulator are more concerned with human safety than the corporation's bottom line." Until it is announced that the vents will have filters it is just more of the same, "corporate bottom line before human safety." Apparently some within the NRC have not learned the lessons of Fukushima. Why are we even having this discussion? It has been demonstrated the lack of venting in a crisis such as occurred at Fukushima creates a problem with pressure and that the vents need filters. The reason why there are no vents and filters was an intentional action to save money, not protect human life. This engineering defect was identified many years ago. Folks may justify this inaction by any number of reasons, including requirements of bureaucratic rule making, the result is the same. A condition, in the case of a catastrophic failure, where there will be high levels of radiation released into the atmosphere compromising human health. A skewed system of accident probabilities have been employed by the nuclear industry and supported by the NRC for many years. The nuclear industry is now beginning to reap the inevitable results of playing the odds; most of the time you win, but with aging, defective nuclear reactor systems when you lose people's lives are ruined for the rest of their lives. Such is the story of Three Mile Island, Chernobyl and Fukushima. It is time for the deceit to stop as it compromises the reliability of the regulator. As we all should know, reliability is a "cornerstone requirement" for everything and everyone within the system. There is a moral to this story: Aging, defective nuclear reactors and its radioactive trash are not places for a crap shoot.

## Easter Sunday and Arkansas Nuclear One

posted on Mon, 01 Apr 2013 16:43:40 +0000

*Victor Dricks*

*Senior Public Affairs Officer, Region IV*

As the eyes and ears of the NRC, resident inspectors never know when they might have to respond to an emergency at the plants



they monitor. Fred Sanchez, [Arkansas Nuclear One](#) Senior Resident Inspector, was preparing to attend Easter services with his family when he got a call shortly before 8 a.m. Sunday informing him that a 600-ton component was dropped from a crane while being moved out of the turbine building at Unit 1. He drove to the plant to survey the damage and phoned reports back to Region IV staff all day. The industrial accident resulted in eight injuries and one fatality. Of the injured workers, six were treated and released from a local hospital; two remain hospitalized. At the time of the event, Unit 1 was in a refueling outage with all of the fuel still in the reactor vessel, safely cooled. The accident damaged some electrical equipment that supplies off-site power to the plant. The plant's emergency diesel generators started and power was quickly restored to the decay heat removal systems. Unit 2, which was operating at full power, automatically shut down when power was lost to a reactor coolant pump due to electrical equipment that was damaged when the component fell. At 9:22 a.m. offsite power to one electrical bus was lost because water from a fire main broken by the falling component caused a short circuit. An emergency diesel generator started up and is supplying power to key safety systems. Unit 2 is cooling down using natural circulation. Both plants are in stable shutdown condition. There was no radiological release or danger to the public. Entergy Operations, Inc., which operates the plant, declared a Notice of Unusual Event, the lowest of four NRC emergency classifications, at 10:44 a.m. because the accident damaged some electrical equipment. The Unusual Event was terminated at 6:21 p.m. after the licensee took corrective actions to stabilize the plant's power supplies. Two additional inspectors have been dispatched to ANO to assist the resident inspectors and conduct follow-up reviews of the licensee's response to the event. NRC's Region IV also plans to conduct an inspection to review the circumstances contributing to the event.

### Comments

comment #85390 posted on 2013-04-04 10:16:41 by Moderator in response to comment #85103

The plant is designed with separate electrical power systems to minimize the possibility that an accident at one plant would affect another. On Sunday, it was the physical impact of the 600-ton component that affected both units, not electrical interconnections. When the component fell on the turbine deck it damaged part of the electrical distribution system for Unit 1, causing a loss of offsite

power for Unit 1. The crash of the stator was sensed by a reactor coolant pump for Unit 2, which protectively responded by shutting down, causing the reactor, which was operating at full power, to shut down. In answer to your questions: Unit 1 is still using an emergency diesel generator; Unit 2 is not. Offsite power has been fully restored to Unit 2. Victor Dricks

comment #85392 posted on 2013-04-04 10:43:57 by Mike in response to comment #85103

The loss of power was to the non-vital electrical systems. The stator fell in the train bay, which is between the non-vital bus areas on both units, providing physical separation between the non-vital electrical buses. There are no interconnections between the electrical buses of the two units. Provisions are available to potentially supply one unit from the other under very unusual emergency conditions, but it takes specific operator actions to make that happen. I'm reading this from the outside, just like everyone else. I haven't been inside the plant for several years, but I've walked the areas this occurred in many, many times.

comment #86732 posted on 2013-04-09 13:22:49 by Pave Way IV in response to comment #86697

Thanks, Victor - that makes sense. I understand why one should avoid using jargon, but reporters seem to have been fond of tossing SCRAM somewhere in their articles. The ones that still have jobs today are probably too young to have any idea what it means. For what it's worth, I wasn't nitpicking on the inconsistent SCRAM code to imply that you or Entergy should do something about the event report - I was honestly confused. There really isn't any point in Entergy fixing it now. There's only (apparently) about six or seven of us that actually read them and no Entergy employees. Maybe they have the NRC web site blocked in their firewall?

comment #85402 posted on 2013-04-04 11:12:53 by Mike in response to comment #85383

There is no loss to the "ultimate heat sink." The service water pumps, on Unit 1, automatically restarted on restoration of power to the vital buses after the diesel generators automatically tied on to the buses. The service water system is cooling plant systems, including the decay heat removal systems and the spent fuel cooling system. At least, that's the way it is designed to work and I've seen nothing that makes me think otherwise. (I don't work for anyone, so have nothing vested in this, other than knowledge.)

comment #85383 posted on 2013-04-04 09:51:25 by LillyMunster in response to comment #85364

Nice risk PR song and dance. You used the playbook line by line. This really is sort of two problems. One being the industrial accident with the lift crane. The other being that the plant still has a loss of offsite power and apparently still a loss to the ultimate heat sink. Neither the NRC or Entergy are being up front or clear about the status of either of these situations. This is a problem and the public deserves clear answers.

comment #85389 posted on 2013-04-04 10:16:07 by Moderator in response to comment #85280

NRC resident inspectors, assisted by two additional inspectors sent to the site, are currently reviewing the event. Their findings will be documented in a quarterly inspection report. All NRC inspection reports are posted to the NRC web site at: [http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/listofrpts\\_body.html#wc](http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/listofrpts_body.html#wc) Victor Dricks

comment #85384 posted on 2013-04-04 09:54:44 by Gerhard in response to comment #85280

The Arkansas Tech Univ library is a federally funded repository for most microfiche/paper copies and reports. This blog site and/or the NRC Web site will likely have or link to online versions. The local papers (Russellville-Courier and Little Rock-Arkansas Democrat) usually provide adequate coverage so most people can find the stuff. However, just like NTSB (National Transportation Safety Board) crash reports it may take years of research and painstaking reconstruction before We The People and our appointed officials can fully understand what went wrong.

comment #85375 posted on 2013-04-04 09:21:43 by Anonymous in response to comment #85076

These comments about Easter are perplexing. Outage work is done to a schedule, and the schedule is modified as the work progresses. So if the stator lift comes up on Easter Sunday morning, that's when the crew doing the lift will be there to do their work. It may be hard for regular 9 to 5'ers to understand, but some parts of our world (like making electricity) go on 24 - 7 and the people who work in these industries just do it.

comment #84469 posted on 2013-04-01 18:43:55 by Hiddencamper in response to comment #84409

The reactor is on natural circulation, but decay heat removal still requires injection via the aux feed system and heat removal via the atmospheric steam dumps. Natural circulation simply refers to the ability of the reactor core to move heat to the steam generators without the reactor coolant pumps. The loss of reactor coolant pumps implies the non-safety 6900V or 13kV bus was lost (and indirectly implies that the startup transformer for the unit locked out)

comment #84468 posted on 2013-04-01 18:42:26 by Hiddencamper in response to comment #84394

Nuclear power plants are designed to be single failure proof. Electrical systems are separated physically from other systems, and as such, the damage caused by a broken fire main is not capable of affecting multiple safety divisions of the class 1E power system. As

an aside from that, the safety related power busses are not located in the turbine building (where the water main broke). Turbine buildings are generally not built as seismic class 1E, and as such safety related power busses are not present in turbine building areas, and if they are it is within a separate sealed off section of the turbine building. It was most likely a non-safety divisional power bus that was damaged, causing a loss of normal power feed to a safety/class 1E divisional power bus and an automatic transfer to the emergency source. Many plants are designed with vertical bus arrangements like this where the non safety bus normally feeds power to the safety bus, and if the non-safety bus is damaged then the safety bus automatically disconnects and starts its respective diesel generator (which is what happened in the case of ANO).

comment #84484 posted on 2013-04-01 20:10:34 by Atomik Rabbit (@Atomikrabbitt) in response to comment #84394

Do you understand how natural circulation works? Do you even care to find out?

comment #84485 posted on 2013-04-01 20:13:27 by Atomik Rabbit (@Atomikrabbitt) in response to comment #84409

@Phil - agreed, except article says Unit 1 was not defueled, but still had fuel in vessel.

comment #84487 posted on 2013-04-01 20:31:01 by Atomik Rabbit (@Atomikrabbitt) in response to comment #84394

@Ace "loss of decay heat removal on ANO Unit 1... was restored in 3 minutes and 50 seconds." That's right Ace, another 10 seconds and Russellville would have been a smoking, permanently uninhabitable crater. <http://www.nrc.gov/reading-rm/doc-collections/event-status/event/en.html>

comment #84644 posted on 2013-04-02 09:33:12 by in response to comment #84429

You must work for the power plant.....dude

comment #84742 posted on 2013-04-02 15:46:22 by Moderator in response to comment #84503

There are four levels of emergency event, each with their own criteria. The plant declared an Unusual Event because they believed an explosion had occurred in an electrical breaker supplying offsite power to plant safety systems at Unit 2, although this was later determined not to be the case. An explosion, however, is one of the criteria for an Unusual Event, thus the declaration. Victor Dricks

comment #84741 posted on 2013-04-02 15:45:41 by Moderator in response to comment #84510

The NRC and the Occupational Safety & Health Administration will conduct inspections on this failure, which will be documented in inspection reports that will be made public in the future. Victor Dricks

comment #85286 posted on 2013-04-04 03:07:45 by in response to comment #84503

Battery backup

comment #85280 posted on 2013-04-04 01:56:38 by Andrew Castle

"The NRC and the Occupational Safety & Health Administration will conduct inspections on this failure, which will be documented in inspection reports that will be made public in the future." Mr. Dricks, when these reports become available where can the public find them?

comment #85364 posted on 2013-04-04 09:00:16 by Gerhard

I am a former worker at this place but not necessarily a blind nuclear advocate. Accidents of all types happen. Honest, hard working people drop torpedos on their own submarines and those weigh much less than 12 hundred-thousand pounds. Reading the open and reasonably fair press coverage of this incident, I am impressed by the plant operators (Entergy's) response and willingness to be forth coming. The NRC is doing even better. It is my assessment from all public accounts that there are some tough questions that must be asked ... but there was and IS less danger to the public from this "Industrial Accident" than most 18 wheeler (only 80 thousand pounds mind you) accidents that happen along Interstate 40 from Memphis TN to Fort Smith AR. Lets give these folks some room to breath, debrief and recover BEFORE drawing conclusions. If the radiation sirens go off, that is the time to duck and cover. And Fear or Panic should not in your minds even then. BTW: when was the last time you checked the batteries in your emergency weather radio?

comment #86705 posted on 2013-04-09 11:26:54 by Gerhard LANGguth ANO\_u2 RO August 1987! in response to comment #86697

Thanks for your Careful moderation. That could be a Boron joke but lets kNote go there. April fools was 04/01/13 in English or 01.04.2013 in Y2K Deutsch. I speak all three and sometime get MY acro\_nyms or even dat(ah)s or DtC (NiST=DateCodes) mixed up. Sorry for too much info when or if Silence is the best option currently available. My FuSimy comnts are at WP=GLsword

comment #86693 posted on 2013-04-09 10:47:55 by David Andersen. in response to comment #86546



The term SCRAM dates back to the beginnings of nuclear reactors and meant Shutdown Control Rod Ax Man because a man was literally stationed with an ax to cut the rope holding the control rod. The term carried over but the Ax Man didn't. Several other terms are now also used such as Reactor Trip, and Automatic Shutdown, they mean the same thing. I'm not sure why we don't use a standard term but it would be nice if we did to avoid confusion.

comment #86697 posted on 2013-04-09 11:03:13 by Moderator in response to comment #86546

We try to avoid use of the term SCRAM because it is jargon. Instead we usually say a reactor shut down automatically in a controlled fashion designed to protect equipment and public health and safety. Regarding Event Report 48869, you are correct and there is an error when it shows that Unit 2, which was critical and operating at full power, did not SCRAM as a result of the breaker malfunction. It did and the box should indicate a "Y" rather than an "N." We're notifying Entergy so they can fix the error. The box correctly shows a "Y" for RX CRIT indicating the reactor was critical at the time of the event. Victor Dricks

comment #86699 posted on 2013-04-09 11:07:55 by acehoffman in response to comment #86697

I prefer "plunk go the rods"

comment #86703 posted on 2013-04-09 11:22:14 by Gerhard LANGguth ANO\_u2 RO August 1987! in response to comment #86697

FYI inforMation, more than likely the mini-seizmic event busted breaker mounts on switch gear at Elevtion 372 (none safety) and either that (loss of 4160/6900 3oAC) to the RCPs OR the main turbine vibration sensor probably intiated a full blown WTF response. Once the main "Christmas Tree" lights come on who cares whether A,B,C or Z#101 actually caused the trip. We are talking Milli and uMicroSeconds not even Minutes

comment #86718 posted on 2013-04-09 12:43:44 by Pave Way IV in response to comment #86693

Thanks for you reply, David. I heard this many times, but think I'll stick with Tom Wellock's version: <http://public-blog.nrc-gateway.gov/2011/05/17/putting-the-axe-to-the-scram-myth/> It's not that I believe one hazy recollection over the other. I just find the first story's premise - that Fermi would make up an acronym like this to shout - very hard to believe. Grad students clowning around? Yep - I'll stick with that.

comment #86707 posted on 2013-04-09 11:41:14 by Gerhard LANGguth ANO\_u2 RO August 1987! in response to comment #86546

I suggest that SCRAM be reserved to Manually intiated human responses to WTFs going on. And only that. Automatic shutdown Rabot (international-sic) responses try Robotic instead sound much better and are fair/balanced reporting VS sensational none Seismic events.

comment #84510 posted on 2013-04-01 23:46:21 by NuclearGrrl

I am very interested to learn the root cause of this lift failure. We work so hard - checking, researching, questioning, and double checking - to prevent things like this from occurring. This might become something that college students learn about in the textbooks. I just hope the families and people affected find some relief for the grief they must be feeling. What an unfortunate and sad event.

comment #84497 posted on 2013-04-01 21:48:50 by jaagu in response to comment #84409

@ Phil Nasadowski This is not a little event. This is a major event that will cost the utility \$ millions to repair and provide replacement power generation. Unit 1 was not defueled - it was still in the reactor as the article says. The fuel still needs cooling when it is in the reactor vessel. Starting diesel generators because of loss of offsite power (LOOP) puts the reactors in a vulnerable mode of operation.

comment #84499 posted on 2013-04-01 22:03:41 by jaagu

It is somewhat misleading to say that the unit 2 is cooling down using natural circulation. Actually the reactor coolant decay heat is being removed via the steam generators steam dumps to atmosphere which require the emergency feedwater pumps to provide water to the steam generators.

comment #84503 posted on 2013-04-01 23:04:50 by Christopher Paine

Let's go over this one more time: a 600 ton-stator is dropped from a crane, leaving one worker dead, two hospitalized with injuries, and four "treated and released," and in so doing it severs a fire main, shorting electrical electrical equipment and causing a loss of off-site power to both units, one of which was operating, and Entergy merely deems this an "Unusual Event," the lowest of NRC's four emergency classifications??? Come on, Entergy, get real! While the emergency diesels may have kicked in as designed, this was clearly a serious event and I suspect the NRC will find as much in its follow-up root-cause inspection. What if the fire suppression system had experienced wider damage and malfunctions, shorting the electrical system that distributes emergency diesel power? What then?

comment #84889 posted on 2013-04-03 01:45:14 by Crack Fickerson

I saw the same lift executed at another plant. the same type equipment was used (including the brand name on the lift equipment). sometimes, in the process of making these big equipment changes to a plant, a small decision can lead to catastrophic events. It's quite sad that a loss of life has occurred. However, this event was on the BOP side of the house, not in the Reactor side. To say the plant was distressingly close to a meltdown is not well informed and making harsh assumptions, including sensationalism. The plant operators reacted in accordance with procedures and shut the running unit down. The diesel generators are a normal backup to off-site power, and while the risk was raised by reducing the redundant systems in operating the diesels, they performed as designed. I am sure the thorough investigation will reveal errors and industry will react to ensure it doesn't happen again. It is a tragic loss and prayers go to the families of the victims. And hopefully the anti-nuke people will feel the same way.

comment #84672 posted on 2013-04-02 10:30:58 by Alex Partridge in response to comment #84503

This is going to sound like nonsense to you, but the "unusual event" classification is done through a process at every nuke plant, and not just this one. There is a prescribed series of questions and answers about plant status, and to the untrained eye this looks to be more serious than an "unusual event" but I ran the same details through the process at my nuke plant and got the same result. It is not about industrial safety that they make these classifications, but about radiological safety, which in this case was never really in jeopardy.

comment #84426 posted on 2013-04-01 16:40:30 by Ross in response to comment #84394

Distressingly close to a meltdown? You got to be kidding me... Please educate yourself before you make such ridiculous claims, But this is the type of comments you get from people who get their info from Greenpeace.

comment #84428 posted on 2013-04-01 16:45:00 by Joshua Palmer (@JoshuaPalmer) in response to comment #84389

it was the stator

comment #84429 posted on 2013-04-01 16:46:00 by Joshua Palmer (@JoshuaPalmer) in response to comment #84394

get over yourself dude, the first paragraph was just meant to contrast business as usual to these horrific events,

comment #84432 posted on 2013-04-01 16:50:37 by Moderator in response to comment #84389

The 600-ton component (we've corrected the weight in the post) is a stator. It surrounds the spinning rotor within the main generator. Victor Dricks

comment #84444 posted on 2013-04-01 17:28:47 by Anne

My thoughts and prayers are with the coworkers and families of those involved. it is a sober reminder that radiation is not the only danger when working in the nuclear power industry and though we strive to do everything safely, things can still go wrong.

comment #84445 posted on 2013-04-01 17:34:34 by Nancy

Do you have any information on why the stator dropped?

comment #84864 posted on 2013-04-02 23:20:44 by LillyMunster

Is there any update available? Some actual information would be useful. Does unit 2 have access to the ultimate heat sink? Has either unit been put back on grid power or are both all or partially being powered by the diesels?

comment #84568 posted on 2013-04-02 03:59:30 by Aladar Stolmar in response to comment #84432

Who was the genius, scheduling the lift of the heaviest equipment on Easter Sunday? Who designed this operation? Was OSHA involved?

comment #84836 posted on 2013-04-02 20:49:46 by IA Nuke

Heavy lifts are scheduled to minimize the amount of people who could be travelling through/under (via other floors) the lift area and be affected. It is not done to bypass or prevent inspectors from being there. Could it be possible that this was scheduled when a hired contractor was available to move the equipment? It will be determined what happened by the regulators/ANO/contractor what happened/how it happened/ why it happened. Speculation is too far away from truth at this time.

comment #84820 posted on 2013-04-02 19:22:24 by not urs in response to comment #84510

I was there when it happened and there were so many things that could of prevented the accident. The previous shift started to do the lift and they didnt feel the load was safe to lift so day shift came in and evidently someone felt that it was ok to do it and you see what happened. I hope the people that was in charge of it pays for it cause the families are gonna suffer for the rest of their lives and this happened because of the almighty dollar.

comment #84783 posted on 2013-04-02 18:03:12 by R S

As a bystander in all this, I hate to interrupt this highly technical person over this... cause he/she is quite humorous. But I need a technical question answered. Question is: Was this a New stator being put in place or was it the old stator being removed that dropped. PS. My condolences go out to the families and all of those who work at ANO.

comment #85425 posted on 2013-04-04 13:09:10 by Gerhard in response to comment #85383

If you would just read the local newspaper(s) and ask honest question instead of spouting non-sense, we would all be better informed. The "ultimate heat sink" either the emergency cooling pond or Lake Dardanelle are there and as long as there is diesel fuel NOTHING has been lost except the normal offsite shutdown power supply(ies). Or more precisely -read the actual incident report as it was written and shown on this dot.gov portal- The connections between a triple redundant power grid outside the Unit and the fully functional and redundant safety supplies inside is broken. However EACH safety bus is being powered by its own diesel powered generator with enough fuel on site for at least a few month of shutdown cooling and safety related operations. Now IF you have some information that contradicts THAT propoganda then lets hear it here. I do no longer work for Entergy or toe the NRC line. Obviously they allowed you to challenge their version of the facts. So go ahead challenge or better yet correct mine. All the information I have comes from public sources. If I was still a Licensed Reactor Operator (try Unit 2 back in the 1980s), I would probably be there doing my job. Instead I am "following" this and keeping myself, neighbors and friends (who ask me questions) informed as best as I can. If for one second I thought there was a clear and present danger Id be packing my bags. But to the best of my knowledge all there is is a bunch of mangled garbage and it will take a week or so to get -the electric- traffic going again. In the mean time, you just sit tight, turn up the radio and let Entergy/NRC/OSHA do their jobs.

comment #84409 posted on 2013-04-01 15:50:54 by Phil Nasadowski in response to comment #84394

"Actually, we all know: Fukushima USA could have happened" I know it's fun for the anti-nukes that read this blog to pretend that every little thing that happens at a nuclear plant is the end of the world, but the reality is there was no danger: Unit 2 shut down as designed, the emergency generators both came on as designed, and the plant is cooling on convection (i.e. no pumps!), again, as designed. Unit 1 was defueled for an outage. There is, and was, no danger to the public.

comment #84708 posted on 2013-04-02 12:31:28 by hiddencamper in response to comment #84503

event classifications are based on industry standards and regulations. The cause of the unusual event emergency classification was the degradation and loss of offsite power sources for greater than 15 minutes. A reactor scram on its own is not an emergency classification, neither is an industrial accident. These are industry standards.

comment #84706 posted on 2013-04-02 12:25:58 by Christopher Paine in response to comment #84672

Alex -- You may well be right about application of the official NRC event classifications, but whenever you have two nuclear units relying on backup diesel power for cooling AND damaged fire protection and electrical system buses, you have an elevated threat to radiological safety. At least that is my personal view. Also, dropping a 600 ton stator suggests that all is not well with safety procedures at this plant, which suggests there may be broader plant safety culture issues that could contribute to elevated radiological risks given certain precursor events, like a fire, earthquake, or flood There are obviously a lot of unanswered questions. Moving a 600 ton stator on Easter Sunday, when the resident inspector and probably a lot of other key plant employees were attending services or taking the day off?? What was that about? Was the full complement of personnel, including plant safety personnel, prudently required for such an operation on duty at the plant on Easter Sunday? Why did the company choose to do it then? When it has all the facts, the NRC will presumably review whether the company's minimal event declaration was the correct one.

comment #84709 posted on 2013-04-02 12:33:53 by hiddencamper in response to comment #84499

It's important to know the cooldown mode for a PWR. BWRs are fully capable of removing heat from the fuel without forced flow, but in PWRs a loss of forced flow can present many challenges. Even worse is a condition where natural circulation cannot be maintained and PORV cooling or some other varient is requiried to ensure critical safety functions. I agree saying "natural circulation" can be misleading to some people, but it is important technical information to know how heat is being transferred from the fuel to the ultimate heat sink.

comment #84394 posted on 2013-04-01 13:51:56 by Ace Hoffman

The way this is written, the first two paragraphs are narcissistic and we are led to believe the worst part of this tragedy is that the NRC inspector missed Easter services. In fact this was a true cascade of terrifying events which came distressingly close to causing a meltdown. With a fire main broken and equipment short-circuiting, who knows what might have happened if things had gone just a little differently? Actually, we all know: Fukushima USA could have happened. One death is bad enough. Losing Arkansas was not

far off.

comment #84389 posted on 2013-04-01 13:33:02 by Aladar Stolmar

500 t? Which equipment could that be?!

comment #85222 posted on 2013-04-03 17:30:47 by Mike

This job was critical path for the outage, so it was going to happen when everything in the schedule lined up. Restoration of decay heat in 3 minutes and 50 seconds is a good thing. They had two different procedures that they had to implement at the same time to accomplish this: Loss of Decay Heat and Degraded Power. These guys had 1.2 MILLION pounds drop 40 feet to the train bay floor, and then all the lights in the control room except for emergency lighting went out until the diesel generators started and tied onto their respective buses. The last loss of offsite power at ANO was April and June of 1980. Both of those events involved both units and were caused by events away from the site. The sound of this event was heard by residents outside the exclusion area. I suspect it was extremely loud in the control room and that the operators felt the resultant shock. That 1.2 million pounds, along with large pieces fell in a bay. From the pictures, I can see that there is structural damage just above that area. I am a retired, previously licensed SRO on ANO Unit 1 Note: Some sensitive site-specific information deleted.

comment #86546 posted on 2013-04-08 23:55:26 by Pave Way IV

Victor - I noticed that the word 'SCRAM' was almost completely absent from media reports on the ANO accident. Media reports of ANO-2 automatically 'shutting down' from a breaker explosion without mentioning a SCRAM implies - to me - some kind of uncontrolled shutdown. I know that wasn't the case and Unit 2 is now in Mode 3 - Hot Standby. I thought SCRAM had a pretty distinct meaning and was expecting to see it somewhere in media reports. The Event Report (48869) confuses me more when it states "...On Unit 2, all rods inserted during the trip..." but the SCRAM code is 'N' and RX CRIT is 'Y'. If Unit 2 tripped, doesn't that mean it has been SCRAMed and is no longer critical? Has there been any change in the way NRC responds to media inquiries to avoid that term, or am I just confused about \*what\* it means?

comment #85076 posted on 2013-04-03 12:32:20 by Jwags23

My heart and prayers go out to the family members and the injured in this tragedy. It has been all long time since nuclear power plants regarded Easter and Christmas as sacred holidays. Maybe it is time. Greed is a poor reason to disregard them.

comment #85472 posted on 2013-04-04 17:36:09 by Mike in response to comment #84783

R S -- It was the old stator. It was only a week into the outage and things would have still been coming apart at this time. This was the critical path job for the outage, which WAS scheduled for just over a month's duration.

comment #85103 posted on 2013-04-03 13:35:41 by LillyMunster

In looking at the various reports beyond the limited information the NRC has provided it seems that the electrical system for unit 2's intakes was wired over on the #1 side, causing the loss of power on the #2 side and loss of the intake pumps. If a multi unit plant shouldn't the power systems for each side of the turbine building be wired independently and ON that side of the building rather than passing both through one side of the turbine building? This mirrored and separate systems makes sense from a design and safety standpoint and appears to not have been the case, causing an additional problem on top of the accident. Has power been restored to unit 2's intakes yet? Yes or no? When will offsite power be restored to both units? The public deserves some clear answers on these two issues. These seem to be the only outstanding safety related issues. As others have mentioned this could have been worse. Someone asked me if the rail pit the stator fell into is on concrete slab? If this equipment had failed elsewhere it could have gone through multiple floors. I hope there are some follow up reports on this as more is found out about the extent of building damage etc. The whole incident is very unfortunate and I am sure is very hard on those working at the plant but the failure seems to maybe just be one of those freak things that can happen.

comment #85448 posted on 2013-04-04 14:41:18 by hiddencamper in response to comment #85103

Some references for class 1E power systems (vital power systems) in nuclear power plants: IEEE 384, separation criteria for class 1E power systems in nuclear power facilities. IEEE 308, standard for class 1E power systems in nuclear power facilities. IEEE 379, standard for application of single failure criteria to class 1E power systems. As nuclear plants were designed to these standards, they may provide the insight you are looking for. Additionally, note that these are only for the class 1E power system. The non 1E power system (non-vital busses) don't behave in this way.

comment #85447 posted on 2013-04-04 14:31:51 by hiddencamper in response to comment #84864

Ultimate heat sink for PWRs can be the atmosphere. Natural circulation cooldown + auxiliary feed water implies that the atmosphere was being utilized as UHS. I know you don't like hearing my knowledge, but I can say I've read nothing that suggests they lost UHS, and that based on what I've seen, they did cool the reactor down to mode 4 pretty quickly (which you wouldn't opt to do w/out UHS)



comment #85023 posted on 2013-04-03 10:54:57 by Alex Partridge in response to comment #84672

The classification was correct and the NRC will agree. I understand you thinking that in your “personal view” it is an elevated threat, but the risk analysis just doesn’t support it. The terminology used in the business...emergency power...natural circulation...lead the inexperienced to draw skewed pictures of the situation. The NRC is not required to oversee this type of activity, nor will they have any issue with it being classified as an UE. I have been a licensed Senior Reactor Operator on a similar plant, and assure you that this tragedy is an industrial accident. The damage to the electrical equipment did raise the risk of radiological issues but it was a very minimal change. The fact that it was on Easter Sunday is actually a good thing...fewer people were at the plant and this probably reduced the human loss. On a non-holiday, it is likely that more people would have been working near the stator’s path after the lifting equipment failed. As for the safety procedures and culture, that will be up to OSHA to investigate. This type of lift is a huge evolution. No doubt that many hours of planning went into it and that the right people were there. Many plants actually have an engineer on staff that specializes in heavy lifts.

comment #85731 posted on 2013-04-05 18:39:32 by John Weigler

Anonymous, excellent show of courage. You explained my point exactly. "The schedule" takes priority over everything. The culture of nuclear power has changed dramatically over my nuclear career. Scheduled outages have been reduced from 100 days to less than 30 days. Many of those changes I agree with. However, the disregard of a power greater than ourselves and the manipulation of people to accomplish these schedules is horrible to me. I am not saying that is what happened here. I truly do not know what happened here. I know a stator was dropped and people were hurt. One person was killed. I also know night-shift thought the lift was unsafe. Day-shift came in and tried the lift, the rest is history. Lets just say replacement power is 1 million dollars a day. How many days will this set the outage back? What will the lawsuit cost? How much is a life worth? I know my management and the management in other plants wants everyone to go home the way they came in. Would it hurt anything to acknowledge God and observe the holiday? At least put off enormous evolutions until all were thru the holiday. I have seen that done before. We even schedule planned outages around big holidays. It is better for our people and better for the plant.

## Inspector General Report Presents Results of the NRC 2012 Safety Culture and Climate Survey

posted on Wed, 03 Apr 2013 16:35:22 +0000

*Stephen Dingbaum*  
Assistant Inspector General



The [Office of the Inspector General's](#) most recent report — [2012 NRC Safety Culture and Climate Survey](#) — is now available to the public. The results of the survey of the agency workforce were significantly more favorable than comparable national and industry norms. However, the results of the 2012 survey were less favorable than the agency’s 2009 results, and the report identifies opportunities for improvement. The survey was administered from September 4 – September 28, 2012. All NRC employees and managers were eligible to participate and almost 80 percent did so – providing a reliable and valid measure of the current attitudes and perceptions of the agency staff. The OIG engaged an independent contractor, Towers Watson, to conduct the survey. The OIG asked the contractor to conduct results-to-action workshops during the week of Jan. 8, 2013. The workshops were designed to help agency managers analyze the survey results for their individual organizations and develop appropriate action plans aimed at improving NRC’s safety culture and climate.



### Comments

comment #86605 posted on 2013-04-09 04:38:52 by James Greenidge

Excellent brief on NRC's safety culture! A article that highlights its success in the face of FUD and denial can be found at <http://atomicinsights.com/2013/04/was-gundersen-a-licensed-reactor-operator-and-senior-vp-nuclear-licensee.html>. James Greenidge  
Queens NY

comment #86778 posted on 2013-04-09 15:46:53 by Brenda Edwards McCracken in response to comment #85098

My sentiments exactly CaptD. Complaining people can be a sign of a healthy Culture of Safety. Few people complain when there's a Culture of Silence.

comment #85098 posted on 2013-04-03 13:18:44 by CaptD

In tough financial times who is going to not take part in saying how wonderful their employer is, especially when all Government jobs are dependent upon the public not calling for reductions!

## Inspector General Report Identifies Ways To Improve NRC's Safeguards Information Local Area Network and Electronic Safe

posted on Thu, 04 Apr 2013 18:16:17 +0000

*Stephen Dingbaum*  
Assistant Inspector General



The Office of the Inspector General's most recent [report](#) – Audit of NRC's Safeguards Information Local Area Network and Electronic Safe (SLES) – is now available to the public. This audit set out to determine if the system used by the NRC for safeguards information, a special category of sensitive unclassified information, met the needs of the users and was secure. The OIG found that NRC has developed a secure electronic system to store and manage safeguards information while also reducing paper SGI and the space needed to store SGI documents; however areas exist for improvement. Specifically, the system does not meet user needs and uses inconsistent access rights. The OIG's audit report makes recommendations to improve the agency's SLES system. NRC management stated their agreement with the audit report and recommendations.

### Comments

comment #86411 posted on 2013-04-08 15:51:29 by Moderator in response to comment #85729

OIG has not recently reviewed fines given to operators and OIG does not have any information that this is a problem at this time. If you have information indicating a problem we would like to hear from you so we can consider conducting such a study. Stephen Dingbaum

comment #87641 posted on 2013-04-11 19:12:24 by CaptD in response to comment #86411

Sir, Please search the NRC database for DAB Safety Team, we have submitted "too many" technical papers on the safety problems at San Onofre which have resulted in no fines (that I know of) to date! See this link for more:  
[https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=15V8BD4YK0MjwUV6gPZt6tLS\\_IP7CpClzgnZentLfx8U](https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=15V8BD4YK0MjwUV6gPZt6tLS_IP7CpClzgnZentLfx8U) + Here is our latest, a copy of which was sent to many at the NRC, including the Director, let me know, (my contact info is listed below) if you would like to be added to our email list, which is always sent out as Bcc and is never shared without your permission:  
<https://docs.google.com/folder/d/0BweZ3c0aFXcFZGpvRlo4aXJCT2s/edit?pli=1&docId=1rmeut1NMP4Wh7j0GWJxoQVyeLEnsS7X-K2BaCcThLtc> If this does not get your attention, I don't know what will!  
Thanks in advance

comment #85454 posted on 2013-04-04 15:20:11 by Moderator in response to comment #85446

Thank you. We've corrected the link. Moderator

comment #85446 posted on 2013-04-04 14:30:45 by

The attached report seems to deal with Safety Training and not the subject of the BLOG.

comment #85729 posted on 2013-04-05 18:32:38 by CaptD

I'd like to hear more about how the IG of the NRC reviews the fines given to Operators that don't follow the rules and hopefully you can provide a link to a listing of how they are calculated and when they were given to each Operator... If I remember correctly there was an IG report that said in essence that the NRC was rubber stamping industry documentation instead of producing their own rules in order to regulate the industry...

## The NRC and Protecting the Environment: The NEPA Process

posted on Fri, 05 Apr 2013 14:29:10 +0000

*Larry Camper  
Director  
Division of Waste Management and Environmental Protection*



At the NRC, we think of ourselves as an environmental agency. This view is included in the NRC mission statement: "To license and regulate . . . to ensure the adequate protection of public health and safety, promote the common defense and security, and to protect the environment." To fulfill the environmental protection part of our mission, we use the National Environmental Policy Act, or [NEPA](#), as implemented through [NRC regulations](#). NEPA requires all federal agencies to evaluate the impacts of their actions on the environment. NRC conducts environmental reviews on applications for a license to construct and operate a new facility; to renew or amend an existing license; or a plan to decommission an existing facility. Such facilities include commercial power reactors, as well as nuclear fuel fabrication plants, spent fuel storage installations, uranium conversion and deconversion plants, enrichment facilities, radioactive waste disposal sites, and uranium recovery operations. The product of an NRC environmental review is typically an Environmental Impact Statement, or EIS, which publicly available and developed with input from the public. The EIS details the potential environmental impacts of a proposed action (such as construction and operation of a nuclear facility) and reasonable alternatives (such as other locations for a facility or not building it at all). It also identifies mitigation measures to reduce any adverse impacts to the environment. NRC reviewers analyze impacts to air, water, plants and animals, natural resources, and property of historic or cultural significance. They also evaluate economic, social, human health, cumulative and other impacts, and environmental justice. Impacts of potential accidents are also assessed. Public

involvement is key to this process. NRC requests public input on the scope of the review and the draft conclusions, usually through public meetings held near the proposed facility. We consult with federal, state and local agencies, as well as Tribal governments. The draft EIS is critically reviewed by the [U.S. Environmental Protection Agency](#), other organizations, and the public. We address each comment received during the public comment period in the final EIS. NRC's NEPA process and our reviews of the safety aspects of facilities we regulate form the basis for the Commission's regulatory decisions and help ensure that our mission goals are accomplished. We are always trying to improve our NEPA process. One way is through the NRC's NEPA Steering Committee. This committee helps ensure coordination and consistency among the agency's offices that implement NEPA. It also analyzes emerging and complex NEPA issues and implements programmatic changes.

The steering committee has focused recently on improving our implementation of the National Historic Preservation Act Section 106 process, enhancing our outreach to Native American Tribes, and reviewing guidance from the Council on Environmental Quality.

### Comments

comment #87626 posted on 2013-04-11 18:28:23 by CaptD in response to comment #86028

I disagree, the NRC has proven itself little more than an industry cheerleader, caught too often rubber stamping suggestions from the very industry it is charged with regulating! Great example are the bowing to SCE instead of shutting down San Onofre and the EPA now wanting to increase radiation limitations to make it easier for the nuclear industry to "justify" ineffective evacuation plans... More here on why the nuclear industry feel threatened by Solar (of all flavors) A Most Important Article about why Solar is such a threat to US Utilities, Think of it as an Fiscal/Energy War for market share: Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business <http://www.eei.org/ourissues/finance/Documents/disruptivechallenges.pdf>

comment #86406 posted on 2013-04-08 15:26:06 by Moderator in response to comment #85911

There are several opportunities for the public to participate in the NEPA process, as described in the post above. However, our NEPA reviews examine the potential environmental impacts of proposed licensing actions. Monitoring radiological releases falls under our Reactor Oversight Process in the course of our day-to-day regulatory oversight of the nuclear power plants. The NRC requires all plants to submit annual reports detailing their radioactive releases and the effects, if any, on the environment. These reports are not proprietary or sensitive, and they are posted on the NRC website here: <http://www.nrc.gov/reactors/operating/ops-experience/tritium/plant-info.html> Larry Camper

comment #85911 posted on 2013-04-06 10:13:34 by CaptD

Larry, How can the public take part in the EIR process and more importantly determine if a Utility complies with its pollution

standards, since they do not have to notify the public of radioactive releases either into the atmosphere and/or the cooling water (ocean or river) they use? Public oversight demands access to information and/or data, much of which is now either restricted or labeled "proprietary" in order to keep it from public scrutiny by the NRC.

comment #86028 posted on 2013-04-06 21:08:49 by John J. Coupal, Ph.D.

There appears to be interest in consideration of changing the hierarchical leadership structure of the U.S. Environmental Protection Agency into one more like that of the U.S. Nuclear Regulatory Commission. Environmental decisions by the U.S.E.P.A. often appear to be political, couched in language implying only scientific and technical analysis. A commission of both political appointees and a chairperson appears capable of impartiality in scientific and technical decisions, which often appears absent from an agency with a sole administrator.

## NRC Posts Newly Digitized Historical Images on Flickr

posted on Mon, 08 Apr 2013 18:59:07 +0000

*Ivonne Couret*  
Public Affairs Officer

Are you interested in what President Jimmy Carter looked like when he toured Three Mile Island in the spring of 1979? Or see the



change in fashion styles of NRC engineers over the past decades? These photos and more than 50 other newly digitized historical images have been added to the [NRC's Flickr Photostream](#). They are in a set called [Historical Moments](#) and coincide with the release of our new [YouTube video – Moments in NRC History: Three Mile Island](#). We will continue to add more historical images on a regular basis. These photos are open domain and may be used for all non-commercial purposes (although we do like a photo credit). You do not need a Flickr account to view or download the images. To learn more about NRC photos on Flickr read our previous [NRC blog post](#).

### Comments

comment #87016 posted on 2013-04-10 13:41:12 by

The engineers' fashions haven't changed since the agency was formed.

comment #93037 posted on 2013-04-25 06:26:00 by Vector Graphics

The image is broken. I love the Three Mile Island:)

comment #93154 posted on 2013-04-25 11:27:33 by Moderator in response to comment #93037

We checked all the links, and they are all correct . . . Moderator

## NRC Sends Additional Inspectors to Oversee Perry's Refueling Outage

posted on Wed, 10 Apr 2013 13:17:33 +0000

*Viktoria Mitlyng*  
Senior Public Affairs Officer  
Region III





A refueling outage is a time when the number of workers at the plant soars from 700 to about 2,000 -- with most working in highly radioactive areas of the plant not accessible during normal plant operation. The NRC has sent four additional inspectors -- in addition to the two Resident Inspectors -- to the [Perry Nuclear Plant](#) in Ohio to watch and evaluate how the plant is ensuring the safety of these workers. Sending these extra inspectors to monitor outage activities reflects the measure of our concern with Perry's occupational radiation safety program -- which is supposed to make sure workers don't get exposed to unnecessary levels of radiation. The plant is under increased NRC oversight because of deficiencies in this program. Even though these issues have not resulted in any overexposures to workers, we want to make sure the plant fixes the weaknesses in this vital area. To be clear, there are no problems with the plant's program to protect the public from radiation. In June, we will conduct a thorough inspection to determine if plant owner FENOC has understood the extent of the weaknesses in occupational radiation safety at Perry and has taken what we call "sufficient and sustainable actions" to fix the problems and prevent them from happening again. This refueling outage is a great opportunity for our inspectors to see with their own eyes how the plant is handling the most hectic time for the site with the largest number of people working in most highly radioactive places in the plant. Specifically, our inspectors are looking at whether the plant's radiation protection department is accurately assessing the radiological conditions in high radiation areas and adequately preparing the workers for these conditions. They are evaluating the quality of the plant's radiation safety procedures; the effectiveness of workers' radiation safety training and the workers' adherence to procedures. Inspectors are also assessing if plant workers across the board, not just radiation protection personnel, are adhering to radiation safety practices. Our observations and assessments from the current refueling outage plus the follow-up inspection in June will help us determine if the plant has resolved the deficiencies in occupational radiation safety. If not, the plant will start receiving the highest level of NRC oversight for an operating plant.

#### Comments

comment #87373 posted on 2013-04-11 08:18:15 by Ken Johnson in response to comment #87153

All workers ( including temporary ) who enter the Owner Controlled Area of a nuclear power station have had background checks, fingerprinting, drug testing, and training. We do not have "security clearances" per se, in the civilian nuclear industry.

comment #87153 posted on 2013-04-10 22:55:15 by john bowers

Do these 1300 extra workers have security clearances?

comment #87511 posted on 2013-04-11 14:02:23 by Moderator in response to comment #87153

Contract workers are subject to the same regulations as regular plant workers and must have the required clearances to work at the plant. Viktoria Mitlying

comment #89473 posted on 2013-04-16 14:30:51 by Jerry

Great gesture and crucial decision to add more of the inspectors.

### Ensuring the Safety of Spent Fuel in Storage

posted on Tue, 16 Apr 2013 18:22:36 +0000

*Mark Lombard*  
*Director, Office of Spent Fuel Storage and Transportation*



Spent fuel dry casks

[caption id="attachment\_4049" align="alignright" width="300"]

While no one can say with certainty today where spent nuclear fuel will ultimately go for long-term storage or disposal, one thing is clear: the current methods of spent fuel storage are safe. Managing the “back end” of the nuclear fuel cycle – what happens to the fuel after it is taken out of a reactor – may never be completely separated from political and economic considerations. But the technical challenges are fairly straightforward. Spent fuel is hot. And it is extremely radioactive. It must be kept cool and it must be shielded to protect workers, the public and the environment. It must also be properly controlled to prevent it from achieving a sustained nuclear chain reaction, also known as going critical. The NRC has updated its [Storage of Spent Nuclear Fuel fact sheet](#), which explains the two major ways spent fuel is managed – in pools and in dry cask storage. The fact sheet explains the regulatory requirements, inspections and monitoring that ensure spent fuel is managed safely. It also details improvements the NRC has made to address concerns raised by the accident at Japan’s Fukushima plant and the 9/11 terrorist attacks. An NRC backgrounder, [Dry Cask Storage of Spent Nuclear Fuel](#), provides more detail on how this management strategy evolved, the basic requirements for dry storage, different licensing options and opportunities for public input. A great deal more information on spent nuclear fuel storage is also available on the [NRC’s website](#). We encourage you to read about our activities in this area and post your questions, comments and concerns below.

## Comments

comment #91805 posted on 2013-04-22 14:08:24 by Moderator in response to comment #91208

The dry storage casks typically have an inner sealed metal canister, several inches thick, that provides containment for the spent nuclear fuel. One of the many requirements for licensing a spent fuel storage system is that it must prevent a nuclear chain reaction. Cask designers can do this by putting “poisons” inside the canister—materials that absorb the neutrons necessary to cause fissioning. They can also space the fuel assemblies far enough apart that they will not fission. Another protection against criticality is the fact that the fuel is “spent,” which means it can no longer efficiently sustain a chain reaction even in the reactor core. Spent fuel is much less reactive than fresh fuel. Spent fuel has much less of the U-235 isotope that fissions than is present in fresh nuclear fuel. There are also more fission products, which become more stable (less reactive) the longer the fuel remains in the reactor core. The buildup of fission products slows down the chain reaction at the same time that the U-235 is being depleted, which is why the fuel is eventually removed from the core. Finally, the canisters are designed to keep out any water. A chain reaction in a spent fuel storage cask could not begin without the presence of water. The spent fuel could not burn inside these sealed metal containers. A fire requires oxygen. All oxygen is removed from these casks and they are filled with an inert (nonreactive) gas. Even if oxygen were present, there is no ignition source inside the canisters. Mark Lombard

comment #91804 posted on 2013-04-22 14:06:58 by Moderator in response to comment #91033

Dry storage casks usually consist of a sealed metal cylinder to contain the spent fuel placed inside a metal or concrete outer shell to provide radiation shielding. The casks must also manage the heat and prevent nuclear fission. They are designed to withstand earthquakes, projectiles, tornadoes, floods, temperature extremes and other scenarios. The heat and radioactivity from the spent fuel decrease over time without the need for fans or pumps. The casks are under constant monitoring and surveillance. More details about dry cask storage can be found in this backgrounder: <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/dry-cask-storage.html> Mark Lombard

comment #91760 posted on 2013-04-22 11:20:53 by hiddencamper in response to comment #89811

Hi John, here's a reactor engineer response: Spent fuel has lifetime limits and burnup limits. Lifetime is straightforward, the fuel is only allowed so many years at reactor temperature and pressure. Burnup limits are what you are talking about, and has to do with how much energy was extracted from the fuel (this causes changes inside the rod), and neutron/radiation exposure. For the most part, the fuel rod cladding (zircalloy) is transparent to neutrons, the bigger issue with the rods is generally the changes to the chemistry of the fuel INSIDE the rod, which reduces the heat conductivity of the rod. For a BWR, a fuel rod can typically transfer something like 12 kw of heat per foot of rod, but after a couple years, it can only transfer about 5 kw per foot. For PWRs, they tend to start in the 20-22 kw/ft range, and decrease to around 12 kw/ft. In either case, this limits how much power you are allowed to get out of the rod and is another reason they are replaced. The thing which USUALLY drives replacement, is actually the depletion of fuel, and not the thermal and age limits of the fuel rod. However, sometimes you end up in cases where you have a fuel assembly which spent too much time in hot spots of the core and needs to be discharged early. The plant's core monitoring systems keep track of these parameters for every individual fuel rod and calculates this continuously.

comment #91759 posted on 2013-04-22 11:16:30 by hiddencamper in response to comment #91208

I can't speak for all plants, but the plants i have worked at have boron plated fuel racks for spent fuel. it is basically a permanently installed control rod which ensures the fuel cannot go critical in the spent fuel pool. There are requirements to maintain the spent fuel pool criticality less than 0.95 dk/k of reactivity at all times. For plants that do not have boron plated racks, they need to do calculations to prove this every time they move a spent fuel bundle. With regards to Ft. Calhoun, the spent fuel rods are well above the flood plane. I know this much for fact.

comment #89475 posted on 2013-04-16 14:34:16 by

Why not pursue "closing" the fuel loop by finding alternatives for reuse of the spent fuel. France has been reprocessing for years. We had reprocessing available to us in the 1960's and early 1970's and then West Valley was abruptly shut down. Although reprocessing may not be a complete answer, there are alternatives that decrease the amount of spent fuel and storage requirements. Research and development is being conducted now, yet nothing has resulted from it. It seems as what is being developed here is used in other countries. We have one of the best nuclear programs in the world, yet we fall behind in implementing the technologies we develop here in the United States. How do we benefit here at home? How do we communicate the future of nuclear as being a safe and sound energy alternative? Moreso, how are we closing the fuel cycle rather than just allowing the spent fuel to sit? I understand that money has a lot to do with it, but if Yucca Mountain is not even on the list of alternatives, then that money should be redirected to something that will work in the near future. Even private corporations have explored these alternatives.

comment #89525 posted on 2013-04-16 17:46:09 by Susan Beech

That's interesting because I had no idea that you could take the fuel out of a nuclear reactor. Most fuels that help highly destructive weapons like that is usually extremely hot and very radioactive. I do know they have specialized tanks for that. Tanks are built for the highly flammable and radioactive fuels.

comment #90897 posted on 2013-04-19 11:55:17 by hiddencamper in response to comment #90682

Talk about FUD You can go to every plant's operating license on the NRC webpage. If you go to technical specifications, usually in chapter 3.8.1 (for improved standard technical specifications, which many plants use), a condition of operability for the plant is to perform monthly testing for each diesel generator. There are also reliability requirements for diesel generators (most plants are over 95%, many over 97.5%), requirements for cold quick starts, 24 hour run requirements, and rebuild maintenance requirements, that are required as part of the plant's operating license. I know my plant in particular performed 300 start tests on each diesel during startup testing, and we perform at least 12 start tests per year, per diesel, with at least two of those cold quick starts, and at least 1 every 2 years is a full 24 hour after major maintenance. We also rebuild our generators every 10 years to keep them in like new condition. I've personally witnessed many of these tests on the generators. When things wrong with them are discovered we have a clock which starts which requires us to fix it or shut the plant down, then re-test the generator after it has been fixed. Additionally we have to evaluate "past operability", and perform common mode evaluations to ensure the other generators are not out of service due to the same problem. I'm not sure why things from 30 years ago somehow mean the nuclear industry isn't doing the right thing today. This is nothing more than conjecture/conspiracy/FUD.

comment #89806 posted on 2013-04-17 10:55:17 by in response to comment #89733

I stated the same thing, but for some reason, my comment did not post. My point was that so much research and development has gone into the reuse of spent fuel. Additionally, we can mention Yucca Mountain--which could, rather be used for long term storage--be a facility where spent fuel is stored and reprocessed. New technologies could be developed there too. Many things are being developed here all the time--with other countries taking advantage of our technology and expertise. Remember West Valley?

comment #89811 posted on 2013-04-17 11:06:10 by Moderator in response to comment #89525

Because nuclear fuel loses efficiency over time, commercial nuclear reactors routinely remove the oldest fuel from their cores every 18 to 24 months and load fresh fuel in its place. These loading/unloading operations must be done in compliance with NRC regulations to ensure that the public and plant workers are adequately protected from the spent fuel's radioactivity. The fuel is then placed in large pools of water to cool and shield it. Commercial spent fuel is not used to make nuclear weapons. The fact sheet and backgrounder linked to the blog post explain spent fuel storage in more detail. Mark Lombard

comment #89813 posted on 2013-04-17 11:07:45 by Moderator in response to comment #89475

Anonymous -- We do not have any unapproved comments pending, nor have any been "not approved." If you still do not see your comment, please resubmit it. Moderator

comment #89733 posted on 2013-04-17 06:18:47 by James Greenidge in response to comment #89475

You know if there was a way people could see physically in one place the mass of material emitted in the atmosphere (hence hourly into their babies lungs) by fossil fuels in the country just in one week they'd be having grave second thoughts about how "big" a problem siting sealed-up nuclear waste is. James Greenidge Queens NY

comment #91033 posted on 2013-04-20 02:16:29 by Usman Raza

Yes, i agree, its truly very important task of storing fuel..Cask storage, what is this storage medium? can you explain?

comment #90682 posted on 2013-04-19 00:46:33 by john bowers

NPPs and SFPs are not safe if the diesel generators aren't checked and made sure they are not a joke: Back in the day, when we checked the emergency back-up diesels in America, a mind-blowing number flunked. At the New York nuke, for example, the builders swore under oath that their three diesel engines were ready for an emergency. They'd been tested. The tests were faked, the diesels run for just a short time at low speed. When the diesels were put through a real test under emergency-like conditions, the crankshaft on the first one snapped in about an hour, then the second and third. We nicknamed the diesels, "Snap, Crackle and Pop." from <http://enenews.com/emergency-declared-at-u-s-nuclear-plant-after-lightning-strike-venting-of-the-unit-1-primary-containment-normal-radiation-levels-have-been-reported-nrc-mobilizes-incident-response-ce> Come on nuclear industry, you threaten half the country with every plant and pool.

comment #90356 posted on 2013-04-18 10:00:53 by Moderator in response to comment #89475

The NRC, as an independent regulatory agency, does not promote nuclear programs. NRC ensures public health and safety through regulatory programs on any fuel cycle facility the country pursues. At this time, there has not been sufficient commitment by industry to license, construct and operate a reprocessing facility. The Department of Energy plays a leading role in setting nuclear policy. DOE is researching advanced nuclear fuel technologies, including reprocessing, fuel designs and advanced reactors. The NRC has done some investigations to better understand reprocessing technologies, should the Commission task the staff with developing regulations for licensing an advanced reprocessing facility. The NRC staff is due to report to the commissioners this summer on recommendations as to whether NRC should proceed toward developing a regulatory framework for reprocessing. Mark Lombard

comment #91212 posted on 2013-04-20 15:35:44 by john bowers in response to comment #89733

I'll take the coal particulate matter over fallout like that from Fukushima any day, thank you. I'm also wondering if the wood fiber substrate photovoltaic technology (1/100,000th the cost of glass substrate to produce), will be allowed to flourish, or if we will stick with the Global Genome Destruction means of producing power.

comment #91209 posted on 2013-04-20 15:33:46 by john bowers in response to comment #89811

Is it true spent fuel also is removed and replaced because the intense radioactivity damages the cladding enough to make integrity a concern?

comment #91208 posted on 2013-04-20 15:32:24 by john bowers

Why is spent fuel not stored in containment structures? Is is not an uncontained nuclear reaction waiting to happen in the event of meltdown? Is a fire not just as bad? Fort Calhoun, did those rods get exposed to river water? Would the NRC or the industry have told us if they did? Your industry risks the entire freaking corn belt just from one spent fuel pool at Calhoun. More flooding this year is predicted. Does the COE have a plan to blow levees if needed to prevent further 'incidents' in Nebraska or with other reactors in flood plains? Or would that be too embarassing to the economy or the administration?

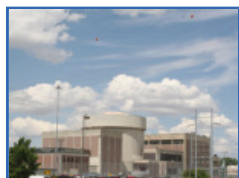
comment #91710 posted on 2013-04-22 08:55:51 by sfmtusker

This is something indeed very remarkable. I was unaware that fuel can be extracted from a nuclear reactor. Totally agree with you Susan, tanks are specifically manufactured for highly flammable and radioactive fuels. By updating its fact sheet, NRC has done a wonderful job.

## Fort Calhoun: A Status Update

posted on Thu, 18 Apr 2013 19:47:10 +0000

*Lara Uselding*  
Public Affairs Officer, Region IV



The NRC held a public meeting with Omaha Public Power District (OPPD) on March 27 to discuss the status of the [Fort Calhoun](#) nuclear plant. The plant, just north of Omaha, Neb., has been shut down since April 9, 2011, for a refueling outage. The outage was extended due to historic flooding along the Missouri River followed by an electrical fire that led to an "Alert" declaration and further restart complications. At the March meeting, NRC oversight panel members shared that a 15-member inspection team had been on site conducting a very thorough inspection and independent verification of the plant's current status. Based on the results of the team inspection



activities, the NRC has found there are a number of potential issues that appear to need licensing actions. The NRC has scheduled a meeting with OPPD officials on April 22 to discuss four changes the licensee made to the plant that may have required prior NRC approval. The first involves a change made to the plant's water intake structure, which was discussed in a recently issued [report](#). Secondly, OPPD used a method to evaluate systems, structures and components for seismic conditions that was not part of their licensing basis. Thirdly, they changed the method for analyzing the suitability of piping systems without approval. Lastly, some plant equipment may not be adequately protected from tornado-driven projectiles. The meeting to discuss these issues is open to the public and details about the meeting can be found [here](#). The public is encouraged to contact the project managers to obtain meeting materials prior to the meeting and to ensure they plan for the appropriate number of bridge lines. A second [meeting](#) also is scheduled between NRC and OPPD on April 22. That meeting, to discuss the ongoing review of flood mitigation activities, is closed to the public due to sensitive security information being discussed.

#### Comments

comment #92144 posted on 2013-04-23 08:39:35 by Ménage in response to comment #90502

You have absolutely right John!

comment #90685 posted on 2013-04-19 00:51:52 by john bowers

The Calhoun accident illustrates something I bet safety planners did not take into consideration. Why didn't the COE have a plan to blow levees if necessary to keep the plant from flooding and melting down? And to keep the SFP from flooding? The COE blew SE Missouri levees to protect downstream towns from flooding. But not to keep the Corn Belt from being DESTROYED!!!! The left hand of government did not know what the right hand was doing. OR, and here it is, the executive branch did not want to disturb the economy or the public by blowing levees to keep an NPP from flooding. I think the latter was the case, though bureaucracy alone is perfectly capable of destroying a nation. And by the way, were the cooling water pumps submersible? Please tell.

comment #90502 posted on 2013-04-18 16:40:56 by John

Public participation is utmost important and their input during the meeting is crucial.

comment #91711 posted on 2013-04-22 09:01:02 by Moderator in response to comment #90685

Cooling water pumps are not submersible. The plant has adequate protection, as demonstrated during the last flood, to keep the plant in a safe shutdown condition during flooding. Lara Uselding

#### Let's Chat – Coming Soon to the NRC

posted on Tue, 23 Apr 2013 13:49:04 +0000

Holly Harrington  
Senior Advisor



The NRC is expanding its social media program next week by launching a pilot of a live discussion platform known as [NRC Chat](#). The first Chat is scheduled for April 30 at 2 p.m. EST on the subject of history of U.S. nuclear power with the NRC's historian, Tom Wellock. The Chat is similar to the existing NRC blog, and is also hosted on WordPress, but it features a real-time discussion. Each one-hour Chat session will focus on a specific issue with an NRC expert responding to the questions. Some sessions we hope to hold in the future will include such topics as Japan "lessons learned" activities, hurricane preparedness and "waste confidence." Chat addresses a key element in NRC's Open Government Plan -- enhancing the agency's communication with the public and other stakeholders through the use of social media technologies. Information on Chat comment guidelines is [here](#). We'll post the future schedule and topics soon, and will always [tweet](#) reminders. We expect to hold two Chat sessions a month for about six months. We'll then evaluate the platform, and solicit your input. You can submit questions early by sending them to [opa.resource@nrc.gov](mailto:opa.resource@nrc.gov). Please put CHAT in the subject line. We hope to see you at the Chat!

#### Comments

comment #92207 posted on 2013-04-23 12:02:25 by CaptD

Suggestion: Why not be brave and let US suggest topics for these live chats, this would give "US" access to NRC experts that otherwise we would never be able to communicate with? I'd LOVE to be able to discuss the potential ramifications of multiple steam generator tube failures and/or Main Steam Line Breaks, which both the NRC, the NRR and even the ACRS has been very reluctant to say very much about!

## Q&A With NRC Kids: Radiation and Other Questions

posted on Thu, 25 Apr 2013 15:23:46 +0000

*Eliot Brenner*  
*Director, Office of Public Affairs*



[caption id="attachment\_4079" align="alignright" width="300"] One of the participants in the new video takes a question. [caption] Art Linkletter, a 1950s and '60s radio and television host, used to interview children for his show "Kids Say the Darndest Things." In that spirit, at last year's "Take your Child to Work Day" at the NRC, we seized the opportunity to see what kids knew about NRC and related matters – and make it into a [video](#). We asked: Do you know what radiation is? We got a variety of answers – some vague and some spot on (they've obviously been listening to their parents). Then we asked: Do you know what has radiation in it? No, not candy, despite what the kids might think. But yes, bananas and salt, and it also comes from the sun and from the stars, as explained by the NRC expert who answered the question. Other questions we asked include what do nuclear power plants generate and what is a regulation. We have a variety of NRC experts answering all the questions – and correcting a few misunderstandings. We hope you enjoy the video, and that teachers and parents can use it to help explain nuclear matters to school-aged children. And we want thank all the kids who participated in this project.

### Comments

comment #93982 posted on 2013-04-26 14:23:41 by CaptD

This is nothing less than NRC propaganda and I'm disappointed in the NRC that they feel like they can use OUR tax money to help push the Nuclear Industries agenda! Where is the balanced perspective and/or video's from kids that have been displaced by Nuclear Gone BAD like in Fukushima?

comment #94930 posted on 2013-04-29 15:05:53 by akanter

I find this quite disturbing. Although potentially educating the younger generation about the real dangers of nuclear power plants and the entire fuel cycle would be a useful endeavor, this is total propaganda, blurs--no, erases--the line between regulator and industry spokesperson. I can appreciate the fun it must have been for the director of public affairs to get employees' children into a video, but not only is this misleading and misinformed, but the effect on both the children and the public is detrimental. This video should be pulled immediately. Why not ask the children around Fukushima or Hanford, Washington, or the Navajo reservations (where uranium is mined) these same questions? I think you would get a different response. The NRC should do its job and stop playing at it. We have dozens of nuclear power plants identical to those that melted down in Fukushima still in operation. No significant changes have been applied. It is the nuclear REGULATORY commission, not the nuclear propaganda corporation.

comment #94064 posted on 2013-04-26 14:31:50 by CaptD

UNICEF 2006 comments on Health Impacts of Chernobyl [http://www.unicef.org/infobycountry/ukraine\\_33604.html](http://www.unicef.org/infobycountry/ukraine_33604.html) Twenty years later, the Chernobyl disaster still affects children's health

comment #94760 posted on 2013-04-28 23:22:46 by Christina MacPherson

This article is just another example of the nuclear lobby's snide deceptions. Take for example, the mention of radiation in bananas. Is that the same as radiation from nuclear activities? The potassium-40 in bananas is a particularly poor model isotope to use, because the potassium content of our bodies seems to be under balanced control. When you eat a banana, your body's level of Potassium-40 doesn't increase. You just get rid of some excess Potassium-40. The net dose of a banana is zero.

comment #93167 posted on 2013-04-25 11:47:22 by knownukesil

I wonder -- did you also ask them what the National Academy of Sciences is? or, if they knew what BEIR VII meant? or, what they concluded about radiation in June of 2005? Did you ask them if they knew that they were up to 6 times more susceptible to the negative health effects of ionizing radiation than is an adult white male? and that in utero, the effects are even more pronounced? or that women are also more susceptible than men to its effects? Did you ask them if they knew that arsenic and lead were "natural," and

all around us, often in our food and water? I was never one to use "scare tactics" on kids; it's mean and unethical. But so is the incremental "normalization" of something that is largely of potential harm, especially to those with primitive or incomplete understanding of the topic. This seemingly innocent "softening up" technique going on with kids seems less about clarification than it is about removing deserved healthy suspicion and skepticism of the effects of ionizing radiation.

comment #93329 posted on 2013-04-25 17:36:02 by

Did you tell them that it causes cancer and is now in their milk? That President Kennedy knew back in 1962 that Strontium 90 from above ground nuclear testing (the same S 90 that is found in nuclear power production and accidents today) in the US had migrated to their parents baby teeth via milk when they were kids, and that even then it was known to cancer? This was before the NRC had turned pro with propagating lies at our kids expense. Spin on, NRC, spin on...

## Tracking the Source: Pilgrim's Tritium Link

posted on Mon, 29 Apr 2013 17:43:06 +0000

*Neil Sheehan*  
Public Affairs Officer, Region I



It may not be as daunting as searching for the proverbial needle in a haystack, but the process of trying to track down the source of tritium contamination at the [Pilgrim nuclear power plant](#) has been long and painstaking. Since mid-2010, efforts have been under way to determine why certain groundwater monitoring wells at the Plymouth, Mass., site have detected very low levels of [tritium](#), a naturally occurring radioactive form of hydrogen that is also a byproduct of nuclear power plant electricity production. While tritium emits a weak form of radiation, does not travel very far in air and cannot penetrate the skin, the release of the radioactive material via an uncontrolled pathway is unacceptable to the NRC. There is still more checking to be done, but now there is a possibility a 4-inch underground pipe might be the culprit. The NRC, from the time the contamination was identified, has continued to press the plant's owner, Entergy, to hunt for the point of origin so that further leakage could be prevented. Work done to find the source included extensive visual inspections of tanks, and piping and dye tests to track groundwater flows at the facility. Until recently, those efforts did not bear fruit. However, water leakage into the reactor building that occurred in mid-April helped plant personnel focus on the pipe in question. This pipe is used infrequently during any given year, to allow for the discharge of water containing small amounts of radioactivity, which limited the opportunities to detect this break. Still, this pipe was due to be checked as part of a voluntary nuclear industry initiative to inspect underground pipes and tanks that has been under way for several years and that all plants have undertaken. The NRC will independently verify whether the pipe is, in fact, to blame for the contamination. In the meantime, the pipe has been removed from service to prevent any additional leakage. An NRC inspection of the plant's implementation of the voluntary industry initiative is scheduled for September. It's important to note that the tritium contamination has remained on-site. Since the groundwater there is not used for drinking-water purposes, there is believed to be no risk to plant employees or the public as a result of the contamination.

### Comments

comment #95138 posted on 2013-04-30 10:04:39 by Mary Lampert

Pilgrim Watch response to (4) statements in press release: "Since mid-2010, efforts have been under way to determine why certain groundwater monitoring wells at the Plymouth, Mass., site have detected very low levels of tritium" The efforts got underway due to: (a) the rash of leaks at reactors around the country, including Pilgrim and Vermont Yankee that spurred the Governor of Massachusetts to contact NRC saying that neither reactor should be relicensed until the sources of leaks were identified and directed the Massachusetts Department of Public health to take split samples at Pilgrim and track the status of monitoring; and (b) a contention in Pilgrim's license renewal adjudication process regarding leaks of radioactive material from buried components at Pilgrim. The detected levels of tritium were persistent and above the standards set by California, Colorado and Canada, for example. "There is still more checking to be done, but now there is a possibility a 4-inch underground pipe might be the culprit." Yes there is more checking to be done because it is likely that other buried pipes and tanks are or are about to leak because: Pilgrim's buried components are old (corrosion is a function of age); they are buried in a corrosive environment (corrosion results from exposure to moisture and salt); and the aging management program is insufficient. "It's important to note that the tritium contamination has remained on-site." Neither NRC nor the public knows what has or has not leaked offsite. Because until 2007, there were no monitoring wells onsite and at that time only four were installed- the number required at a typical corner service station. The number of wells at Pilgrim remains inadequate in number and there is uncertainty if all are placed according to potential sources and hydro-geological conditions at the reactor site. "Voluntary industry initiative:" After the leaks at Braidwood and the proliferation of leaks around the country, NRC

established a Task Force. The Task Force recommendations were impressive; however NRC chose once again not to regulate but allow the industry to put into place voluntary measures that does not serve the public interest and is an abrogation of NRC's mandate to protect public health and safety and enforce its own rules that prohibit unmonitored radiation materials to go offsite unmonitored.

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