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TO: Leeds, NRR  
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AUTHOR:

Don Leichtling

AFFILIATION:

ADDRESSEE:

Chairman Resource

SUBJECT:

Concerns press release - the thirty unresolved alarms recorded by San Onofre Nuclear  
Generating Station's vibration monitoring system during eleven months of operation, requires an  
immediate NRR safety investigation

ACTION:

Appropriate

DISTRIBUTION:

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## Remsburg, Kristy

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**From:** CHAIRMAN Resource  
**Sent:** Friday, December 28, 2012 4:15 PM  
**To:** Remsburg, Kristy; Lewis, Antoinette; Mike, Linda  
**Subject:** FW: Press Release + 12-12-28 Thirty Alarms Demonstrates SONGS Unsafe

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**From:** Capt.D [mailto:captddd@gmail.com]  
**Sent:** Friday, December 28, 2012 11:50 AM  
**To:** Capt D  
**Subject:** Press Release + 12-12-28 Thirty Alarms Demonstrates SONGS Unsafe

### **Press Release *Shortened Version* (for Complete Version see below)**

**The DAB Safety Team: December 27, 2012**

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

### **The 30 Un-Resolved Alarms Recorded by SONGS Vibration Monitoring System During 11 Months of Operation, Requires An Immediate NRR Safety Investigation**

**Three Questions affecting US reactor safety need to be answered ASAP, by the NRR:**

1. **WHY**, if these 30 separate alarms were indicating that some unusual phenomena (e.g., FEI) was occurring in Unit 3, did SCE not immediately shut down Unit 3, notify the NRC of the unusual phenomena and get their help in order to properly understand what exactly was going on inside the Unit 3 SG in order to properly diagnose the problem(s), instead of just ignoring them while continuing to operate Unit 3 for 11 months *in an unsafe manner*?
2. **Why** has NRC Region IV's AIT Team **NOT** resolved this issue almost 6 months after issuance of their AIT Report and already informed the public as to the cause(s) of these unusual phenomena, if the causes are now understood.
3. **WHY** should a Utility be able to operate a nuclear reactor while something unknown is happening without shutting it down ASAP and informing the NRC?

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This press release will be posted on the web at this link: [San Onofre Papers](#).

**The DAB Safety Team:** Don, Ace and a BATTERY of safety-conscious San Onofre insiders plus industry experts from around the world who wish to remain anonymous. These volunteers assist the DAB Safety Team by sharing knowledge, opinions and insight but are not responsible for the contents of the DAB Safety Team's reports. We continue to work together as a Safety Team to prepare additional [San Onofre Papers](#), which explain in detail why a SONGS restart is unsafe at any power level without a Full/Thorough/Transparent NRC 50.90 License Amendment and Evidentiary Public Hearings. For more information from The DAB Safety Team, please visit the link above.

**Our Mission:** To prevent a Trillion Dollar Eco-Disaster, like Fukushima, from happening in the USA.

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## Press Release (Complete Version)

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### **The 30 Un-Resolved Alarms Recorded by SONGS Vibration Monitoring System During 11 Months of Operation, Requires An Immediate NRR Safety Investigation**

The DAB Safety Team has transmitted the following Request to the Chairman of the NRC, Offices of Nuclear Regulator Regulations, Atomic Safety Licensing Board and NRC AIT Team Chief.

**Observation:** Thirty times over 11 months, vibrations monitors positioned in the Unit 3 reactor's two steam generators near the tube sheet triggered alarms after sensing unusual movements. 30 alarms were recorded in Unit 3, but none were detected at its sister, Unit 2, which is the same Mitsubishi Heavy Industries design. NRC officials sifted through months of data to determine if Edison properly

analyzed a series of mysterious vibrations detected inside the now-crippled Unit 3 reactor. At the time, it raised questions about whether Edison completely missed possible clues that something was terribly wrong inside the generators. However, the agency later determined that the vibrations were not connected to tube-to-tube wear, according to NRC officials. Unit 3 RSGs were operating at lower pressures compared with Unit 2 therefore lower operating pressures in Unit 3 caused FEI while higher operating pressures did not cause FEI in Unit 2. Mitsubishi states, "lower pressures at steady power cause severe vibrations." NRC AIT Report States, "Additional review and follow up will be required of the vibration and loose parts monitoring system alarms, including evaluation and disposition of Unit 3 alarms and then determine whether this issue represents a performance deficiency or constitutes a violation of NRC requirements." This issue is identified in the NRC AIT Report as URI 05000362/2012007-02, "Evaluation of Unit 3 Vibration and Loose Parts Monitoring System Alarms (Section 3)."

**NOTE:** According to a Japanese Research Paper, "Large vibrations in a nuclear steam generator may suddenly or periodically appear when the fluid velocity approaches the critical velocity creating the onset of fluid elastic instability." Fluid elastic instability may temporarily become pronounced due to formation of steam dry-outs in regions of U-tube bundle with low tube clearances, high heat flux and no in-plane protection. During this time, the entire tube from the bottom of the tube sheet to the top of the U-tube bundle free span\* would move with large amplitudes and hit other neighboring tubes with violent impact due to absence of water film (no tube damping) on the tubes. As the tube clearances adjust due to tube-tube impact and secondary side flow velocity decreases due to changing plant and thermal-hydraulic conditions, the vibrations tend to reduce and fluid elastic instability changes into random vibrations. DAB Safety Team and Westinghouse have established that Unit 3 experienced FEI, but Unit 2 did not. This explains why 30 vibration alarms were recorded in Unit 3 near the tubesheet by vibration loose part monitoring sensors because entire tubes were vibrating with large amplitudes-but none were detected at its sister, Unit 2, because its tubes were vibrating below the detection limit of the poor choice of vibration sensors used.

- **NRC AIT report states,** "In general, tubes exhibiting the free-span wear indications tended to exhibit tube support plate indications with the highest depth measurements, typically with the deepest values at the seventh tube support plate and trending down at successively lower support levels." There were 3000 tube support plate wear indications in Unit 3, while only 360 tube support plate wear indications were found in Unit 2.

**Three Questions affecting US reactor safety need to be answered ASAP, by the NRR:**

1. **WHY,** if these 30 separate alarms were indicating that some unusual phenomena (e.g., FEI) was occurring in Unit 3, did SCE not immediately shut down Unit 3, notify the NRC of the unusual phenomena and get their help in order to properly understand what exactly was going on inside the Unit 3 SG in order to properly diagnose the problem(s), instead of just ignoring them while continuing to operate Unit 3 for 11 months *in an unsafe manner*?

2. **Why** has NRC Region IV's AIT Team **NOT** resolved this issue almost 6 months after issuance of their AIT Report and already informed the public as to the cause(s) of these unusual phenomena, if the causes are now understood?

3. **WHY** should a Utility be able to operate a nuclear reactor while something unknown is happening without shutting it down ASAP and informing the NRC?

## Background

1. OC Register Published: Dec. 19, 2012 Updated: 8:32 a.m.:

### ***San Onofre: Edison backpedals on claim that retooling will aid safety***

The utility that runs the idled San Onofre nuclear power plant backpedaled Tuesday from an earlier claim that a retooled vibration-detection system for the plant's ailing steam generators would be an important safety advance that could help open the way for a possible restart. Southern California Edison said in its October proposal to restart the Unit 2 reactor that the redesigned system, which relies on monitors to detect unusual vibration inside the huge generators, could help detect a break in a tube that carries radioactive water, according to federal documents.

Edison officials came under sharp questioning about the monitors at a U.S. Nuclear Regulatory Commission panel meeting in Maryland, where an NRC official argued that the equipment could not do the job described by the company or provide additional safety if the plant is restarted.

"The instrumentation that you're proposing ... does not appear to be capable of detecting the conditions that would lead to actual tube wear," said Richard Stattel of the agency's instrumentation branch.

The company depicted the equipment in its restart plan as an important safety measure "but it doesn't appear to do that," Stattel said. The NRC staff "doesn't understand where that adds an additional safety margin" as proposed by the company.

Mike Short, an Edison consultant, told regulators that the company "had not intended" to characterize the system as an important safeguard, technically known as "defense-in-depth," or multiple layers of systems designed to prevent accidents or the release of radiation from a nuclear power plant. Short said the data collected by the system could be used in future research examining vibrations picked up by the monitors. "It's our plan ... to make sure that's clear," he said.

The original monitoring system was at issue in a federal investigation after the plant was shut down in January. NRC officials sifted through months of data to determine if Edison properly analyzed a series of mysterious vibrations detected inside the now-crippled Unit 3 reactor. Thirty times over 11 months, monitors positioned in the reactor's two steam generators triggered alarms after sensing unusual movements, according to documents and Nuclear Regulatory Commission officials involved in the probe. At the time, it raised the questions about whether Edison missed possible clues that

something was terribly wrong inside the generators. However, the agency later determined that the vibrations were not connected to tube-to-tube wear, according to NRC officials.

According to an analysis by an outside contractor that reviewed some of the data, the signals picked up by the Unit 3 monitors were similar in nature to what would occur with steep temperature changes when a reactor is starting up or shutting down. But, strangely, the vibrations were detected when the Unit 3 reactor was running at a steady clip. The monitors, technically known as accelerometers and designed to detect loose or broken parts, were positioned near the bottom of the 65-foot high generators. In that location, federal officials say, it would be difficult or even unlikely to pick up vibration and friction among tubes at the other end, where damage was concentrated. And while 30 alarms were recorded in Unit 3, none was detected at its sister, Unit 2, which is the same Mitsubishi Heavy Industries design. The redesigned system is expected to be more sensitive.

## **2. NRC Augmented Inspection Team Report for SONGS**

**Description:** During the review of operational differences between Unit 2 and 3 steam generators the team identified a significant difference in the number of valid vibration and loose parts monitoring system alarms. The vibration and loose parts monitoring system was designed to provide continuous monitoring and conditioning of loose parts accelerometer signals. Two separate accelerometers were installed on each of the steam generators. The location of these instruments are on the steam generators' lower supporting structures and provide acoustic information about loose parts impacts specifically on the reactor coolant or primary side of the steam generators. The vibration and loose parts monitoring system real time functions consist mainly of impact alarm validation of suspected loose part events and recording acoustic data. Long term vibration monitoring and loose part event trending were done by engineering personnel using recorded data.

Unit 3 returned to service in February 2011, and the resident inspectors noted a number of nuclear notifications associated with Unit 3 steam generators vibration and loose parts monitoring alarms. On January 20, 2012, prior to the Unit 3 tube leak, engineering personnel also identified this trend and documented in Nuclear Notification NN 201818719 this problem and assigned an action to do further evaluation. On February 3, 2012, engineering personnel sent two sets of alarm signatures to Westinghouse, which contained impact data on alarms for time periods of steady state operation (i.e., no major temperature changes). Westinghouse engineering personnel concluded that the acoustic signals picked up by the accelerometers were valid and similar in nature to acoustic signatures caused by thermal movement of a steam generator expected during changes in thermal conditions, such as plant startup or shutdown. However the data obtained and analyzed had been taken during steady state operations. The team noted that Unit 2 steam generators did not receive the same number and type of alarms during a similar period of steady state operations. Engineering personnel also compared hot leg temperature changes linked to Unit 3 operations from February 18, 2011, to January 31, 2012, and confirmed about 30 valid alarms during this period were not associated with thermal transients.

NRC AIT report states, "In general, tubes exhibiting the free-span wear indications tended to exhibit tube support plate indications with the highest depth measurements, typically with the deepest values at the seventh tube support plate and trending down at successively lower support levels." There

were 3000 tube support plate wear indications in Unit 3, while only 360 tube support plate wear indications were found in Unit 2.

### **3. AREVA Operational Assessment Report for SONGS Unit 2 Restart**

<http://www.songscommunity.com/confirmation-action-letter.asp>, Attachment 6, Appendix B, SONGS Unit 2 Return Service to Service Report shows Figure 4-4 (Pg. 26) and Figure 4-5 (Pg. 27) are tubesheet maps illustrating the U-bends in Unit 3 SG E-088 and SG E-089 that have TTW. The more detailed view of the positions of TTW indications in Figure 4-6 (Pg. 28), Figure 4-7 (Pg. 29) and Figure 4-8 (Pg. 30) are instructive. Note that the positions are contiguous with only one tube not affected. This argues against a random spatial and temporal occurrence of instability. There just aren't enough unaffected tubes to indicate that instability independently initiated at different positions at different times. Three dimensional plots of TTW depth versus column and row in Figure 4-9 (Pg. 31) and Figure 4-10 (Pg. 32) reinforce the concept that the development of instability at different positions is a sequence of dependent events and not a sequence of independent events.

### **DAB Safety Team Observations**

Unit 3 tubes were severely vibrating at the top with large amplitudes, and also moderately vibrating near the tube sheet (3000 TSP wear indications) near the bottom, that is why we believe the alarms were triggering (30 alarms in 11 months) due to FEI. The Unit 2 tubes were vibrating at the top with smaller amplitudes and were not vibrating with any detectable magnitude near the tube sheet near the bottom (no FEI and only 360 TSP wear indications near the top plate) because of the poor choice of detection equipment used, that is why no alarms were triggered in the 22 months of operation, despite all the damage that was occurring in Unit 2.

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Glossary of Terminology:

AIT: Augmented Inspection Team

DID: Defense-In-Depth

FEI: Fluid Elastic Instability

MSLB: Main Steam Line Break

NN: Nuclear Notification

NRC: Nuclear Regulatory Commission

NRR: Nuclear Reactor Regulation, Office of (NRC)

RCS: Reactor Coolant System

RSG: Replacement SG

SCE: Southern California Edison, an Edison Int'l Company

SG: Steam Generator

SONGS: San Onofre Nuclear [Waste] Generating Station

TSP: Tube Sheet Plate

TTW: Tube-to-Tube Wear

URI: Unresolved Item

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