OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

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AUTHOR:	Arora V
AFFILIATION:	Public Commenter
ADDRESSEE:	Macfarlane A M
SUBJECT:	LTR-13-0366 - Vinod Arora E-mails re: Multiple E-mails Concerning San Onofre Nuclear Generating Station
ACTION:	Appropriate
DISTRIBUTION:	SECY to Ack.
LETTER DATE:	04/17/2013
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DUE DATE:	**DATE SIGNED:**

Joosten, Sandy

From: Vinod Arora [vinnie48in@gmail.com]
Sent: Wednesday, April 17, 2013 12:20 AM
To: CHAIRMAN Resource; Leeds, Eric; Borchardt, Bill; R4ALLEGATION Resource; Lantz, Ryan; Benney, Brian; Hall, Randy; Howell, Art; Dorman, Dan
Subject: Southern California San Onofre Sad Saga - Continued

HAHN Baba April 17, 2013 at 12:10 am *Your comment is awaiting moderation.*

Sincere Thanks to NRC Chairman, Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC for posting this blog.

San Onofre NRC/SCE/MHI/Public Awareness Series – Please excuse me for any computer or human performance grammatical or spelling errors.

If you cannot see or test a component, then you cannot predict its reliability or safety with significant confidence. Fluid elastic instability, flow-induced vibrations and Mitsubishi Flowering Effect caused tube-to-wear, tube-to-AVB wear, Retainer Bar to tube wear, tube-to-TSP wear, and high-cycle thermal fatigue, axial and circumferential cracks, and incubating cracks. Undetected incubating cracks caused by fluid elastic instability, flow-induced vibrations and Mitsubishi Flowering Effect are of the greatest concern, because they can cause tube leakage or ruptures at 70% power in Unit 2 at any time without notice due to inadvertent component manipulation (opening or closing valves wrong valves), anticipated operational occurrences (loss of offsite power, ATWS) and Design Basis Accidents (Main Steam Line Break, Earthquake) and fire caused by a short circuit or electrical fault in an energized system. Public Safety against radiological accidents cannot be risked in terms of profits or peak electrical demands in summer months. SCE cannot get away with answers to three simple questions, with a quick NRC Review and advertisement in Federal Register. Mitsubishi Fatigue calculations are erroneous and based on hideous data, and do not meet ASME and NRC Regulations. SCE, MHI, Westinghouse, AREVA and Intertek have not addressed the combined synergic effects of tube-to-tube wear and incubating/undetected cracks caused due to adverse effects of fluid elastic instability, flow-induced vibrations and Mitsubishi Flowering Effect. SCE and their consultants cannot answer these questions, So NRC has to prove the safety of Unit 2. Who is going to assure the safety of 8.4 million Southern Californians. NRC cannot sit silent and take no action like a Helpless Police Officer sitting in a Stalled Car with Empty Guns and No radio Communications. Nuclear Wisdom requires safe, time proven and reliable actions. Nuclear regulators cannot be pressured by Billion Dollar Corporations and Powerful Politicians. A nuclear accident in Southern California will have immense and significant adverse consequences beyond the nightmares or dream of a Regulator, Corporation, Citizen or Politician.

Joosten, Sandy

From: Vinod Arora [vinnie48in@gmail.com]
Sent: Monday, April 22, 2013 12:50 AM
To: CHAIRMAN Resource; Borchardt, Bill; Leeds, Eric; Lantz, Ryan; R4ALLEGATION Resource; Hall, Randy; Benney, Brian; Howell, Art; Dorman, Dan
Subject: The Dark Past and Dangerous Future of San Onofre - 8.4 Million Southern Californians at the mercy of NRC Commission

HAHN Baba April 22, 2013 at 12:39 am *Your comment is awaiting moderation.*

Sincere Thanks to NRC Chairman, Mr. Victor Dricks, Mr. Cale Young, Mr. Ryan Lantz, Mr. Randy Hall and entire NRC Staff. Thanks to NRC for posting this blog.

San Onofre NRC/SCE/MHI/Public Awareness Series – Please excuse me for any computer, human performance, grammatical or spelling errors. I would rather make a honest conservative error on the side of Public Safety. Life is a Unique Opportunity to serve the Society without any Rewards, Financial Gains or Recognition. It is the legal and moral duty of every United States government official and politician to ensure that public safety is not endangered, whether, it is gun violence, terrorist attacks or radiological accidents. But, that does not seem to be case with NRC preliminary approval of San Onofre proposed License Amendment to Operate Unit 2 at 70% reduced power.

The Dark Past of San Onofre

The ratio of flow rate of the steam water mixture, which flows through the SG tube bundle, to the flow rate of steam out of the steam nozzle, is called the circulation ratio. It is desirable to maintain a high circulation ratio above 4 (preferably over 5) to reduce the concentration of chemicals, debris, steam blanketing and steam dry-outs, etc., in the SG. San Onofre Unit 3 RSGs had a circulation ratio of around 3.26, which along with high steam flows, narrow tube to pitch diameter, lack-of in-plane restraints, narrow tube clearances, excessive number of extremely tall tubes and low pressure of secondary side (833 psi) caused fluid elastic instability in 4% area of the RSGs. Everything between San Onofre Units 2 and 3 was the same, except Unit 2 was operating with a steam pressure between 892-942 psi (consistent with NRC AIT Report). At low steam pressure and low circulation ratios, a RSG can produce more heat and more thermal megawaats (more profits in the pocket of SCE). But, low steam pressures and low circulation ratio are severe for vibrations, steam blanketing and steam dry-outs. These are basic elementary facts established about the design and operation of nuclear steam generators prior to San Onofre RSG design, which SCE and Mitsubishi should have known.

Because of the high secondary pressure operation, fluid elastic instability did not occur in Unit 2, which is consistent with Westinghouse Operational Assessment. Contact forces play a role in the out-of plane FEI, but SCE/MHI inadvertently designed better supports and double the contact forces in Unit 2 are not the reason that FEI did not occur In Unit 2. That is just an attempt to mislead the public and NRC and is contested based on an in-depth review of conflicting AREVA, Westinghouse, John Large, SCE and MHI Reports.

Now MHI says, "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."

The above statement reflects negligence, ignorance, excuses and cover-up both by MHI/SCE. Let us examine what is happening next.

The Dangerous Future of San Onofre

San Onofre Unit 2 Retainer Bar and AVB Performance Analysis during Anticipated Operational Transients and MSLB

San Onofre replacement steam generators (RSGs) consist of about 9,727 extremely tall and very tightly packed inverted U-tubes. The tubes in each RSG, are arranged in a triangular pitch in 142 rows and 177 columns. The tubes form the boundary separating the steam-water mixture in the secondary circuit from the highly pressurized hot radioactive coolant contained in the primary circuit (tubes). After San Onofre Unit 3 Accident, the integrity and the life expectancy of the Unit 2 tubes are therefore of prime concern 8.4 Million Southern Californians.

The tube bundle top region, known as the U-bend region is supported by a floating Anti-Vibration Bar (AVB) structure consisting of three sets of two V-shaped AVBs between each tube column. The AVBs are made of Type 405 ferritic stainless steel and are equipped with two Alloy 690 end caps. Each AVB end cap is welded to an Alloy 690 retaining bar. The continuous retaining bar wraps around the tube bundle to which is fixed the outboard ends of the AV bars. The retaining bar is pulled in, wrapped around the tube bundle by the hairclip-like retainer bar, this being captured in situ by being threaded through the first two rows of tubes, and held in this position by friction between the retainer bar and the inboard top surfaces of the AV bars. Thirteen Alloy 690 bridges run perpendicular to the retaining bars and hold the entire structure together. A total of 24 Alloy 690 chrome-plated retainer bars welded to the retaining bars is provided to prevent AVB structure displacement during SG fabrication and during anticipated operational transients and main steam line breaks.
In San Onofre replacement steam generators, to accommodate the increased number of tubes, the retainer bars are relatively long and thin as compared to the retainer bars in other SGs designed by MHI, resulting in their having low natural frequencies (56 Hz). The retainer bars anchor the AVB structure to the tubes, but are designed such as to not contact the tubes under operating conditions. The AVB structure is not attached to any other SG component and under operating conditions is held in place by friction between the AVBs and the tubes.

In San Onfre replacement steam generators, the relative motion between the tubes and the anti-vibration bars (AVBs), tube support plates, and the retainer bars have resulted in tube wear and fatigue damage in tubes due to fluid elastic instability (FEI), flow-induced random vibrations and hydrodynamic pressures. SCE, Westinghouse, AREVA, MHI and Intertek have not addressed the synergic effects of tube wear and fatigue damage. These adverse phenomena can produce instant (> 10 minutes) multiple tube failures when the stresses generated during vibrations are sufficiently large due to the collapse of unique MHI anti-vibration bar structure and retainer bars during anticipated operational transients and main steam line breaks as discussed below.

MHI reports, "The Steam Generator tube wear adjacent to the retainer bars was identified as creating a potential safety hazard. The maximum wear depth is 90% of the tube thickness. The cause of the tube wear has been determined to be the retainer bars' random flow-induced vibration caused by the secondary fluid exiting the tube bundle. Since the retainer bar has a low natural frequency, the bar vibrates with a large amplitude. This

type tube wear could have an adverse effect on the structural integrity of the tubes, which are part of the pressure boundary. The plugging of the tubes that are adjacent to the retainer bars was performed. MHI has recommended to the purchaser to remove the retainer bars that would have the possibility of vibration with large amplitude or to perform the plugging and stabilizing for the associated tubes." Plugging of the at-risk tubes is not a satisfactory solution because it is the retainer bar that vibrates via random fluid flow processes at sub FEI critical velocity levels – these are likely to continue in play or, indeed, exacerbate at the proposed U2 restart at 70% power, leading to through-tube abrasion, the detachment of tube fragments, lodging at other unplugged and in-service tube localities, resulting in the so-called 'foreign object' tube wear. MHI's recommendation that those retainer bars at risk of large-amplitude fluid flow excited vibration should be removed or plugging and stabilizing for the associated tubes is, of course, dependent upon reliable analysis to identify the at-risk assemblies. SCE and MHI have a repeated history of catastrophic design failures and cover-ups with San Onofre RSGs.

During anticipated operational transients and main steam line breaks, the whole u-tube bundle will be subject to fluid elastic instability (due to formation of 100% void fractions) and would be connected to the outside environment as described below. According to the latest research papers, the in-plane velocity caused by fluid elastic instability is more than double the out-of-plane velocity caused by flow-induced random vibrations. Retainer bar vibrations caused by flow-induced random vibrations was the reason identified by MHI to remove the retainer bars that would have the possibility of vibration with large amplitude or to perform the plugging and stabilizing for the associated tubes. Retainer bars have not been removed, but more than 180 tubes in SONGS Unit 2 RSGs have been plugged and/or stabilized. The problem stems from that none of the SCE consultants and MHI have analyzed what will happen to the structural integrity of the retainer bars and floating Anti-Vibration Bar (AVB) structure, and thousands of worn, cracked, plugged and stabilized tubes during adverse effects of anticipated operational transients and main steam line breaks. Let us examine the scenarios:

Based on SONGS Unit 3 tube leakage, failure of 8 tubes at main break steam line testing conditions and more than three hundred damaged tubes, the following two potentially risk-significant events have not been considered as beyond-design basis accidents in SONGS NRC Approved FSAR or SCE proposed License Amendment for Unit 2 restart at 70% power with significant adverse consequences:

(1) Operating experience from SONG Unit 3 and design information of RSGs suggests that the potential exists for a line breach to significantly increase RSG leakage, because of resonant, out-of-plane and in-plane vibrations of RSG tubes from a main steam line break. These events could potentially cause increased tube leakage due to multiple tube ruptures resulting from thousands of worn, cracked, plugged and stabilized tubes.

(2) Significant RSG tube leakage could lead to secondary system breaches (lifting of main steam line relief valves) from anticipated operational transients (e.g., a loss of offsite power). The resulting SG secondary side blowdown could further increase tube leakage due to resonant, out-of-plane and in-plane vibrations within the affected SG tube bundle.

From any such leakages, concurrent with containment bypass, these events might cause offsite radiation doses in excess of 10 CFR Part 100 as evaluated in the SONGS FSAR. Any of these two events would cause a simultaneous reactor, turbine, feedwater and reactor coolant trips. Due to feedwater pump trip, the RSG U-bundle secondary water level will shrink and tubes will be uncovered for a period of at least 10 minutes and experience a sharp drop in secondary side pressure. The entire sub-cooled feedwater inventory contained in the faulted RSG will instantaneously flash to high dry steam. The combination of resonant, out-of-plane, in-plane vibrations, jet impingement forces, broken tube fragments and RSG debris will cause large axial, bending, dynamic and cyclic loads on all the tubes, tube support plates, retainer bars and anti-vibration structure. The strength of the welded and mechanical connections of these low frequency retainer bars, retaining bars and bridges have not been analyzed for the effects of these cumulative loads to prevent AVB structure displacement, deformation or collapse during anticipated operational transients and main steam line breaks. The displacement,

deformation or collapse of AVB structure along with the large axial, bending, dynamic and cyclic loads can potentially cause thousands of worn, cracked, plugged and stabilized tubes to exceed several times the allowed tube ASME Endurance Limit of 13.6 ksi. If this happens, multiple tube ruptures will occur at tube-support plates, mid-spans, free spans and tube-to-anti-vibration bar notched interfaces. Since all the water from the RSG would escape to the environment, the iodine-131 from un-partitioned reactor coolant leaking out the rupture tubes will also escape to the environment in less than 10 minutes with 60 tons of radioactive coolant. Consistent with Fukushima Task Force Lessons Learnt and NRC Commissioner Meeting Transcripts, this event will be considered as a beyond design basis event, and SONGS Operators will be unable to take any timely mitigation actions to stop a severe nuclear accident in progress. If the prevailing winds are towards San Clemente, consistent with NRC Inspector General Reports, NRC Studies and observations of SONGS Emergency Plan Drills for the last six years, SCE and Offsite agencies would not have time to respond, notify, evacuate, shelter or give Potassium Iodide to the affected residents within the 10-mile affected emergency planning zone. The casualties, and short, long-term cancer affects to the affected population will depend upon the iodine spiking factor and the duration of blowdown, but will significantly exceed the NRC approved SONGS Control Room limit of 5 Rem Total Effective Dose Equivalent (TEDE), and the Exclusion Area Boundary and Low Population Zone limit of 2.5 Rem TEDE.

Joosten, Sandy

From: Vinod Arora [vinnie48in@gmail.com]
Sent: Tuesday, April 23, 2013 12:38 AM
To: CHAIRMAN Resource; Dorman, Dan; Borchardt, Bill; Lantz, Ryan; Leeds, Eric; R4ALLEGATION Resource; Benney, Brian; Hall, Randy
Subject: Updated - San Onofre Dark Past and Dangerous Future

The Dark Past of San Onofre

A review of nuclear plant operating history and Academic Research Paper shows that void fractions have to be ≤ 98.5% to prevent formation of areas of high dry steam (fluid elastic instability) in nuclear steam generators. According to Dr. Pettigrew, the steam-mixture velocities in U-tube bundle have to be ≤ 20 feet/sec to prevent flow-induced vibrations. The above parameters are generally achieved by operating steam generators with circulations ratios > 4 and steam pressures > 900 psi.

The ratio of flow rate of the steam water mixture, which flows through the SG tube bundle, to the flow rate of steam out of the steam nozzle, is called the circulation ratio. It is desirable to maintain a high circulation ratio above > 4 (preferably over 5) to reduce the concentration of chemicals, debris, steam blanketing and steam dry-outs in the SG. San Onofre Unit 3 RSGs had a circulation ratio of around 3.3, which along with high steam flows, lack-of in-plane restraints, narrow tube clearances, excessive number of extremely tall and tightly packed tubes and low pressure of secondary side (838 psi) caused fluid elastic instability (Void fractions > 99.6%, high dry steam) in 4% area of the RSGs. Everything between San Onofre Units 2 and 3 was the same, except Unit 2 was operating with a steam pressure between 892-942 psi (consistent with NRC AIT Report). At low steam pressure and low circulation ratios, a RSG can produce more heat and more thermal megawatts (more profits in the pocket of SCE). But, low steam pressures and low circulation ratio are severe for vibrations, steam blanketing and steam dry-outs. These are basic elementary facts established about the design and operation of nuclear steam generators prior to San Onofre RSG design, which SCE and Mitsubishi should have known.

Because of the high secondary pressure operation, fluid elastic instability did not occur in Unit 2, which is consistent with Westinghouse Operational Assessment. Contact forces play a role in the out-of plane FEI, but SCE/MHI inadvertently designed better supports and double the contact forces in Unit 2 are not the reason that FEI did not occur In Unit 2. That is just an attempt to mislead the public and NRC and is contested based on an in-depth review of conflicting AREVA, Westinghouse, John Large, SCE and MHI Reports.

Now MHI says, "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."

To reduce void fractions, would have meant (1) increase in circulation ratios, which would have entailed using a larger down-comer, using larger flow slot design for the tube support plates, and even removing a TSP, (2) increasing the steam pressure. Making change (1) would have increased cost, delayed construction and installation schedules, increased shutdown and plugging costs for OSGs and triggered the Lengthy 10 CFR 50.90 Licensed Amendment and Public Hearings, (2) would have reduced the thermal megawatts for RSGs and decreased the profit margins. Now MHI States, "But each of the considered changes had unacceptable consequences and the AVB Design Team agreed not to implement them." The question is why were the consequences unacceptable. The consequences were unacceptable for MHI, because MHI, most likely had a fixed contract, and would have lost money in money in the short-term making these changes. But, SCE would have lost money in the short-term and long term, if they would have gone along the changes, that is why the changes were more unacceptable to SCE than MHI. SCE wrote the specifications, were the customer and controlled Money & SCE/MHI AVB Design Team, that is why the change was not mostly beneficial to SCE and may be to some degree to MHI. That is why AVB Design Team agreed not to implement them

Let us examine the table below. By making these changes, void fractions and fluid velocities would have been reduced and the damage to both Units 2 and 3 could have been minimized although not fully averted, because fluid velocities due to flow-induced random vibrations caused by high steam flows would have been still higher than 20 feet/second recommended by Dr. Pettigrew. If SCE would not have made the design changes to increases the heat transfer area by 11%, San Onofre would have been like Plant A, the problems could have been fully avoided. Therefore, the above statement In MHI reflects beyond the shadow of doubt, negligence, ignorance, excuses and cover-up both by MHI/SCE. **NRC AIT Team Role blind favoritism towards SCE and Mud Slinging on MHI is very clear from its public statements and retractions, and needs to be investigated by the NRC Office of Inspector General. This is America and NRC cannot be biased against any body and take sides, whether it is a Rich and Powerful Utility, Manufacturer, Nuke Plant Worker or American Public.**

Description	Power Level	Steam Pressure	Circulation Ratio	Void Fraction	Fluid Velocity	Steam Quality	Fluid Elastic	Flow-induced

					feet/sec		Instability	Random Vibrations
San Onofre Unit 3	100%	838 psi*	3.3*	99.6%*	25 *	90%*	YES	YES
San Onofre Unit 2	99%	892- 942 psi	3.3*	98.5%	23 *	75%**	NO	YES
San Onofre Unit 2	70%	946 psi	4.9	92.5%	12	36%	NO	NO
San Onofre Unit 2	80%	939 psi	4.2	97.2%	14	61%	NO	NO
Plant A	88%	N/A	N/A	98.5%	18	73%	NO	NO
San Onofre OSG 2/3	99%	900 psi	3.2*	96.1%	23 *	N/A	NO	YES
ANO Unit 2	N/A	900 psi	≥ 4	98.5%	N/A	75%	NO	NO

* Optimum Values: Void Fraction ≤ 98.5%, Void Fraction ≤ 20 feet/sec, Circulation Ratio ≥ 4, Steam Dome Pressure ≥ 900 psi

Note: With Unit 2 at reduced 70% power, the circulation ratio and steam generator pressures are 4.87 and 946 psi respectively. This will change void fraction to 92.5% fluid velocity to 12.5 feet/sec and fluid quality to 36%. With Unit 2 at reduced 80% power, the circulation ratio and steam generator pressures are 4.20 and 939 psi respectively. This means void fraction to 97.2%. fluid velocity to 14 feet/sec and fluid quality to 61%. With Unit 3 at 100% power, the circulation ratio and steam generator pressures were 3.26 and 838 psi respectively. Because of lower circulation ratios and lower steam pressures, the void fraction was 99.6%, out-of –plane fluid velocity to 25 feet/sec, in-plane velocity of 50 feet/sec and steam quality to 90%. What this data shows, that RSG would have been safe even with the flawed design, if the steam pressures were at 950 psi and circulation ratios were at ≤ 4, the void fraction would have been ≤ 98.5% even with high steam flows at 95% reactor thermal power.

The Dangerous Future of San Onofre

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The tube bundle top region, known as the U-bend region is supported by a floating Anti-Vibration Bar (AVB) structure consisting of three sets of two V-shaped AVBs between each tube column. The AVBs are made of Type 405 ferritic stainless steel and are equipped with two Alloy 690 end caps. Each AVB end cap is welded to an Alloy 690 retaining bar. The continuous retaining bar wraps around the tube bundle to which is fixed the outboard ends of the AV bars. The retaining bar is pulled in, wrapped around the tube bundle by the hairclip-like retainer bar, this being captured in situ by being threaded through the first two rows of tubes, and held in this position by friction between the retainer bar and the inboard top surfaces of the AV bars. Thirteen Alloy 690 bridges run perpendicular to the retaining bars and hold the entire structure together. A total of 24 Alloy 690 chrome-plated retainer bars welded to the retaining bars is provided to prevent AVB structure displacement during SG fabrication and during anticipated operational transients and main steam line breaks.

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have not been removed, but more than 180 tubes in SONGS Unit 2 RSGs have been plugged and/or stabilized. The problem stems from that none of the SCE consultants and MHI have analyzed what will happen to the structural integrity of the retainer bars and floating Anti-Vibration Bar (AVB) structure, and thousands of worn, cracked, plugged and stabilized tubes during adverse effects of anticipated operational transients and main steam line breaks. Let us examine the scenarios:

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(1) Operating experience from SONG Unit 3 and design information of RSGs suggests that the potential exists for a line breach to significantly increase RSG leakage, because of resonant, out-of-plane and in-plane vibrations of RSG tubes from a main steam line break. These events could potentially cause increased tube leakage due to multiple tube ruptures resulting from thousands of worn, cracked, plugged and stabilized tubes.

(2) Significant RSG tube leakage could lead to secondary system breaches (lifting of main steam line relief valves) from anticipated operational transients (e.g., a loss of offsite power). The resulting SG secondary side blowdown could further increase tube leakage due to resonant, out-of-plane and in-plane vibrations within the affected SG tube bundle.

From any such leakages, concurrent with containment bypass, these events might cause offsite radiation doses in excess of 10 CFR Part 100 as evaluated in the SONGS FSAR. Any of these two events would cause a simultaneous reactor, turbine, feedwater and reactor coolant trips. Due to feedwater pump trip, the RSG U-bundle secondary water level will shrink and tubes will be uncovered for a period of at least 10 minutes and experience a sharp drop in secondary side pressure. The entire sub-cooled feedwater inventory contained in the faulted RSG will instantaneously flash to high dry steam. The combination of resonant, out-of-plane, in-plane vibrations, jet impingement forces, broken tube fragments and RSG debris will cause large axial, bending, dynamic and cyclic loads on all the tubes, tube support plates, retainer bars and anti-vibration structure. The strength of the welded and mechanical connections of these low frequency retainer bars, retaining bars and bridges have not been analyzed for the effects of these cumulative loads to prevent AVB structure displacement, deformation or collapse during anticipated operational transients and main steam line breaks. The displacement, deformation or collapse of AVB structure along with the large axial, bending, dynamic and cyclic loads can potentially cause thousands of worn, cracked, plugged and stabilized tubes to exceed several times the allowed tube ASME Endurance Limit of 13.6 ksi. If this happens, multiple tube ruptures will occur at tube-support plates, mid-spans, free spans and tube-to-anti-vibration bar notched interfaces. Since all the water from the RSG would escape to the environment, the iodine-131 from un-partitioned reactor coolant leaking out the rupture tubes will also escape to the environment in less than 10 minutes with 60 tons of radioactive coolant. Consistent with Fukushima Task Force Lessons Learnt and NRC Commissioner Meeting Transcripts, this event will be considered as a beyond design basis event, and SONGS Operators will be unable to take any timely mitigation actions to stop a severe nuclear accident in progress. If the prevailing winds are towards San Clemente, consistent with NRC Inspector General Reports, NRC Studies and observations of SONGS Emergency Plan Drills for the last six years, SCE and Offsite agencies would not have time to respond, notify, evacuate, shelter or give Potassium Iodide to the affected residents within the 10-mile affected emergency planning zone. The casualties, and short, long-term cancer affects to the affected population will depend upon the iodine spiking factor and the duration of blowdown, but will significantly exceed the NRC approved SONGS Control Room limit of 5 Rem Total Effective Dose Equivalent (TEDE), and the Exclusion Area Boundary and Low Population Zone limit of 2.5 Rem TEDE

Joosten, Sandy

From: Vinod Arora [vinnie48in@gmail.com]
Sent: Wednesday, April 24, 2013 11:44 PM
To: CHAIRMAN Resource; Leeds, Eric; Benney, Brian; Lantz, Ryan; Hall, Randy; Borchardt, Bill
Subject: Safety Over Production - "Enron-style" power shortages throughout SCal this summer, with SONGS Unit 2 down are exaggerated.
Attachments: BriefingSummer2013-Presentation-Mar2013.pdf

NRC can take its sweet time to review all San Onofre Documents. No compromise over safety. SCE will keeping making money with SONGS Unit 2 down for years, until Units 2 & 3 are repaired or replaced by Westinghouse.

MHI simply does not have the tools, technology, testing facilities, and learning/research skills personnel to repair or replace these complex CE Units. New Anti-vibration Bar Testing in Japan will not resolve the problems. SONGS Units need to be operated at high pressures >950 psi and high circulation ratios >4.5 @85% power to stay within Dr. Pettigrew's Comfort Zone and prevent the adverse effects of fluid elastic instability, flow-induced vibrations and high cycle fatigue. See for yourself, new facts based articles after MHI Root Cause published In Union Tribune, San Diego. Contact: Morgan Lee, | U-T San Diego newspaper | 619 293-1251

Present, SCE Management does not know how to manage, maintain and operate a Nuclear power Plant. Not my words, But the Words of San Onofre Shift Managers, Corporate and Station Emergency Directors.

Unit 3 was destroyed in a Testing Mode (due to extra power production) of the new anti-vibration bars. FEI did not happen in Unit 2, not due to double the contact forces and better supports, but due to operation at high pressure and less steam flows compared with Unit 3. NRC needs to investigate the operational differences between Units 2 & 3 to find the Real Root Cause (Hardware, Process and Human Performance Errors)

Despite reports in the press that the continuing outage of the San Onofre Nuclear Power Plant will cause "Enron-style" power shortages throughout Southern California this summer, one expert on the electrical grid says such fears are exaggerated.

A report in Bloomberg News claims that the combination of the offline plant at San Onofre and a bleak forecast for hydroelectric generation in the state due to drought means that the state could face power shortages unrivaled since the Enron scandal in the early 2000s. In their story, Bloomberg reporters Naureen S. Malik and Lynn Doan quote Pennsylvania energy consultant Stephen Schork as saying "California may see the biggest test since Enron manipulated the market. If you have a reactor down and you don't have as much hydro, your fuel for air conditioning is going to have to come from gas."

Malik and Doan also spoke with Michael Blaha at Wood Mackenzie Ltd. in Houston, who credited hydro for fulling the gap as San Onofre stayed offline through the summer of 2012.

But according to engineer and frequent ReWire tipster Bill Powers, an expert on power generation and transmission issues, enough new gas-fired capacity in Southern California is scheduled to come online by the peak power consumption season this summer to nearly make up for San Onofre being offline even without any power from hydroelectric power plants. In the Los Angeles Basin load area alone, Powers tells ReWire, 1,900 megawatts of gas-fired plants are scheduled to come online in the first half of 2013. San Onofre's capacity? 2,150 megawatts.

Powers points out that it's not just him saying so: he directs our attention to a briefing document on San Onofre's downtime composed by the California Independent System Operator (CaISO), which runs the power

grid for 80 percent of the state, including the Southern California Edison and San Diego Gas & Electric service areas, which are the portions of the grid most affected by San Onofre's outage.

According to CaISO, while there is room for concern about running low on power reserves as a result of San Onofre being down, the grid operator characterizes those concerns as applying mainly to San Diego County and southern Orange County rather than the entire southern section of the state. If this summer's heat hits a ten-year high, CaISO runs the chance of having to engage in "load shedding" -- a method of reducing demand more commonly known as rolling blackouts.

But, says CaISO, a combination of upgrading transmission lines near Long Beach, adding capacitors to regulate transmission line voltage, and increasing funding for the agency's Flex Alert program should address the reliability issues on the grid without needing to add more generation capacity over the summer.

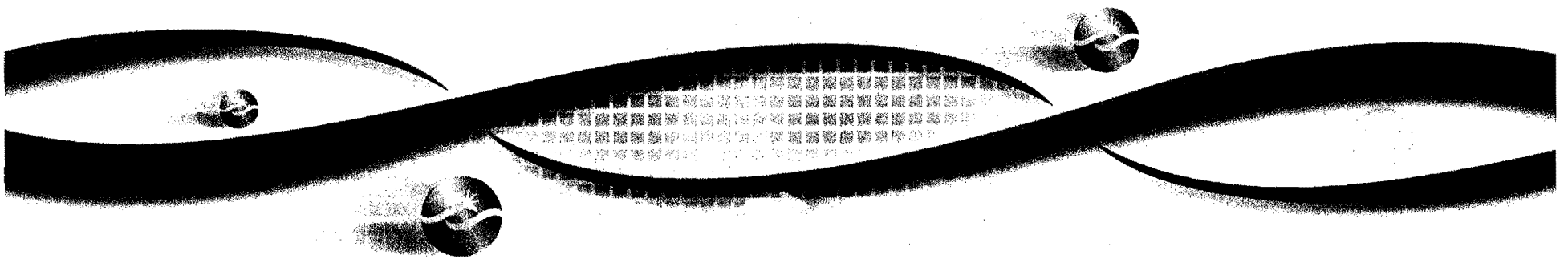
And given that the state is likely to have a gigawatt or more of new solar power coming into the grid compared to last summer -- much of that in Southern California -- those peak demand hours may not be all that scary this year, even without San Onofre.

California ISO
Shaping a Renewed Future

Briefing on Summer 2013 Outlook & Update on SONGS Mitigation Planning

Neil Millar
Executive Director, Infrastructure Development

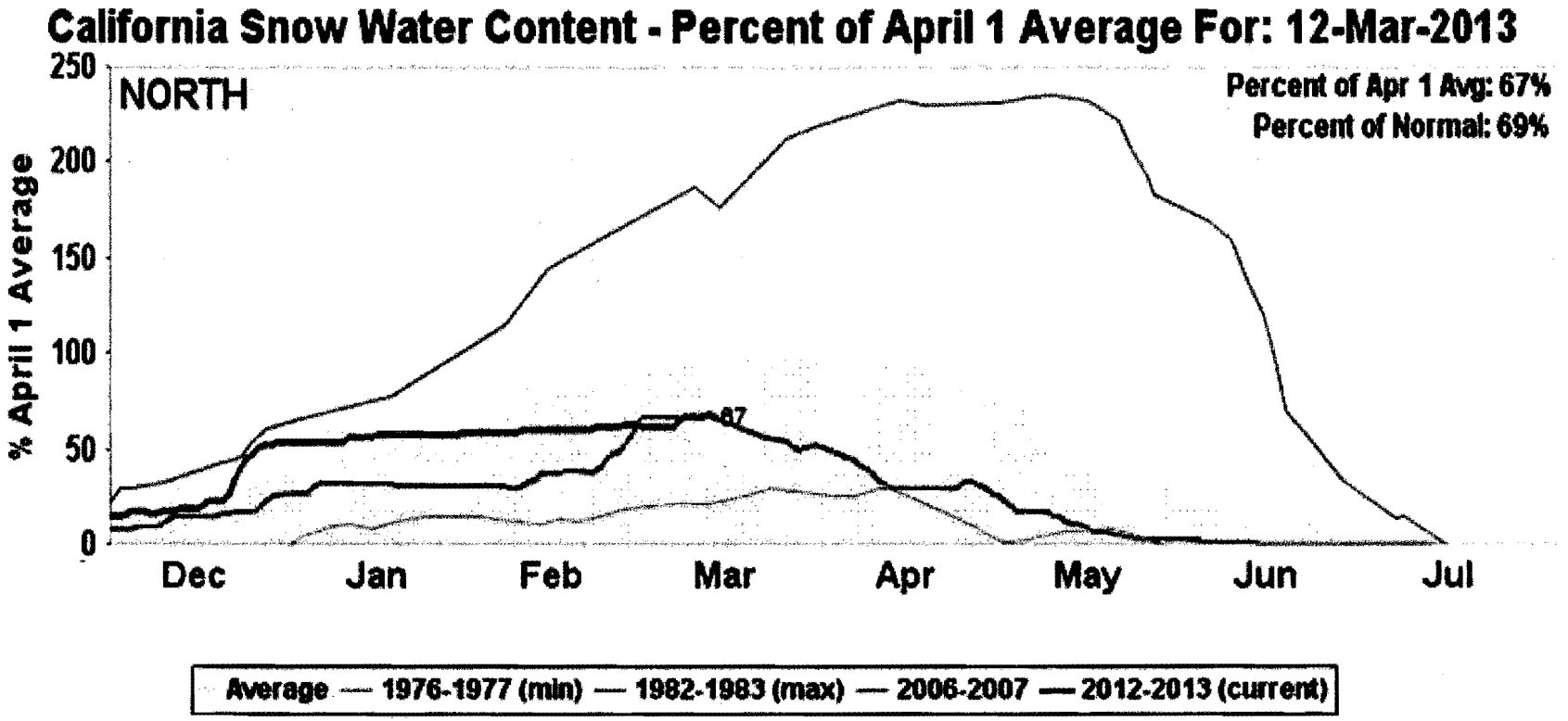
Board of Governors Meeting
General Session
March 20-21, 2013



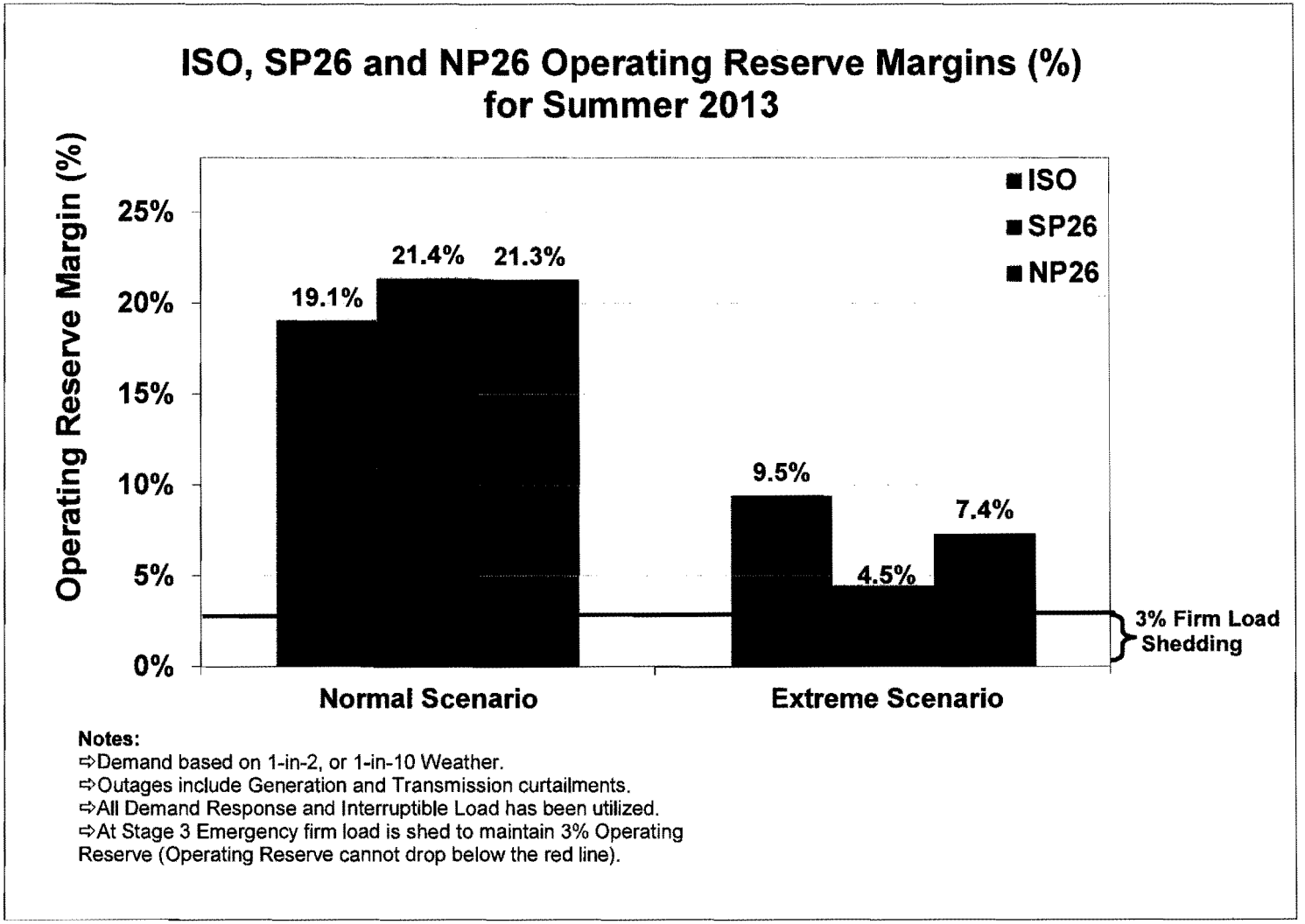
2013 Summer Assessment

- Summer assessment deferred to May Board meeting to incorporate evolving hydro situation
- Preliminary results indicate ample summer supply margins for the overall system and in northern California
- Summer supply margins over the entire southern California region are also ample but reliability concerns remain for South Orange County and San Diego due to continued outage of San Onofre Nuclear Generating Station

Preliminary hydro situation showing below-average expectations, as observed by the north conditions



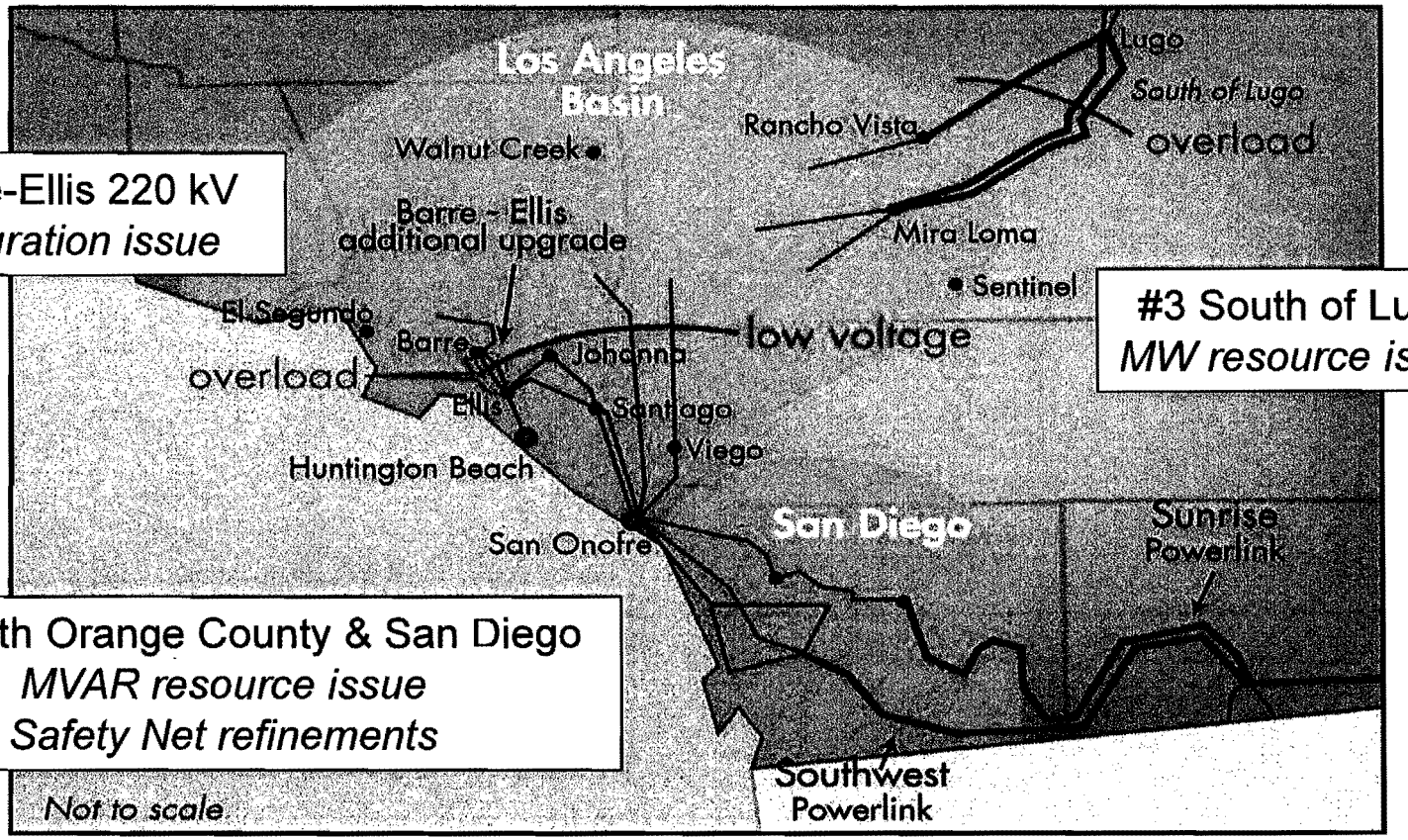
Overall reserve margins in northern and southern California remain healthy



Notes:
- ⇨Demand based on 1-in-2, or 1-in-10 Weather.
- ⇨Outages include Generation and Transmission curtailments.
- ⇨All Demand Response and Interruptible Load has been utilized.
- ⇨At Stage 3 Emergency firm load is shed to maintain 3% Operating Reserve (Operating Reserve cannot drop below the red line).

Supply into southern Orange County and San Diego with SONGS off-line remain the primary concern

Focus is on non-generation alternatives to mitigate load shed risk for multiple-contingency events



#2 Barre-Ellis 220 kV
Configuration issue

#3 South of Lugo
MW resource issue

#1 South Orange County & San Diego
MVAR resource issue
Safety Net refinements

The solutions address 2013 reliability needs without excessive reliance on load-dropping schemes:

1) Convert Huntington Beach units 3 & 4 into synchronous condensers

2) Install capacitors (80 MVAR each at Santiago and Johanna,160 MVAR at Viejo)

3) Split Barre-Ellis 220 kV circuits (from 2 to 4 lines)

4) Confirm new resources South of Lugo

5) Support adequate funding for Flex Alerts and continue to explore applicable demand response

Next Steps

- Continue to press forward with 2013 mitigation plan
- Seek Board approval later today for additional mid-term mitigation:
  - South Orange County Dynamic Reactive Support
  - Talega area Dynamic Reactive Support
  - Sycamore – Penasquitos 230 kV transmission line
- Continue analysis on additional longer-term needs