



Daniel P. Breig, P.E.  
Station Manager  
San Onofre

November 30, 2005

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket No. 50-362**  
**Licensee Event Report No. 2005-002**  
**San Onofre Nuclear Generating Station, Unit 3**

Gentlemen:

This submittal provides a Licensee Event Report (LER) 2005-002 for one train of Containment Emergency Cooling inoperable for longer than allowed by Technical Specifications. Redundant containment cooling systems were available during this period. This event did not affect the health and safety of either plant personnel or the public.

If you require any additional information, please contact me.

Sincerely,

A handwritten signature in cursive script that reads "Daniel P. Breig".

Unit 3 LER No. 2005-002

cc: B. S. Mallett, NRC Regional Administrator, Region IV  
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

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<b>NRC FORM 366</b> (7-2001)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	APPROVED BY OMB: NO. 3150-0104 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>	EXPIRES: 06/30/2007								
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>											
<b>1. FACILITY NAME</b> San Onofre Nuclear Generating Station (SONGS) Unit 3		<b>2. DOCKET NUMBER</b> 05000-362	<b>3. PAGE</b> 1 OF 5								
<b>4. TITLE</b> <b>Emergency Containment Cooling Inoperable for Longer than Allowed by Technical Specifications</b>											
<b>5. EVENT DATE</b>			<b>6. LER NUMBER</b>								
MO	DAY	YEAR	YEAR    SEQUENTIAL NUMBER    REV NO								
12	23	2004	2005-002-00								
<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>								
MO	DAY	YEAR	FACILITY NAME    DOCKET NUMBER								
11	30	2005	FACILITY NAME    DOCKET NUMBER								
<b>9. OPERATING MODE</b> 1											
<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR '': (Check all that apply)</b>											
<b>10. POWER LEVEL</b> 100		<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)						
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)						
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)						
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<b>OTHER</b> <small>Specify in Abstract below or in NRC Form 366A</small>						
		<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)							
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)							
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)							
		<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)									
<b>12. LICENSEE CONTACT FOR THIS LER</b>											
<b>NAME</b> D. P. Breig, Station Manager, Nuclear Generation			<b>TELEPHONE NUMBER (Include Area Code)</b> 949-368-9263								
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>											
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX		
<b>14. SUPPLEMENTAL REPORT EXPECTED</b>						<b>15. EXPECTED SUBMISSION DATE</b>			MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO					
<b>16. ABSTRACT</b> (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)											
<p>On October 2, 2005 at 0825 (discovery date) Containment Emergency Cooling Unit Train "A", 3ME399, did not start during its monthly surveillance test. SCE discovered 3BLP0303, Containment Emergency Fan 3ME399 Backup Breaker had tripped open.</p> <p>SCE's review determined this breaker (and also breaker 3BLP0304 for Train "A" ECU 3ME401) had been installed with incorrect setpoint tolerances. Because SCE installed these breakers during the last refueling, ECUs 3ME399 and 3ME401 were considered inoperable from December 23, 2004 to October 5, 2005. SCE is submitting this report in accordance with 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(v)(D).</p> <p>This event was initiated by incorrect field implementation of an engineered change package. This condition went undetected after the September 4, 2005 surveillance because the surveillance procedure did not provide sufficient instruction to determine that 3BLP0303 tripped during the surveillance. SCE corrected the breaker setpoint tolerances, and improved the ECU surveillance procedure.</p> <p>Since redundant Containment Cooling systems remained available and operable throughout the duration of this occurrence, the safety significance of this event is low.</p>											

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Plant: San Onofre Nuclear Generating Station (SONGS)  
 Event Date: December 23, 2004  
 Discovery Date: October 2, 2005  
 Reactor Vendor: Combustion Engineering

Mode: Mode 1 – Power Operation  
 Power: 100 percent

### Description of Event

On October 2, 2005 at 0825 (discovery date) Containment Emergency Cooling Unit (ECU) Train "A", 3ME399, did not start during its monthly surveillance test. Plant operators determined that 3BLP0303, Containment Emergency Fan 3ME399 Backup Breaker, was open (tripped). Backup breaker 3BLP0303 is normally closed.

Since the ECUs are located inside containment, the monthly surveillance is conducted by plant operators in the control room monitoring the fan motor starting current. During the last surveillance test of 3ME399 on September 4, 2005, the motor starting current was observed by plant operators. The operators recorded the surveillance as completed satisfactorily, but the breaker 3BLP0303 had tripped open after the starting current was observed.

SCE had replaced backup breakers 3BLP0303 and 3BLP0304 (breaker to fan on ECU 3ME401) during the Unit 3 cycle 13 refueling outage and returned to service on December 23, 2004. SCE's review determined that the breakers had been installed with incorrect setpoint tolerances. ECU 3ME399 had successfully passed its monthly surveillances since 3BLP0303 was installed in December 2004, until it tripped on September 4, 2005. ECU 3ME401 had successfully passed its monthly surveillances since 3BLP0304 was installed in December (3BLP0304 did not trip).

SCE's evaluation concluded that both 3BLP0303 and 3BLP0304, while functional, would not be able to fulfill their design function due to the incorrect setpoint tolerances. Consequently, ECUs 3ME399 and 3ME401 were considered inoperable from December 23, 2004 to October 5, 2005 (when the breakers were replaced and returned to operable status). Both ECUs are in Train "A".

Technical Specifications (TS) 3.6.6.1, Containment Spray and Cooling Systems, requires two trains of containment cooling to be operable while the plant is in Modes 1, 2, and 3. With one train of containment cooling inoperable, TS 3.6.6.1 Action C requires the containment cooling train be restored to operable status in 7 days. Train "A" of containment cooling was inoperable from December 23, 2004 through October 5, 2005 (greater than 7 days).

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If two containment cooling trains are inoperable, TS 3.6.6.1, Action D requires one train to be restored to operable status within 72 hours. If Action D is not completed, Action F requires the plant to be placed in Mode 3 within the following 6 hours.

The Emergency Diesel Generators (EDGs) provide AC power to provide containment cooling under loss of offsite power conditions. TS 3.8.1, Electrical Power Systems, AC Sources, requires two EDGs to be operable in Modes 1 – 4. If one EDG is inoperable, Action B.2 states that a required feature supported by the inoperable EDG must be declared inoperable when its redundant required feature is also inoperable. This action is required to be completed within 4 hours of discovery.

Between December 23, 2004 and October 5, 2005, SCE periodically removed the Train "B" EDGs from service. One instance was the 12-year overhaul of the Train "B" EDG, which removed the EDGs from service for about eight days (August 21-29, 2005). During the overhaul, TS 3.8.1, Action B.2 would have required SCE to declare the Train "B" ECUs inoperable within 4 hours of declaring the Train "B" EDG inoperable and TS 3.6.6.1, Action F, would have required a plant shutdown 72 hours later. Because plant operators were unaware the incorrect breaker setpoint tolerances were installed and the Train "A" ECUs should have been considered inoperable, these actions were not completed.

SCE is reporting the conditions prohibited by TS 3.6.6.1 and TS 3.8.1 in accordance with 10CFR50.73(a)(2)(i)(B).

As noted above, there were times when Train "A" ECU was inoperable at the same time that Train "B" ECU was required by TS 3.8.1 to be considered inoperable. Consequently, even though Train "B" ECU remained functional (normal power was available), SCE is electing to report this occurrence in accordance with 10 CFR 50.73(a)(2)(v)(D), as a loss of safety function.

### Cause of Event

During cycle 13 refueling outage, SCE replaced 3BLP0303 and 3BLP0304, Containment Emergency Fan 3ME399 and Fan 3ME401 backup breakers. The replacement breakers required a non-typical setpoint tolerance (-0 percent, +25 percent); however, 3BLP0303 and 3BLP0304 were installed with a SONGS standard setpoint tolerance (nominally +/-25 percent), which was incorrect. The non-typical setpoint tolerance were correctly identified in the engineering change package for the replacement breakers, but the information was not adequately implemented in the planning process and during field installation.

During the September 4, 2005, monthly surveillance, breaker 3BLP0303 tripped due to normal variation of the motor in-rush starting current. The tripped breaker went undetected after the surveillance because the procedure did not provide sufficient instruction to determine if the backup breaker had tripped during the surveillance. The condition of the tripped breaker 3BLP0303 was not discovered until October 2, 2005, during the subsequent monthly surveillance. SCE's review also concluded that backup breaker

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3BLP0304 had not tripped between the time it was installed to the date 3BLP0303 was discovered tripped open.

### Corrective Actions

1. SCE installed a new breaker tested to the correct setpoint tolerances in position 3BLP0303 and returned the breaker to operable status on October 5, 2005. Breaker 3BLP0304 was replaced with a new breaker and tested to the correct setpoint tolerances and returned to operable status on October 5, 2005.
2. The surveillance procedure was revised to trend bus to load amps and outlet ECU temperature to determine ECU fan starts and operates continuously through the duration of the surveillance testing. In the past, only indication of motor starting in-rush current was used to determine ECU operability during surveillance testing. SCE will review this surveillance issue with plant operators.
3. SCE revised procedures to ensure engineering changes affecting setpoint tolerances in plant equipment are identified and implemented in the field.

Additional corrective actions may be implemented as they are identified.

### Extent of Condition

Breakers 3BLP0303 and 3BLP0304 were two of eight backup penetration breakers (four in Unit 2, four in Unit 3) identified for replacement because they were obsolete equipment. Only these eight breakers specify the non-typical setpoint tolerance of -0 percent, +25 percent. To date, 3BLP0303 and 3BLP0304 had been replaced. Consequently, no other plant systems were affected because the remaining six breakers had not been installed.

SCE's review also concluded that 3BLP0304 had not tripped between the time it was installed to the date 3BLP0303 was discovered tripped open.

### Safety Significance

SONGS has two trains of emergency containment cooling systems. Each train has a containment spray pump and two containment emergency coolers.

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Thus, there are six individual components between Train "A" and Train "B" that can provide post accident containment cooling as follows:

**Train "A"**

- 1) Containment Spray Pump P012
- 2) Emergency Cooler E399
- 3) Emergency Cooler E401

**Train "B"**

- 4) Containment Spray Pump P013
- 5) Emergency Cooler E400
- 6) Emergency Cooler E402

A probabilistic risk analysis showed the incremental core damage probability (ICDP) and incremental large, early release probability (ILERP) risk due to the inoperability of 3ME399 and 3ME401 was less than 1E-8 for ICDP and less than 1E-9 for ILERP. This analysis was based on actual component unavailability and plant operations from December 23, 2004 through October 5, 2005. Although Containment Cooling Train B was considered TS inoperable, normal power to the components remained available to perform its required safety function throughout the duration of this event.

For these reasons, SCE concludes this event was of low safety significance.

**Additional Information**

In the past three years, SCE submitted one LER (Unit 3 2002-002-00) for containment cooling being inoperable for longer than allowed by TS. That event was the result of a manufacturing defect which prevented a breaker from fully charging through the end of the charge cycle. That failure mode was discussed in a May 6, 2002, 10CFR21 report from Asea Brown Boveri to the NRC. Because the incorrect setpoint tolerances reported in this LER were not related to a defective breaker, corrective action taken for LER 2002-002-00 could not have prevented this event.

In the past three years, SCE has not reported any events caused by an inadequate procedure that allowed inoperable equipment to be declared operable.

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Dr. Raymond W. Waldo  
Vice President - Nuclear  
San Onofre

December 7, 2005

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket No. 50-361**  
**Licensee Event Report No. 2005-004**  
**San Onofre Nuclear Generating Station, Unit 2**

Gentlemen:

This submittal provides a Licensee Event Report (LER) 2005-004 required when the Main Steam Isolation Signal was unintentionally, due to personnel error, removed from service for less than an hour. This event did not affect the health and safety of either the public or plant personnel.

If you require any additional information, please so advise.

Sincerely,

A handwritten signature in cursive script that reads "Raymond Waldo".

Unit 2 LER No. 2005-004

cc: B. S. Mallett, NRC Regional Administrator, Region IV  
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

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NRC FORM 366 (7-2001)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104			EXPIRES: 06/30/2007			
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>					<small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0301, or by Internet e-mail to bjs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEDB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>						
1. FACILITY NAME				2. DOCKET NUMBER			3. PAGE				
San Onofre Nuclear Generating Station (SONGS) Unit 2				05000-361			1 OF 4				
4. TITLE											
Personnel error causes the Main Steam Isolation System to be inoperable for less than one hour											
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED		
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER	
10	12	2005	2005	004-00		12	07	2005			
9. OPERATING MODE		1		11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR *: (Check all that apply)							
10. POWER LEVEL		95		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)				
				20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)				
				20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)				
				20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)				
				20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A				
				20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)					
				20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)					
				20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)					
				20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)					
				20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)					
12. LICENSEE CONTACT FOR THIS LER											
NAME						TELEPHONE NUMBER (Include Area Code)					
D. P. Breig, Station Manager, Nuclear Generation						949-368-9263					
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT											
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX		
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR	
YES (If yes, complete EXPECTED SUBMISSION DATE)						NO					
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)											
<p>On 10/12/05 at about 1939 PDT, with Unit 2 in Mode 1 at approximately 95 percent power, technicians were preparing to perform a TS required surveillance of channel "B" of the PPS Low Steam Generator (SG) Pressure(s) and placed all channel "B" low SG pressure functions in bypass. A technician was sent to depress the Low SG Pressure Setpoint Reset button at the Evacuation Shutdown Panel.</p> <p>Due to inattention to detail, the technician sent to perform this step first incorrectly depressed the reset buttons for channels "D" and "C" before correctly depressing "B". As a result, MSIS channel "B" function was in bypass at the same time that channels "C" and "D" were below their TS allowed values.</p> <p>With three channels of MSIS function inoperable, the MSIS function would still generate a reactor trip signal, but at a lower steam pressure value than allowed by the TS. Because MSIS would not function as described in the TS Bases for the RPS, SCE is reporting this event in accordance with 10CFR50.73(a)(2)(v)(D) for a loss of safety function.</p> <p>SCE restored the SG Pressure-Low channels "C" and "D" values. The Technician and the responsible supervisor were disciplined. SCE revised the procedures for performing the Plant Protection System, Channel Functional Test, to prevent recurrence of mispositioning and reviewed this event with the I&amp;C group.</p>											

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Plant: San Onofre Nuclear Generating Station (SONGS)  
 Event Date: October 12, 2005  
 Reactor Vendor: Combustion Engineering  
 Unit 2  
 Mode: Mode 1 – Power Operation  
 Power: 95 percent

## Background:

At San Onofre Nuclear Generating Station Unit 2, the Plant Protection System (PPS) contains four identical measurement channels for steam generator pressure for each steam generator (SG). Each channel for each SG is designed to actuate protective functions for reactor trip, Main Steam Isolation (MSIS), and an emergency feedwater actuation interlock. The PPS initiating device and its setpoint is the same for a reactor trip function and a MSIS function, a nominal 741 psia, although Technical Specification (TS) 3.3.1, "Reactor Protective System (RPS) Instrumentation-Operating," allows the setpoint to be as low as 729 psia.

The low steam generator pressure setpoint for each channel in both SGs (E088 and E089) can be manually lowered by means of a reset pushbutton to allow controlled cooldowns of the reactor coolant system to temperatures corresponding to less than 741 psia without receiving automatic reactor trips or steam line isolations. When the manual reset pushbutton for either steam generator is depressed, the setpoints for both SGs in that channel are reset to approximately 163.5 psia below the actual steam pressure, subject to a maximum setpoint of 741 psia and to instrument tolerances.

Technical Specification 3.3.1, Reactor Protective System (RPS) Instrumentation – Operating, requires four RPS trip and operating bypass removal channels for each function in table 3.3.1-1 to be operable. One of the listed functions is steam generator pressure–low for each SG. With one channel of SG pressure inoperable, SCE is required to place the affected channel in bypass or trip within one hour. With two channels inoperable, SCE is required to place one channel in trip and one channel in bypass within one hour. There is no TS action specified for three channels inoperable.

Technical Specification 3.3.5, Engineered Safety Features Actuation System (ESFAS) Instrumentation requires four ESFAS trip and bypass removal channels for each function listed in Table 3.3.5-1 to be operable. One of the listed functions is steam generator pressure–low for each SG. With one channel of SG pressure inoperable, SCE is required to place the affected channel in bypass within one hour. With two channels inoperable, SCE is required to place one channel in trip and one channel in bypass within one hour. There is no TS action specified for three channels inoperable.

## Description of Event:

On October 12, 2005 at about 1939 PDT, with Unit 2 in Mode 1 at approximately 95 percent power, Instrumentation and Control (I&C) technicians were preparing to perform a TS required surveillance of channel "B" of the Plant Protection System (PPS) Low Steam Generator Pressure(s) and placed all channel "B" functions associated with low steam generator pressures in bypass. To complete part of this surveillance, an Instrumentation and Controls (I&C) technician is required to depress the Low Steam Generator Pressure Setpoint Reset button at the Control Room Evacuation Shutdown Panel L042 located on the 50' elevation of the control building. An I&C technician (utility, non-licensed) was sent to perform this procedural step.

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At about 2135 PDT, a second I&C technician (utility, non-licensed) was reviewing the results of channel "B" Functional Test and noted that the SG pressure - low setpoints for channels "C" and "D" were reading approximately 645 psia on the control room panel lumigraphs. This was about 100 psi lower than channels "A" and "B" and lower than the TS required setpoint ( $\geq 729$  psia). The technician notified plant operators who took action to comply with TS requirements and to restore the setpoints.

SCE's review of this event concluded that from about 2053 PDT to approximately 2135 PDT on October 12, 2005, PPS channel "B" function was in bypass at the same time that channels "C" and "D" were inappropriately set below their TS required setpoint. During that period (~ 42 minutes), Unit 2 was unknowingly in TS 3.0.3 (the plant was also momentarily in TS 3.3.1, Action B, TS 3.3.5, Action D, when only two channels were inoperable).

With three channels of MSIS function inoperable, the MSIS function would still generate a reactor trip signal, but at a lower steam pressure value than allowed by the Technical Specification (TS). Because the MSIS function would not function as described in the TS basis for the RPS, SCE is reporting this event in accordance with 10CFR50.73(a)(2)(v)(D) for a loss of safety function.

## Cause of Event:

This event was caused by personnel error (inattention to detail) and insufficient supervision.

- Inattention to Detail - When an PPS channel function is in bypass and a pre-trip is in that channel, depressing a SG pressure-low reset button at the Control Room Evacuation Shutdown Panel L042 will extinguish a local indicator light. Due to inattention to detail, the I&C technician (utility, non-licensed) incorrectly depressed the reset button for channel "D" and channel "C" before correctly depressing the channel "B." The expected response was not received until he also depressed the channel "B" reset button,

The technician did not reveal that he had incorrectly depressed the reset buttons for channels "C" and "D" until interviewed by SCE management the following morning. The technician also did not follow the surveillance procedure as written and did not have the procedure in hand as required by SCE's procedure use standards.

- Insufficient supervision - The I&C supervisor did not use sufficient rigor in the performance of this surveillance. He did not conduct an adequate pre-job brief and did not ensure/require the I&C technician to have the surveillance procedure in-hand when performing the surveillance.

## Corrective Actions:

- SG Pressure-Low setpoints for channels "C" and "D" were restored.
- I&C Technician (utility, non-licensed) and the responsible I&C Supervisor were appropriately disciplined.
- SCE revised the procedures for performing the Plant Protection System, Channel Functional Test for Channels A, B, C, and D. to prevent recurrence of mispositioning.
- SCE management reviewed this event with the specific crew involved and with the I&C group. SCE emphasized the importance of adhering to SONGS procedure use policies and continuing to use the SONGS Human Performance Tools program.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2005	--004 --	00	4 of 4

Safety Significance:

Before and after this event, the MSIS was Operable. Between 2053 PDT and 2135 PDT, PPS channels were configured as follows

- Channel A: Setpoint at 741 psia (both SGs)
- Channel B: Bypassed (inoperable)
- Channel C: Reset to approximately: 641 psia (for E088) and 640 psia (for E089)
- Channel D: Reset to approximately: 645 psia (for E088) and 639 psia (for E089)

In this configuration, the MSIS function would still generate actuation signals, but would do so at the lower values noted above rather than the TS required value of  $\geq 729$  psia. The lower setpoints would cause the MSIS function to generate actuation signals later in a postulated accident. Of the postulated accidents evaluated in Chapter 15 of the UFSAR, the following events would be affected by a late MSIS generated actuation signal:

- Post-trip Steam Line Break
- Pre-trip Steam Line Break
- Increased Main Steam Flow
- Inadvertent Opening of a Steam Generator Atmospheric Dump Valve
- Feedwater System Pipe Break
- Anticipated Transient Without SCRAM

SCE confirmed that the effect on these events is minimal and the plant remained bounded by the existing safety analysis.

Additional Information:

There were no reportable events involving MSIS misoperation within last three years.

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Dr. Raymond W. Waldo  
Vice President - Nuclear  
San Onofre

April 3, 2006

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket Nos. 50-361 and 50-362**  
**Licensee Event Report No. 2006-002**  
**San Onofre Nuclear Generating Station, Units 2 and 3**

Dear Sir or Madam:

This submittal provides Licensee Event Report (LER) 2006-002 for SONGS declaration of Offsite Power inoperable.

Any actions listed are intended to ensure continued compliance with existing commitments as discussed in applicable licensing documents; this LER contains no new commitments. If you require any additional information, please so advise.

Sincerely,

A handwritten signature in cursive script that reads "Raymond Waldo".

Units 2 and 3 LER No. 2006-002

cc: B.S. Mallett, Regional Administrator, NRC Region IV  
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

Mail Stop D45  
P.O. Box 128  
San Clemente, CA 92672  
949-368-8725  
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waldorw@songs.sce.com

<b>NRC FORM 366</b> (7-2001)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	APPROVED BY OMB: NO. 3150-0104 06/30/2007  <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-8 E8), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to ljs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>	EXPIRES:
<b>LICENSEE EVENT REPORT (LER)</b>  <small>(See reverse for required number of digits/characters for each block)</small>			

<b>1. FACILITY NAME</b> San Onofre Nuclear Generating Station (SONGS) Unit 2	<b>2. DOCKET NUMBER</b> 05000-361	<b>3. PAGE</b> 1 OF 3
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**4. TITLE**  
 Offsite Power Declared Inoperable following the trip of a 500 KV Transmission Line in Southern California

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	4	2006		2006-002-00		04	3	2006	SONGS Unit 3	05000-362
									FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b>	6	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR ': (Check all that apply)</b>			
		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
<b>10. POWER LEVEL</b>	0	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER <small>Specify in Abstract below or in NRC Form 366A</small>
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> D. P. Breig, Station Manager, Nuclear Generation	<b>TELEPHONE NUMBER (include Area Code)</b> 949-368-9263
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>			
YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/>	NO	

**15. EXPECTED SUBMISSION DATE**

On February 3, 2006, at 1646 PST, the Devers-Palo Verde line (500 KV transmission line) relayed. The SCE Grid Control Center (GCC) and the California Independent System Operator (CAISO) evaluated the adequacy of the grid to support operations at SONGS. Using grid nomograms, the GCC and the CAISO concluded the grid nomograms predicted offsite power would not be within limits if SONGS Unit 3 were to trip. At 1815 PST, the GCC notified SONGS operators that offsite power was out of limits and SONGS declared offsite power inoperable at that time.

NUREG-1022, Revision 2 indicates offsite power unavailability is reportable regardless of whether other electrical power systems are available. SCE reported this occurrence to the NRC in accordance with 10CFR50.73(b)(3)(v)(D) on February 3, 2006, at about 2146 PST (Event Number 42310). SCE is providing this follow-up LER in accordance with 10CFR50.72(a)(2)(v).

No SONGS corrective actions are required for this offsite occurrence.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2006	-- 002--	00	2 of 3

Plant: San Onofre Nuclear Generating Station (SONGS) Units 2 and 3  
 Discovery Date: February 3, 2006  
 Reactor: Combustion Engineering  
 Vendor:  
 Mode: Unit 2: Mode 6 – Refueling Unit 3: Mode 1  
 Power: 0 percent 99.9

**Description:**

On February 3 2006, at 1646 PST the Devers-Palo Verde line (a 500 KV grid transmission line) relayed. As required by their procedures, the SCE Grid Control Center (GCC) and the California Independent System Operator (CAISO) evaluated the adequacy of the grid to support operations at SONGS. (At the time of occurrence, SONGS Unit 2 was shutdown in a refueling outage and Unit 3 was operating at about 100 percent power).

Using grid nomograms, the GCC and the CAISO concluded the grid nomograms predicted offsite power [FK] would not be within limits if SONGS Unit 3 were to trip. At about 1815 PST, the GCC notified SONGS operators that offsite power was out of nomogram limits and SONGS declared offsite power inoperable at that time. All four SONGS diesel generators [DG] (two per Unit) remained operable during this event. At about 1843 PST the GCC notified SONGS that the CAISO had added generation to the grid and that offsite power had returned to within nomogram limits and SONGS operators declared offsite power operable at that time.

NUREG-1022, Revision 2 indicates offsite power unavailability is reportable regardless of whether other electrical power systems are available. SCE reported this occurrence to the NRC in accordance with 10CFR50.72(b)(3)(v) on February 3, 2006, at about 2146 PST (Event Number 42310). SCE is providing this follow-up LER in accordance with 10CFR50.73(a)(2)(v)(D).

**Cause of Event:**

Offsite power at SONGS became inoperable when the Devers-Palo Verde line relayed. The Devers-Palo Verde line relayed due to a beaker failure at the Valley substation.

**Corrective Actions**

No SONGS corrective actions are required for this occurrence. SCE may be implementing corrective actions for the issues discussed in the additional information section below.

**Safety Significance:**

An assessment of the incremental core damage probability (ICDP) and the incremental large early release probability (ILERP) for the February 3, 2006 event determined that the Unit 3 ICDP and ILERP were 1.3E-8 and 3.8E-9, respectively. The Unit 2 ICDP for the February 3, 2006 event was determined to be 2E-12. The assessment was based on the reported actual component unavailability, system alignments and operating conditions that existed at the time of the event.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2006	-- 002--	00	3 of 3

**Previous Occurrences:**

In the past three years, SCE has reported two other instances related to operability of offsite power. Unit 2 LER 2004-003 reported that on June 14, 2004, a 230 kV transmission line fault in Arizona caused offsite power frequency at SONGS to momentarily drop below that required for operability. The cause of that event was a failed insulator on a transmitter line in Arizona. Unit 2 LER 2005-003 reported that degraded grid voltage protective relay settings at SONGS might have caused SONGS to separate from offsite power even though offsite power would have supported operability. Corrective actions for these previous events could not have prevented the breaker failure at the Valley substation.

**Additional Information:**

Consistent with SCE's response to the NRC on Temporary Instruction (IT) 2515/163, "Operational Readiness of Offsite Power," the CAISO, the GCC and SONGS followed the actions prescribed in the GCC procedure OP-13 and SONGS procedure SO23-13-4 following loss of the Devers-Palo Verde transmission line.

The CAISO conferred with the GCC and the GCC informed SONGS of degraded grid conditions. The CAISO altered grid conditions to restore power to within limits for SONGS. (Total time of offsite power inoperability was 117 minutes, which is less than the 24 hours allowed by Technical Specification 3.8.1).

SCE's review of this event noted a weakness in the nomogram used to evaluate the status of the offsite power grid. When the CAISO and GCC first evaluated the nomogram, they were unable to immediately determine the status because the nomogram line had shifted below the "X" axis. The CAISO made the determination that the SONGS nomogram was within acceptable limits (within the 1 hour time frame proscribed by procedure). After continuing discussion, the CAISO and the GCC reversed this determination and at 1815 the GCC notified SONGS that the nomogram was outside acceptable limits. The delay in the final determination by the CAISO and the GCC resulted in a delay in declaring offsite power inoperable by SONGS operators. SONGS has met with GCC and CAISO representatives to help identify and address the apparent cause of the delay. Actions have been taken by the GCC to address the circumstances that led to the delay. The GCC has modified the nomogram tool used by the grid dispatcher to determine the SONGS offsite power availability including:

1. Added a visual warning on the bottom of the nomogram with the words "Nomogram Line is OFF SCALE LOW" when the import line is off scale low.
2. Rescaled the nomogram "Y" axis from 0 to 400 to -100 to 400.
3. Similarly modified the other critical line nomograms that monitor SONGS offsite power availability.

SCE is continuing to evaluate ways to further improve communication with, and between, the GCC and the CAISO (060200232-03).

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Daniel P. Breig, P.E.  
Station Manager  
San Onofre

April 12, 2006

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket No. 50-362**  
**Licensee Event Report No. 2006-001**  
**San Onofre Nuclear Generating Station, Unit 3**

Dear Sir or Madam:

This submittal provides Licensee Event Report 2006-001 for the inadvertent fill of a steam generator during an Emergency Safety Features Actuation System subgroup relay test. The plant responded as designed and this event did not affect the health and safety of either plant personnel or the public.

If you require any additional information, please contact me.

Sincerely,

A handwritten signature in cursive script that reads "Daniel P. Breig".

Unit 3 LER No. 2006-001

cc: B. S. Mallett, NRC Regional Administrator, Region IV  
C. C. Osterholtz, NRC Senior Resident Inspector, SONGS Units 2 & 3

P.O. Box 128  
San Clemente, CA 92674-0128  
949-368-9265/PAX 89265  
Fax 949-368-6185  
breigdp@songs.sce.com

NRC FORM 366 (7-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB: NO. 3150-0104	EXPIRES: 06/30/2007
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>		<small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden, estimate to the Records Management Branch (T-6 EB), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>	

<b>1. FACILITY NAME</b> San Onofre Nuclear Generating Station (SONGS) Unit 3	<b>2. DOCKET NUMBER</b> 05000362	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
**Emergency Subgroup Relay Test Causes Inadvertent Fill of Steam Generator**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	15	2006	2006	001-00		04	12	2006		

<b>9. OPERATING MODE</b>	1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR : (Check all that apply)</b>			
		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
<b>10. POWER LEVEL</b>	100	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
		20.2203(a)(1)	50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)(A)
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)		50.73(a)(2)(v)(A)
		20.2203(a)(2)(ii)	50.36(c)(2)		50.73(a)(2)(v)(B)
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)		50.73(a)(2)(v)(C)
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)		50.73(a)(2)(v)(D)
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)		50.73(a)(2)(vii)
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)		50.73(a)(2)(viii)(A)
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(B)

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> D. P. Breig, Station Manager, Nuclear Generation	<b>TELEPHONE NUMBER (Include Area Code)</b> 949-368-9263
---	---

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>						
<small>(If yes, complete EXPECTED SUBMISSION DATE)</small>			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>MONTH</td><td>DAY</td><td>YEAR</td> </tr> <tr> <td> </td><td> </td><td> </td> </tr> </table>	MONTH	DAY	YEAR			
MONTH	DAY	YEAR							

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 02/15/2006 at about 1034 PST, during a subgroup relay surveillance test of the Emergency Feedwater Actuation Signal 1 (EFAS-1) relay K-402B on Train B for Steam Generator (SG) E089, valves HV4706 and HV4715 did not close. The valves are in the Auxiliary Feedwater flowpath to SG E089. Operators terminated the surveillance. The main feedwater (MFW) control system responded as designed. SG E089 level rise stopped at about 77 percent and returned to the setpoint of about 67 percent by 1051 PST.

SCE discovered that a Cutler-Hammer test switch contact block failed. The coils of a return spring for a test switch contact plunger stuck together in the compressed state due to hardened grease at the return spring. This allowed the circuit to open and reset the timing relay in the test circuit, which removed the actuation signal.

SCE replaced the test switch contact block and re-performed the surveillance of the EFAS-1 subgroup relay K-402B with satisfactory results.

The contact block is used only during surveillance tests and is automatically removed from the active circuit upon receipt of a valid EFAS signal. Therefore, the safety significance of the contact block failure is minimal.

**LICENSEE EVENT REPORT (LER)**  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	5. LER NUMBER			PAGE (s)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 3	05000362	2006	--001 --	00	2 of 4

Plant: San Onofre Nuclear Generating Station (SONGS) Unit 3  
 Event Date: February 15, 2006  
 Reactor Vendor: Combustion Engineering  
 Mode: Mode 1  
 Power: 100 percent

**Description of Event**

On February 15, 2006, plant operators were performing a routine subgroup relay surveillance test of the Emergency Feedwater Actuation Signal 1 (EFAS-1) relay K-402B for Train "B" Steam Generator (SG) E089 in accordance with site operations procedures. This surveillance is required by Technical Specification (TS) 3.3.6, "Engineered Safety Features Actuation System (ESFAS) Logic and Manual Trip" Surveillance Requirement 3.3.6.2. The surveillance being performed was to verify that ESF subgroup relay [RLY] K-402B (EFAS-1) placed its actuated equipment in the required position.

To perform the surveillance for ESFAS subgroup relay K-402B (EFAS-1), plant operators manually initiate a test signal to K-402B (EFAS-1), which actuates the following components:

- Valve [V] HV4716, "Steam to Auxiliary Feedwater (AFW) [BA] Pump [P] Turbine P-140 Throttle Valve",
- Valve HV4706, "Auxiliary Feedwater Pump P-140 to SG E089 Discharge Valve", and
- Valve HV4715, "SG E089 Auxiliary Feedwater Containment Isolation Valve".

During normal plant operation, valves HV4706, HV4715, and HV4716 are closed. Valves HV4706, HV4715 are "jog" valves and will only move (open or close) when an actuation signal is present. To verify proper operation of the valves upon an EFAS-1 actuation signal, the surveillance test requires plant operators to align HV4706 and HV4715 to the open position. In the test mode, the expected system response for a K-402B, EFAS-1 actuation signal is the opening of HV4716 and the closing of HV4706 and HV4715. Valves HV4706 and HV4715 are in the AFW flowpath to SG E089. When valves HV4706 and HV4715 are closed, AFW flow would return to the condensate storage tank [KA] via a miniflow line.

At about 1034 PST, operators aligned HV4706 and HV4715 to the open position for the surveillance test. When ESFAS subgroup relay K-402B (EFAS-1) was actuated, operators observed that HV4716 opened (which started the turbine driven AFW pump) and that HV4706 and HV4715 did not move to their closed position. Operators responded by terminating the surveillance and closed HV4716. Valves HV4706 and HV4715 were closed shortly thereafter.

At about this same time, alarms 52A06 "E089 Level Hi/Lo" and 56A33 "E089 Level Hi Pretrip" actuated in the control room. The main feedwater control system (MFCS) [JB]

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 3	05000362	2006	--001--	00	3 of 4

responded as designed and reduced main feedwater flow. Steam Generator E089 level rise stopped at about 77 percent and returned to the setpoint of about 67 percent by 1051 PST.

Actuation of the auxiliary feedwater system during a planned surveillance is ordinarily not reportable. Southern California Edison (SCE) is reporting this event in accordance with 10CFR50.73(a)(2)(iv) because the system actuated in a way that was not part of the planned evolution. This is consistent with the guidance provided in NUREG-1022, Rev. 2.

### Cause of Event

This event occurred due to a failure of the test switch contact block [BLK] (Cutler-Hammer contact block part number 10250T55). The coils of a return spring for a test switch contact plunger stuck together in the compressed state due to hardened grease at the return spring. This changed the intended make-before-break operation of the test switch to break-before-make. This allowed the circuit to open and reset the timing relay in the test circuit, which removed the actuation signal.

Since valves HV4706 and HV4715 are "jog" valves, the contact block failure resulted in the valves losing their close signal, and not moving to their closed position.

### Corrective Actions

SCE has taken or is evaluating the following corrective actions:

1. On February 15, 2006 at about 1713 PST, SCE replaced the test switch contact block and repeated the test for ESFAS subgroup relay K-402B (EFAS-1). The results were satisfactory.
2. Cutler-Hammer contact blocks part number 10250T55 are used in the ESFAS subgroup relay test circuits. There are four 10250T55 contact blocks installed in the plant, one each for Train A and Train B in both Units 2 and 3. The contact block replaced in item #1 (above) was not inspected for hardened grease because the cause evaluation was not completed at that time. Consequently, SCE plans to inspect and clean or replace the four Cutler-Hammer contact blocks.
3. SCE will evaluate other similarly configured Cutler-Hammer contact blocks to determine if they could be affected. This evaluation and any required corrective actions will be documented in SCE's corrective action program.
4. Prior to this event, these contact blocks were not required to be routinely inspected or replaced. SCE is evaluating replacing the contact blocks on a periodic basis.
5. SCE reviewed each ESFAS Subgroup Relay Test to determine if failure of any component (or combination of components) to fully go to the ESFAS position could cause unintended movement of air, gas, or water. SCE identified several similar

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	5. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 3	05000362	2006	--001 --	00	4 of 4

test procedures and has incorporated the lessons learned from this event into future pre-job briefs for these procedures.

### Safety Significance

Failure of the test switch contact block could not prevent safety related plant equipment from performing its required safety function. The contact block is used only during surveillance and/or test evolutions and is automatically removed from the active circuit upon receipt of a valid ESFAS signal. Therefore, the safety significance of the contact block failure is minimal.

This test failure resulted in about 900 gpm of auxiliary feedwater going to SG E089 for approximately two minutes. Main feedwater flow to SG E089 is about 15,000 gpm. This system transient was within the capability of the main feedwater control system to control the steam generator level, and the system responded as designed.

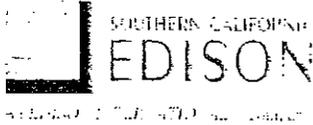
### Additional Information

Previous occurrences - In the past three years, SCE has not reported any other ESFAS test failures that caused an ESFAS system to respond in a manner that was not expected. However while performing a subgroup relay test for Unit 2 Train B EFAS-1 on September 11, 2001, valve 2HV4715 failed to close. SCE discovered that a Potter and Brumfield relay had failed and reported this event in voluntary LER 2002-001, "Aging Phenomenon Affects of Certain Potter and Brumfield Relays." In this event, valve 2HV4706 closed as expected and valve 2HV4715 was manually closed from the control room.

Potential Generic Consideration - The contact block is manufactured by Cutler-Hammer, part number 10250T55 and was dedicated by ABB Combustion Engineering (now Westinghouse) in accordance with 10CFR50 Appendix B and procured as a safety-related component. SCE's believes that the grease found on the failed spring was most likely introduced by Cutler-Hammer.

These contact blocks are used in a test circuit and would not create a substantial safety hazard at SONGS. However, at other facilities, these contact blocks could be used in critical applications and may potentially create a substantial safety hazard. Westinghouse has indicated they will review this issue.

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Dr. Raymond W. Waldo  
Vice President - Nuclear  
San Onofre

August 24, 2007

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: Docket No. 50-361  
Licensee Event Report No. 2007-001-01  
San Onofre Nuclear Generating Station, Unit 2

Reference: Ray Waldo (SCE) letter to NRC Document Control Desk, "Licensee Event Reports Nos. 2007-001 and 2007-002", dated August 17, 2007

Dear Sir or Madam:

This submittal provides revision 1 to Licensee Event Report (LER) 2007-001, which describes the loss of Instrument Air pressure and resulting manual trip of the reactor on June 20, 2007. Southern California Edison has updated the Safety Significance section of this LER to include the Probability Risk Assessment (PRA) for this event. This event did not affect the health and safety of either plant personnel or the public.

If you require any additional information, please contact me.

Sincerely,

A handwritten signature in cursive script that reads 'Raymond Waldo'.

Unit 2 LER No. 2007-001-01

cc: B. S. Mallett, NRC Regional Administrator, Region IV  
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 & 3

Mail Stop D45  
P.O. Box 128  
San Clemente, CA 92672  
949-568-8725  
Fax 949-568-6185  
waldorw@songs.sce.com

NRC FORM 366 (7-2001)	U.S. NUCLEAR REGULATORY COMMISSION	APPROVED BY OMB NO. 3150-0104 <small>Estimate burden per response to comply with this mandatory information collection request 50 hours. Reasoned lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6; U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; or by internet e-mail to bis@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-1020C (3150-0104), Office of Management and Budget, Washington, DC 20503. It is meant to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>	EXPIRES: 06/30/2007
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2> <p style="font-size: small; margin: 0;">(See reverse for required number of digits/characters for each block.)</p>			

1. FACILITY NAME <b>San Onofre Nuclear Generating Station (SONGS) Unit 2</b>	2. DOCKET NUMBER <b>05000361</b>	3. PAGE <b>1 OF 4</b>
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4. TITLE  
**Instrument Air system failure results in Manual Reactor Trip**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REL NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
6	20	2007	2007	001-01		08	20	2007	None	
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 71. (Check all that apply)								
10. POWER LEVEL	96		20.2201(b)	20.2203(a)(3)(iii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)				
			20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)				
			20.2203(a)(1)	50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	73.71(a)(4)				
			20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)				
			20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A				
			20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)					
			20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)					
			20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)					
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)						
		20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)						

12. LICENSEE CONTACT FOR THIS LER	
NAME <b>R. W. Waldo, VP Generation</b>	TELEPHONE NUMBER (Include Area Code) <b>949-368-8725</b>

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 20, 2007, at about 2240 PDT, Unit 2 was operating in Mode 1 at about 96 percent power when a line in the instrument air system separated at a soldered connection. The resulting loss of Instrument Air (IA) pressure caused the loss of control of the Steam Generator Feedwater Regulating valves. One steam generator level rose uncontrolled necessitating the control room Operators to trip the reactor manually at about 2250 PDT, June 20, 2007. Operators subsequently manually tripped the Main Feedwater pumps to stop excess feedwater to the steam generators and actuated the Auxiliary Feedwater System. As designed, loss of IA system pressure isolates cooling water to the normal containment coolers and Operators manually started the Containment Emergency Cooling Units as a conservative measure.

Southern California Edison(SCE) reported this occurrence to the NRC Operations Center at 0024 PDT on June 21, 2007 (NRC Event Log Number 43435). SCE is providing this follow-up written report in accordance with 10CFR50.73(a)(2)(iv)(A).

The soldered connection failed due to improper fit and slow acting corrosion. SCE inspected the IA system piping and installed pipe clamps to strengthen piping joints where needed to add additional margin.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	5. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV. NO.	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000361	2007	--001 --	01	2 of 4

Plant: San Onofre Nuclear Generating Station (SONGS) Unit 2  
 Discovery Date: June 20, 2007  
 Reactor Vendor: Combustion Engineering  
 Mode: Mode 1 – Power Operation  
 Power: 96 percent

### Background

San Onofre Units 2 and 3 share a common instrument air (IA) [LD] system that pneumatically operates components in the plant. The IA system was designed as a Quality Class III (non-safety-related) system and is necessary for plant startup and power operation. Safety Related Equipment supplied by the IA system is designed to fail to their safety function positions on a loss of air pressure. This design allows a non-safety-related system to support safety-related components.

The IA system is provided with three 100 percent capacity air compressors powered from different power supplies. The IA system can be supplemented with air from Service Air [LF] and an independent backup nitrogen supply in case of system failure. Although the IA system is common to both Units 2 and 3, check valves isolate the unit with a break when a high change in pressure occurs. Capacity of the IA system is such that normal system operation could continue with a break in a 1" or smaller IA line.

### Description of Event

On June 20, 2007, at 2240 PDT, Unit 2 was operating in Mode 1 at about 96 percent power when a 3" diameter copper line in the instrument air system separated at a soldered connection joint. The loss of Instrument Air pressure caused the feedwater bypass valves to close. The resulting decrease in steam generator levels caused the controller to increase the speed (flow) of the main feedwater pumps. Due to the differences in the positions of the Main Feedwater Regulating valves that lock as-is on loss of instrument air, the steam generators filled unequally. When Steam Generator E088 level reached about 85 percent, the Control Room Operators tripped the reactor. Operators subsequently manually tripped the Main Feedwater pumps to stop excess feedwater to the steam generators and actuated the Auxiliary Feedwater System. Operators manually initiated the Emergency Feedwater Actuation Signals [JE] to start the Auxiliary Feedwater System [SA]. As designed, the loss of IA system pressure also resulted in the isolation of cooling water to the normal containment coolers. Therefore, operators manually started the Containment Emergency Cooling Units as a conservative measure.

The IA back-up system and check valves sustained IA service to Unit 3 until the break could be completely isolated.

Southern California Edison reported this occurrence to the NRC Operations Center at 0024 PDT on June 21, 2007 (NRC Event Log Number 43435), in accordance with 10CFR50.72(b)(2)(iv)(B) for actuation of the Reactor Protection System, and 50.72(b)(3)(iv)(A) for valid actuation of the Emergency Feedwater and Containment Emergency Cooling Unit. SCE is providing this follow-up written report in accordance with 10CFR50.73(a)(2)(iv)(A).

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV. NO.	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000361	2007	--001--	01	3 of 4

**Cause of Event**

The cause of this event is loss of instrument air system pressure when the instrument air system separated at a soldered connection in a section of 3" diameter piping. The connection failed because (1) a weak solder joint, and (2) corrosion of the solder joint.

This section of pipe and the failed solder joint were installed during original plant construction (~1980). The solder connection was weak because the gap between the tube and the coupling was too large. The larger gap did not allow for the capillary action necessary to provide an even distribution of the melted solder and the solder pooled at the bottom of the coupling. The larger gap also allowed solder flux to remain in the solder, which lead to slow acting corrosion of the solder joint. When corrosion had sufficiently reduced the solder joint strength, the connection separated.

**Corrective Actions**

- SCE replaced the Instrument Air solder joint that had separated and the leaking joint adjoining it.
- SCE inspected all soldered joints on piping greater than one inch in the IA system on Units 2 and 3 (approximately 818 joints). Thirty-two (32) clamps were installed on joints indicating leakage to add additional margin.
- SCE identified the other system containing solder joints at SONGS (Domestic Water System, up to 6" diameter). Given that there is no indication of water leakage, SCE concluded that Domestic Water System can be eliminated from the Extent of Condition scope.

Additional corrective actions will be implemented in accordance with SONGS Corrective Action Program.

**Safety Significance**

The Instrument air system is a non-safety-related system. Safety Related Equipment supplied by the IA system are designed to fail to their safety function position on a loss of air pressure. In response to this manual reactor trip reported in this LER, plant equipment responded as required. This occurrence remained bounded by the Updated Final Safety Analysis Report evaluation of a loss of instrument air event and did not affect the health and safety of either plant personnel or the public.

An assessment of the conditional core damage probability (CCDP) and the conditional large early release probability (CLERP) for the June 20, 2007 event determined that the Unit 2 CCDP and CLERP were 3.3E-6 and 1.9E-7, respectively. The assessment was based on the reported actual component unavailabilities, system alignments and operating conditions that existed at the time of the event.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV. NO.	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000361	2007	--001--	01	4 of 4

**Additional Information:**

During this event, there was a separate Technical Specification violation described in LER 2007-002.

In the past three years, there have been no other occurrences of a failed solder connection resulting in a reactor trip.

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June 6, 2008

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket No. 50-361 and 50-362**  
**Licensee Event Report Nos. 2008-002 and 2008-003**  
**San Onofre Nuclear Generating Station, Units 2 and 3**

Dear Sir or Madam:

In accordance with 10CFR50.73(a)(2)(v)(D), this submittal provides follow-up Licensee Event Reports (LERs) 2008-002 and 2008-003 for occurrences of offsite power inoperability on May 20, 2008, and May 29, 2008, respectively. Neither the health nor the safety of plant personnel or the public was affected by these occurrences.

If you require any additional information, please contact me.

Sincerely,



Enclosures: Units 2 and 3 LER No. 2008-002  
Units 2 and 3 LER No. 2008-003

cc: E. E. Collins, NRC Regional Administrator, Region IV  
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 & 3

**LER Hard Copy Distribution**

bcc: via hard copy w/enclosures

- M. L DeMarco (SDG&E)
- M. L. Edwards (City of Anaheim)
- G. L. Nolff (City of Riverside)
- D. H. Wright (City of Riverside)
- R. T. Ridenoure, Senior Vice President
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- RCT FILES
- M. Carr
- C. E. Williams
- Douglas Porter
- [LEREvents@inpo.org](mailto:LEREvents@inpo.org) (without "pink")

G: \Comp\LERs\2008\2-2008-002 grid under-  
 frequency events.doc, 2-2008-003 grid under-  
 frequency event.doc

Review Req.	Organization	Approval	Date
x	Director, NRA		
x	Manager, Compliance	CEW	6/6/08
x	Author	SGD	6/6/08
x	Independent Verifier	D. Dick	6/04/08
x	RCTS Completed (AR No.)080500932 080501345		
x	Bond Paper Review		
x	Archived on G: Drive		
<b>OTHER APPROVALS</b>			
	Mgr. - Work Control		
	Mgr. - Maintenance		
x	Director, Maintenance/Systems Engineering	COO	6/6/08
x	Director, Operations	T. Yackle by phone	6/6/08
	Mgr. - I&C Mgr		
	Mgr. - Site Security		
	Mgr. - Site Support Services		
	Mgr. - Nuclear Training		
x	Mgr. - Nuclear Fuel Mgmt	DMT	6/6/08
	Mgr., PRA		
The LER Author/Supervisor is required to be PQS 280QC8 qualified			
		Name	Date
PQS-Qualified Individual:		CEW	
Verified by:		SGD	6/6/08

<b>NRC FORM 366</b> (9-2007)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	APPROVED BY OMB: NO. 3150-0104 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-10202 (3150-D104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>	EXPIRES: 08/31/2010
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>			

1. FACILITY NAME <b>San Onofre Nuclear Generating Station Unit 2</b>	2. DOCKET NUMBER <b>05000-361</b>	3. PAGE <b>1 OF 1</b>
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4. TITLE  
**Disturbance on the Pacific DC Intertie cause offsite power frequency to dip below operability limits**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
<b>5</b>	<b>20</b>	<b>2008</b>		<b>2008-002-00</b>		<b>6</b>	<b>06</b>	<b>2008</b>	<b>SONGS Unit 3</b>	<b>50-362</b>
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	<b>1</b>	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
10. POWER LEVEL	<b>99</b>		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)				
		20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)					
		20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)					
		20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)					
		20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER	Specify in Abstract below or in NRC Form 366A				
		20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)						
		20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)						
		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)						
20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)								
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)								

**12. LICENSEE CONTACT FOR THIS LER**

NAME <b>Thomas R. Yackle, Director, Operations</b>	TELEPHONE NUMBER (Include Area Code) <b>949-368-4440</b>
---	---

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
				N					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
YES (if yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
				MONTH	DAY	YEAR

**16. ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 20, 2008, at about 1310 PDT, the offsite power grid connected to San Onofre Nuclear Generating Station (SONGS) experienced a momentary disturbance. Control Room indicators alerted Operators that grid frequency dipped below 59.7 Hz, to about 59.69 Hz. Southern California Edison (SCE) reported this event in accordance with 10CFR50.72(b)(3)(v)(D) (NRC Log No. 44227). The frequency dip at SONGS lasted approximately 10 seconds and was caused by a disturbance on the Pacific DC Intertie line in Oregon.

SCE is submitting this follow-up written report in accordance with 10CFR50.73(a)(2)(v)(D).

During this occurrence, Unit 2 was operating at about 99 percent power; Unit 3 was operating at about 80 percent power.

During the event, both trains of onsite AC sources [EK] on Unit 3 and one train on Unit 2 were available. The size and duration of the frequency dip were small. Consequently, there was little to no safety significance to the event. There are no corrective actions required at SONGS due to this event.

LER 2-2004-003, dated July 16, 2004 and LER 2-2008-003 dated June 6, 2008 also reported grid underfrequency events.

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [bj@nrc.gov](mailto:bj@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME <b>San Onofre Nuclear Generating Station Unit 2</b>	2. DOCKET NUMBER <b>05000-361</b>	3. PAGE <b>1 OF 1</b>
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4. TITLE  
**Disturbance on the Pacific DC Intertie cause offsite power frequency to dip below operability limits**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
<b>5</b>	<b>29</b>	<b>2008</b>		<b>2008-003-00</b>		<b>6</b>	<b>06</b>	<b>2008</b>	<b>SONGS Unit 3</b>	<b>50-362</b>

9. OPERATING MODE	10. POWER LEVEL	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
<b>1</b>	<b>99</b>	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
		<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	
		<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
		<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME <b>Thomas R. Yackle, Director, Operations</b>	TELEPHONE NUMBER (include Area Code) <b>949-368-4440</b>
---	---

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
				<b>N</b>					

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
---	---	-----------------------------

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 29, 2008, at about 1136 PDT, the offsite power grid connected to San Onofre Nuclear Generating Station (SONGS) experienced a momentary disturbance. Control Room indicators alerted Operators that grid frequency dipped below 59.7 Hz, to about 59.6 Hz. Southern California Edison (SCE) reported this event in accordance with 10CFR50.72(b)(3)(v)(D) (NRC Log No. 44247). The frequency dip at SONGS lasted approximately 10 seconds and was caused by a disturbance on the Pacific DC Intertie line in California.

SCE is submitting this follow-up written report in accordance with 10CFR50.73(a)(2)(v)(D).

During the occurrence, Unit 2 was operating at about 99 percent power; Unit 3 was operating at about 80 percent power.

During this occurrence, all trains of Emergency Diesel Generation (EDG) [EK] on both Units 2 and 3 were available. The size and duration of the frequency dip was small. Consequently, there was little to no safety significance to the event. There are no corrective actions required at SONGS due to this event.

LER 2-2004-003, dated July 16, 2004 and LER 2-2008-002, dated June 6, 2008 also reported grid underfrequency events.

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August 1, 2008

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket No. 50-361**  
**Licensee Event Report No. 2008-004**  
**San Onofre Nuclear Generating Station, Unit 2**

Dear Sir or Madam:

In compliance with 10CFR50.73(a)(2)(iv)(A), this submittal provides Licensee Event Report (LER) 2008-004 to report an event that resulted in a reactor trip. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

If you require any additional information, please contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Albert R. Hochevar'.

Albert R. Hochevar  
Station Manager

Unit 2 LER No. 2008-004

cc: E. E. Collins, NRC Regional Administrator, Region IV  
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 & 3

<b>NRC FORM 366</b> (9-2007)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	APPROVED BY OMB: NO. 3150-0104 <small>Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.</small>	EXPIRES: 08/31/2010
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>			

1. FACILITY NAME <b>San Onofre Nuclear Generating Station Unit 2</b>	2. DOCKET NUMBER <b>05000-361</b>	3. PAGE <b>1 OF 3</b>
---	--------------------------------------	--------------------------

4. TITLE  
**Malfunctioning stator water cooling system check valve causes reactor trip**

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
6	05	2008	2008-004-00			8	1	2008		

9. OPERATING MODE	10. POWER LEVEL	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	97	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
		<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)
		<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)
		<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)
		<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	OTHER <small>Specify in Abstract below or in NRC Form 366A</small>
		<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	
		<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
		<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	
		<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
		<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	

**12. LICENSEE CONTACT FOR THIS LER**

NAME <b>Albert R. Hochevar, Station Manager</b>	TELEPHONE NUMBER (Include Area Code) <b>949-368-9275</b>
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
				N					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

**16. ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 5, 2008 (Event Date), with Unit 2 at approximately 97 percent power, plant personnel began a monthly test of the stator water cooling system. In accordance with the test procedure, Operators swapped the stator water pumps by starting the pump that was in standby and then stopping the operating pump. Three alarms were received in quick succession indicating a reduction in stator water flow. Approximately two minutes later, the Main Generator [TA] tripped from a "Rectifier Low Flow." At approximately 2256 PDT, Unit 2 reactor automatically tripped on a "Loss of Load" signal.

SCE's cause evaluation concluded that a pump discharge check valve momentarily remained open following the stator water pump swap and then slammed shut. The resulting pressure spike was sufficient to lift one or both of the relief valves on the stator water heat exchangers. The discharge from the relief valve(s) reduced stator cooling water flow and resulted in a main generator trip and a reactor trip.

SCE repaired the malfunctioning check valve and has suspended monthly stator water cooling flow testing at both Units pending further evaluation.

This event remained bounded by the Updated Final Safety Analysis evaluation of a loss of load event. Therefore, the significance of this event was minimal.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	5. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2008	--004 --	00	2 of 3

Plant: San Onofre Nuclear Generating Station (SONGS) Unit 2  
 Event Date: June 5, 2008  
 Reactor Vendor: Combustion Engineering  
 Mode: Mode 1- Power  
 Power: 97 percent

**Background:**

The Main Generator stator water cooling system [TJ] removes heat from stator windings and excitation rectifiers [TL] and includes two parallel cooling water pumps and two heat exchangers. The system is operated with one pump running and one pump in standby. The stator operating temperature is maintained by a minimum flow rate of approximately 595 gpm to the windings and the main exciter static rectifiers receive a minimum flow of 4 gpm. A sustained decrease in either rate results in an automatic main generator trip [TB] and a subsequent reactor trip.

**Description of Event:**

On June 5, 2008 (Event Date), with Unit 2 at approximately 97 percent power, plant personnel began a monthly test of the stator water cooling system. In accordance with the test procedure, Operators swapped the stator water pumps by starting the pump that was in standby and then stopping the operating pump. The operator in attendance reported that a check valve that prevents backflow through the non-running pump shut louder than expected. Three alarms were received in quick succession indicating a reduction in stator water flow and rectifier water flow. Approximately two minutes later, the Main Generator [TA] tripped from a "Rectifier Low Flow." At approximately 2256 PDT, Unit 2 reactor automatically tripped on a "Loss of Load" signal. On June 6, 2008 at 0148 PDT, Southern California Edison reported this occurrence to the NRC in accordance with 10CFR50.72(b)(3)(iv)(A) (NRC Event Log # 44273).

**Cause of the Event:**

SCE's cause evaluation concluded that a pump discharge check valve momentarily remained open following the stator water pump swap and then slammed shut. The resulting pressure spike was sufficient to lift one or both of the relief valves on the stator water heat exchangers. The discharge from the relief valve(s) reduced stator cooling water flow through the rectifier and resulted in a main generator trip and a reactor trip.

Inspection of check valve S21413MU055 revealed that the disc was contacting the valve body on the sides. Over time, this contact between the disc and valve body resulted in the disc briefly becoming stuck and slamming closed on reverse flow during system testing.

**Corrective Actions:**

SCE has completed the following corrective actions:

1. SCE repaired the malfunctioning check valve.
2. SCE inspected the check valve on the parallel pump revealing no similar wear.
3. The heat exchanger relief valves were removed and replaced by bench tested spares.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
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San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2008	--004 --	00	3 of 3

4. The removed cooler relief valves were tested and performed as expected.
5. SCE reviewed recorded temperatures on the outlet of the stator and determined that very little temperature changes were evident during the transient.
6. SCE performed the generator stator cooling water flow trip test, off-line before unit re-start, with no abnormal results.

The corresponding check valves at Unit 3 have not yet been inspected because Unit 3 was operating at full power at the time of the Unit 2 trip and remains at full power at the time of this report. SCE has suspended monthly stator water cooling flow testing at Unit 2 and Unit 3 pending further assessment.

**Safety Significance**

This event was bounded by the Updated Final Safety Analysis evaluation of a loss of load event. Therefore, the significance of this event was minimal.

**Additional Information:**

The SONGS Plant Computer System (PCS) is a non-safety related system used to monitor and record plant parameters. During the review of the PCS-generated Sequence of Events (SOE) report after the June 5, 2008 Unit 2 trip, two anomalies were noted. The SOE indicated that six of eight reactor trip circuit breakers (RTCBs) opened before the initiating loss of load trip signal. SCE considers this indication to be non-credible. The SOE also indicated that the remaining two of eight RTCBs opened 149 milliseconds after the first six. SCE concluded the integrated clock in the SOE printed circuit card was unreliable and replaced the card. As a precaution, the relay that initiates the opening of the SOE-reported slow responding RTCBs was replaced and tested with satisfactory results.

Following this reactor trip, both main feedwater pumps exhibited undesired oscillation in output flow. Operations personnel secured one pump and took manual control of the second pump. SCE determined the feedwater pump oscillations were caused by a recently installed digital feedwater control system. SCE has changed a proportional gain setting in the digital feedwater control system to dampen this phenomenon.

In the past three years, there have been no reported occurrences related to degraded check valves or other plant trips caused by a loss of stator cooling water flow.

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February 5, 2009

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Subject: **Docket No. 50-361**  
**Licensee Event Report No. 2007-006**  
**San Onofre Nuclear Generating Station, Unit 2**

Dear Sir or Madam:

This submittal provides a Licensee Event Report (LER) 2007-006 to report the inoperability of an emergency chiller due to a loose electrical connection. Neither the health nor the safety of plant personnel or the public was affected by this occurrence.

If you require any additional information, please contact me.

Sincerely,

A handwritten signature in cursive script that reads 'Albert R. Hochevar'.

Albert R. Hochevar  
Station Manager

Unit 2 LER No. 2007-006

cc: E. E. Collins, NRC Regional Administrator, Region IV  
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 & 3

<b>NRC FORM 366</b> (9-2007)	<b>U.S. NUCLEAR REGULATORY COMMISSION</b>	APPROVED BY OMB: NO. 3150-0104 <small>Estimated burden per response to comply with this mandatory information collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOS-10202 (3150-0104), Office of Management and Budget, Washington DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to the information collection.</small>	EXPIRES: 08/31/2010
<b>LICENSEE EVENT REPORT (LER)</b> <small>(See reverse for required number of digits/characters for each block)</small>			

<b>1. FACILITY NAME</b> San Onofre Nuclear Generating Station Unit 2	<b>2. DOCKET NUMBER</b> 05000-361	<b>3. PAGE</b> 1 OF 3
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**4. TITLE**  
 Loose electrical connection results in one train of Emergency Chilled Water (ECW) system inoperable

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	09	2007	2007	006-00		2	5	2009	San Onofre Unit 3	05000-362
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
1			20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
10. POWER LEVEL			20.2201(d)		20.2203(a)(4)				50.73(a)(2)(iii)	50.73(a)(2)(x)
99			20.2203(a)(1)		50.36(c)(1)(i)(A)				50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)		50.36(c)(1)(ii)(A)				50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)		50.36(c)(2)				50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 365A
			20.2203(a)(2)(iii)		50.46(a)(3)(ii)				50.73(a)(2)(v)(C)	
			20.2203(a)(2)(iv)		50.73(a)(2)(i)(A)		<input checked="" type="checkbox"/>		50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)		50.73(a)(2)(i)(B)				50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)		50.73(a)(2)(i)(C)				50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)		50.73(a)(2)(ii)(A)				50.73(a)(2)(viii)(B)	

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> Albert R. Hochevar, Station Manager	<b>TELEPHONE NUMBER (Include Area Code)</b> 949-368-9275
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
				N					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
<input checked="" type="checkbox"/>	YES (If yes, complete EXPECTED SUBMISSION DATE)			<input type="checkbox"/>	NO	
				4 / 6 / 09		

**16. ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 6/9/07 with Units 2 and 3 at about 99 percent power, SCE personnel found the control panel for the Train A Emergency Chiller, E336, de-energized. In a separate power panel, SCE found a cable pulled out of the breaker supplying the 120VAC. The chiller provides a safety function to both Units.

SCE determined the retaining screw anchoring the cable to the supply breaker in the power panel was stripped, preventing securing the cable tightly. The loose connection was most likely due to over tightening the screw on 6/28/05 when the breaker was replaced. From 6/28/05 to 6/9/07, the Emergency Chiller panel was observed to be energized each shift. However, SCE has concluded that it may not have performed its safety function in a seismic event, rendering it inoperable. Technical Specification (TS) 3.7.10, ECW System [KM], requires restoring an inoperable train within 14 days, else initiate shutdown. Failure to enter this Action violated the TS.

SCE replaced the breaker and returned the chiller to Operable. There was very little risk significance to the condition.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2007	--006 --	00	2 of 3

Plant: San Onofre Nuclear Generating Station (SONGS) Unit 2  
 Event Date: June 9, 2007  
 Reactor Vendor: Combustion Engineering  
 Mode: Mode 1- Power  
 Power: 99 percent

**Background:**

At SONGS, the Emergency Chilled Water (ECW) [KM] System is common to both Units 2 and 3. It provides a heat sink for the removal of process and operating heat from selected safety related air handling systems during a Design Basis Accident (DBA). The ECW system is a closed loop system consisting of two 100 percent capacity independent trains - each loop shared by Units 2 and 3. (SONGS Units 2 and 3 share a common Auxiliary Building that houses the control room requiring temperature control during a design basis accident.) Each loop (train) of the ECW has an Emergency Chiller (ME336 and ME335) which removes heat from the chilled water and transfers the heat to the Component Cooling Water [CC] System.

Technical Specifications (TS) 3.7.10 requires two ECW trains to be operable during Modes 1-4. If one train is inoperable, TS 3.7.10, Action A requires SCE to restore the train to operable status within 14 days. Should the Completion Time not be met, TS 3.7.10, Action B requires SCE to initiate shutdown. This applies to both Units 2 and 3.

**Description of the Event:**

On June 9, 2007, at approximately 0745 PDT, during routine Operator Shift rounds, SCE personnel found the control panel to Emergency Chiller, Train A, (ME336) de-energized. The chiller was declared inoperable and Technical Specification (TS) 3.7.10 Action A (one train of ECW inoperable) was entered for both Units 2 and 3. During the subsequent repair efforts, in a separate power panel (Q033), an HVAC technician found a power cable pulled out of the feeder breaker supplying 120VAC to the chiller control panel, L177. On June 9, 2007 at approximately 1700 PDT, Emergency Chiller, ME336, was declared Operable after the breaker was replaced and successful post maintenance testing of the Chiller.

The repair was completed within the allowed outage time of 14 days. SCE initially concluded the equipment to have failed at the time the operator observed the de-energized control panel. Therefore, a LER was not sent.

On December 9, 2008, (discovery date) the NRC Resident Inspector questioned the SCE evaluations of the affect of the loss of power to this panel. After re-examining the condition of the breaker connection and its function in the control circuit, SCE concluded that it may not have provided power to the Chiller to perform its safety function in a seismic event during a period from breaker installation, June 28, 2005, to repair, June 9, 2007. Therefore, SCE is reporting this in accordance with 10CFR50.73(a)(2)(i)(B) for a condition prohibited by TS.

From February 5, 2007 to February 10, 2007, Train B of the ECW system was out of service for planned maintenance. Therefore, the redundant equipment in the same system was not available to perform the required safety function. SCE is reporting this in accordance with 10CFR50.73(a)(2)(v)(D) for the loss of

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

1. FACILITY NAME	2. DOCKET NUMBER	6. LER NUMBER			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REV NO	
San Onofre Nuclear Generating Station (SONGS) Unit 2	05000-361	2007	--006 --	00	3 of 3

safety function.

**Cause of the Event:**

The loose connection most likely resulted from damage to the threads on the breaker retaining screw caused when the breaker was replaced on June 28, 2005. An examination of the connector threads revealed the retaining screw anchoring the cable to the supply breaker was stripped, preventing securing the cable tightly.

**Corrective Actions:**

SCE has completed the following corrective actions:

The breaker was replaced on June 9, 2007.

On July 25, 2007, SCE conducted a meeting with Nuclear Construction Engineers, Supervisors, technicians and craft to discuss the results of the cause evaluation associated with this event. The scope of the meeting was to raise awareness of potential for stripping screws during a tightening operation, and to assure a quality connection by conducting a pull test at task completion.

SCE's initial evaluation of this occurrence was incomplete. SCE will complete a new cause evaluation of this event and implement additional corrective actions as required. This LER will be revised to include the additional corrective actions.

**Safety Significance:**

From June 28, 2005 to June 9, 2007, the Emergency Chiller panel was routinely observed to be energized each shift. Therefore, the Chiller was available to fulfill its safety function to all but seismic events. Except for the period February 5, 2007 to February 10, 2007, the opposite train of the ECW System was operable and capable of performing its safety function for emergency chilled water between June 28, 2005 and June 9, 2007. Based on these ECW train availabilities, SCE completed an assessment of the incremental core damage probability (ICDP) and the incremental large early release probability (ILERP) for the non-seismically qualified connection. This assessment concluded the ICDP and ILERP were 5E-7 and 4E-8, respectively. Therefore, the condition had very little risk significance.

**Additional Information:**

SCE initially identified this event when it occurred in June 2007 but incorrectly concluded the event was "failed when found" and that a report to the NRC was not required. SCE questioned the correctness of that reportability evaluation during an August 2008 audit of previous occurrences of loose electrical connections. That audit and re-assessment for reportability were part of corrective actions resulting from previous events (LER 2-2008-006, LER 3-2005-01 and LER 2-2007-005). An associated August 2008 reassessment of Chiller Operability in the as-found condition incorrectly concluded that the de-energized circuit did not affect its Operability. This resulted in a second missed opportunity to report this occurrence. SCE is completing an evaluation of the factors that lead to the missed opportunities to report this occurrence. SCE will implement appropriate corrective actions.