

10 CFR 50.73

September 24, 2012

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

Subject: **Dockets No. 50-361, 50-362**
LER 2012-002-01, Emergency Diesel Generator Vibration Trip Not Bypassed
for Non-Accident Conditions
San Onofre Nuclear Generating Station (SONGS), Units 2 and 3

Reference: Letter from Douglas R. Bauder (SCE) to USNRC, dated May 14, 2012, LER 2012-002-00, Emergency Diesel Generator Vibration Trip Not Bypassed for Non-Accident Conditions, San Onofre Nuclear Generating Station (SONGS), Units 2 and 3

Dear Sir or Madam:

Attached is Revision 1 to Licensee Event Report (LER) 2012-002 (Reference). The revision provides the results of our analysis concluding the Emergency Diesel Generators (EDGs) would have performed the designed safety function during a Design Basis Earthquake (DBE). The enclosed supplement changes the reporting criteria from 10 CFR 50.73(a)(2)(ii)(B), "Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety," to a voluntary report.

The change is the result of completing a corrective action to analyze the EDG high vibration trip circuitry response under an assumed DBE. The analysis confirmed a DBE would not have caused a spurious high vibration trip of the EDGs.

This letter does not contain any commitments. If you have any questions regarding the attached report, please call Lee Kelly at 949-368-6657.

Sincerely,



Attachment: LER 2012-002-01

cc: E.E. Collins, Regional Administrator, NRC Region IV
R. Hall, NRC Project Manager, SONGS Units 2 and 3
G.G. Warnick, NRC Senior Resident Inspector, SONGS Units 2 and 3

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LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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 an 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 San Onofre Nuclear Generating Station (SONGS) Unit 2	2. DOCKET NUMBER 05000361	3. PAGE 1 of 3
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4. TITLE
Emergency Diesel Generator Vibration Trip Not Bypassed For Non-Accident Condition

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	17	2012	2012	002-01		09	24	2012	SONGS Unit 3	05000362
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A

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

12. LICENSEE CONTACT FOR THIS LER

NAME Douglas R. Bauder, Site Vice President and Station Manager	TELEPHONE NUMBER (Include Area Code) 949-368-9275
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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/A					N/A		

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

On August 17, 2012, the analysis for the SONGS Emergency Diesel Generators (EDGs) high vibration trip was completed, concluding the EDGs would have remained operable as designed during seismic events. LER 2012-02-00 conservatively reported the potential for spurious actuation of the high vibration trip under 10 CFR 50.73(a)(2)(ii)(B), "Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety." This supplemental report documents the previously unanalyzed condition did not degrade plant safety and changes the reporting criteria to voluntary.

The high vibration trip was part of the 1981 EDG installation, and was bypassed during EDG operation for accident mitigation. The original design documentation did not demonstrate the EDGs would respond to a loss of offsite power as described in the Technical Specifications (TS) and the Updated Final Safety Analysis Report (UFSAR) under conditions that did not bypass the high vibration trip. Following submittal of the initial event report, an independent expert developed analytical models based on manufacturer's data, direct measurements, circuit analysis, and shake table testing to further evaluate the response of the circuit. The results confirmed a Design Basis Event would not have caused a spurious high vibration trip of the EDGs.

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

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Background

San Onofre Units 2 and 3 each have two redundant trains of Emergency Diesel Generators (EDG) [EK] to provide onsite AC power when the offsite AC power is unavailable. Each EDG powers the associated 4KV Class 1E busses [BU], supplying the Engineered Safety Features (ESF) [B] for accident mitigation, and the electrical loads necessary to achieve and maintain safe shutdown. Normally, the offsite AC power from the switchyard is distributed to the safety related 4KV Class 1E busses. If the offsite power is interrupted, the resulting voltage drop actuates the Loss of Voltage Signal (LOVS), automatically starting the EDGs. The LOVS also starts the EDGs in response to a degraded voltage condition to ensure sufficient power is available support an ESF actuation.

The EDGs start automatically in response to an ESF actuation, generated by the Safety Injection Actuation Signal (SIAS). Under a SIAS actuation, with a loss of power to the 4KV ESF busses, the associated 4KV ESF busses are unloaded, and the ESF components are automatically loaded in sequence after the EDG has achieved rated speed and voltage. In response to a loss of offsite power to the 4KV ESF buses without a SIAS, the LOVS automatically starts the EDGs, and the supported components are manually realigned to the bus.

The four General Motors Electromotive Division EDGs were procured from Stewart & Stevenson Services in 1977 and installed in the plant in 1981. A vibration sensor was included with the engine accessories, connected to a vibration monitor [MON] in the local panel. The vibration monitor was one of several protective devices in the non-critical engine trip circuit, and was powered by the EDG above idle speed to protect the generator bearings. As the EDG shut down the monitor would lose power, automatically deactivating the high vibration trip, and allowing the EDG supervisory trip circuit to be manually reset from either the control room or the EDG local panel.

The high vibration trip and the other non-critical trips are bypassed by a SIAS to prevent spurious loss of on-site generation when power is immediately needed for accident mitigation. The non-critical trips are active for equipment protection under other conditions that are not as time critical. The non-critical trips are not bypassed by a LOVS, unless a SIAS is also present.

Description of Event

The Metrix Model 5235 vibration sensor on Unit 2 EDG 2G003 failed during a routine surveillance test on May 12, 2011. In preparing the equipment specifications to replace the obsolete vibration sensor, engineers questioned the response of the vibration circuit to a seismic event. The engineering review was inconclusive, based on the legacy design documentation. At the time the design was questioned, March 16, 2012, both SONGS units were in Mode 5 (Cold Shutdown), and the vibration trips were promptly disabled.

The issue was conservatively reported under 10 CFR 50.73(a)(2)(ii)(B), "Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety," as it had the potential to affect the EDG operation described in the Technical Specifications and Updated Final Safety Analysis Report (UFSAR). The analysis completed on August 17, 2012 confirmed the high vibration trip would not have affected either EDG operation or plant safety. Therefore, this supplement provides an update to the original report and changes the reporting criteria to voluntary.

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An external engineering firm with expertise in seismic testing and analysis was requested to evaluate the response of the vibration monitoring circuit to seismic events. Analytical models were developed for the vibration sensors based on the manufacturer's data and circuit analysis, correlated with direct measurements of the frequency response under shake table testing. Ground motion data for the San Onofre site were scaled to representative levels of Design Basis Earthquake (DBE) intensity, and input into a three dimensional analytical model of the EDG structure and soil-foundation interface. The vertical accelerations recorded from the output of the structural model were then used as input into the sensor model. Vibrations normally experienced as a result of diesel generator operation were also included to assure a realistic response of the sensor to both operating and seismic conditions. The integrated vibration monitoring hardware was then tested and analyzed in response to 16 seismic inputs of equivalent DBE level shaking intensity to determine the possibility of triggering a high vibration trip. The results indicated that vibration sensors did not generate a trip in any of the 16 seismic inputs with the tested vibration monitor. Based on these results, it was concluded that the intended safety function would have been performed by each EDG without experiencing a spurious trip under DBE level conditions.

Cause of the Event

Under current and past regulatory requirements, the automatic start of the EDG in response to non-accident events does not require bypassing the non-critical trips. The original design documentation did not address the non-critical high vibration trip in sufficient detail to explain that a spurious trip would not be generated. This is a legacy issue with the original EDG qualification documentation that was completed in the late 1970s to the standards in effect at that time.

Corrective Actions

Immediate action was taken on March 17, 2012 to disable the high vibration trip circuit on the EDGs.

The Long Term Corrective Actions to confirm the response of the high vibration trip under seismic conditions, and to review the operation of the other non-critical trips were completed.

Safety Significance

The completion of the analysis confirmed the high vibration trip would not have spuriously actuated during a DBE. The EDGs, therefore, would have performed the safety function to supply on-site power to the safety related ECCS components.