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Site Vice President & Station Manager
San Onofre Nuclear Generating Station

August 5, 2011

10 CFR 50.73(a)(2)(ii)(B)

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

Subject: **Docket Nos. 50-362**
LER 2011-003-00, Wiring Error in Charging Pump Motor Circuitry Results in Loss of Fire Isolation Capability
San Onofre Nuclear Generating Station (SONGS), Unit 3

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2011-003-00, which is being submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B).

This letter does not contain any commitments. If you have any questions regarding the attached report, please call Ryan Treadway at 949-368-9985.

Sincerely,

Attachment: LER 2011-003-00

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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NRC FORM 366 (10-2010) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

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.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
San Onofre Nuclear Generating Station (SONGS) Unit 3	05000362	1 of 4

4. TITLE
Wiring Error in Charging Pump Motor Circuitry Results in Loss of Fire Isolation Capability

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
									N/A	N/A
06	08	2011	2011	-003	-00	08	05	2011	N/A	N/A

9. OPERATING MODE: 1

10. POWER LEVEL: 100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☒ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

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

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

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

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

On June 8, 2011, it was determined that the fire isolation switch for the Unit 3 Train A Charging Pump (3P190) motor control circuit had not been wired correctly in both the as-built drawing and field wiring configuration. This condition existed since original installation of the fire isolation switch in 1981. Consequently, if a postulated fire-induced circuit fault developed on the circuit and operators stopped 3P190, the circuit fault would result in a loss of capability to restart the pump locally at the switchgear. 3P190 is credited in the 10 CFR 50 Appendix R Safe Shutdown program for fire scenarios in the Alternative Shutdown Fire Areas (including Control Room). Due to the wiring error, this pump may have been unavailable during a postulated Appendix R fire event, resulting in a condition outside the Appendix R design basis. This event is reportable in accordance with 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degraded plant safety. Although the fire isolation switch was impaired, 3P190 remained operable and capable of fulfilling its safety function for all design basis accidents. Appropriate compensatory measures were taken and 3P190 was subsequently returned to fully qualified status on June 14, 2011. The safety significance of this event was determined to be minimal.

A. REPORTABLE OCCURRENCE

On June 8, 2011, it was determined that the fire isolation switch [HS] was not wired correctly in both the as-built drawing and field wiring configuration for the Unit 3 Train A Charging Pump (3P190) [P] motor control circuit [MSTR]. In the as-found configuration, if a postulated fire-induced circuit fault developed on the circuit and operators stopped 3P190, the circuit fault would result in a loss of control power to 3P190. The fire isolation switch would fail to perform its function to isolate the control circuit from a fire in the Control Room or common zone cable spreading area; thereby, losing local capability to restart the pump.

Charging Pump 3P190 is credited in the 10 CFR 50 Appendix R Safe Shutdown program for fire scenarios in the Alternative Shutdown Fire Areas (including Control Room). Due to the wiring error, this pump may have been unavailable during a postulated Appendix R fire event, resulting in a condition outside the Appendix R design basis. This is a condition reportable pursuant to 10 CFR 50.73(a)(2)(ii)(B) as an unanalyzed condition that significantly degraded plant safety.

B. INITIAL CONDITIONS

At the time of discovery on June 8, 2011, San Onofre Nuclear Generating Station (SONGS) Units 2 and 3 were in Mode 1 with reactor power at approximately 100 percent power. The Unit 3 wiring error existed in the plant since the original installation of the fire isolation switch in 1981.

C. BACKGROUND INFORMATION

The charging pumps are components of the Chemical and Volume Control System (CVCS) [CB]. The CVCS includes the letdown and boron injection subsystems, and maintains Reactor Coolant System (RCS) inventory, activity, and chemistry during normal operations including plant startups and shutdowns, as well as during design basis transients. The CVCS also provides an alternative means for reactivity control. The boron injection subsystem is required to establish and maintain a safe shutdown condition for the reactor. There are three charging pumps (Train A, Train B, and Swing) with one normally in operation. The second and third pumps are automatically started/stopped as pressurizer level decreases/increases due to plant transients. In accordance with SONGS Technical Specifications, two operable trains of boron injection flow paths are required while operating in Modes 1, 2, 3, and 4; one operable train is required in Modes 5 and 6. Each train consists of two flow paths from borated water sources to the RCS via charging pumps and/or High Pressure Safety Injection Pump (HPSI) pumps. A Safety Injection Actuation Signal (SIAS) starts all three charging pumps and opens the associated boric acid flow path valves for emergency boration.

The SONGS Updated Fire Hazard Analysis (UFHA) implements the requirements of 10 CFR 50 Appendix R. In accordance with the UFHA, alternative shutdown capability provided for a specific fire area shall be able to: a) achieve and maintain sub-critical reactivity conditions in the reactor, b) maintain reactor coolant inventory, c) achieve and maintain hot standby conditions, d) achieve cold shutdown conditions within 72 hours, and e) maintain cold shutdown conditions thereafter. During post-fire shutdown, the CVCS is utilized to control primary pressure, pressurizer level, and RCS boron concentration. Unit 3 Train A Charging Pump 3P190 is credited for Safe Shutdown for Appendix R fire scenarios in Alternative Shutdown Fire Areas (including the Control Room) to maintain RCS inventory and control pressure and reactivity. To

remain free of fire-induced circuit damage, the design of the control circuit utilizes a fire isolation switch. When operated, the fire isolation switch manipulates contacts within the control circuit such that full control of the component is transferred from the Control Room to the Switchgear (i.e., from remote to local).

D. DESCRIPTION OF OCCURRENCE

On May 10, 2011, during an engineering review of drawings for design change packages, differences were identified between Units 2 and 3 circuits utilizing the fire isolation switch for charging pump motors. Upon further investigation, it was determined on June 8, 2011, that the fire isolation switch was not wired correctly in both the as-built drawing and field wiring configuration for the Unit 3 Train A Charging Pump 3P190 motor control circuit. Consequently, during an Appendix R Alternative Shutdown fire scenario, if the pump was stopped and then Operators attempted to restart it locally, the fire-induced circuit fault on 3P190 circuit would result in a loss of control power to the pump. The loss of charging capability would impact the ability to maintain safe shutdown for Appendix R fire scenarios.

Compensatory measures (hourly firewatch) were established on May 10, 2011. The circuitry was corrected and 3P190 was returned to fully qualified status on June 14, 2011.

Subsequent investigation determined that the wiring error existed since original installation of the fire isolation switch in 1981. The error was also found on the drawings and field wiring configuration of the fire isolation switches for the Unit 3 Train B and Swing Charging Pumps; however, fire isolation capability for these pumps is not credited in the Appendix R analysis. Unit 2 drawings were correct, indicating this condition did not exist on Unit 2.

There was no evidence of prior failure of the fire isolation switch since there has not been a fire affecting the 3P190 control circuits or challenging the operation of the fire isolation switch for 3P190.

Review of operating procedures determined that although alternative alignments to supply water to the RCS were available (e.g., HPSI pumps), sufficient guidance is not provided within the constraints of the Appendix R Control Room evacuation scenario to credit alternatives.

While the incorrect wiring impacted the Appendix R qualification of charging pump 3P190, the pump remained operable and capable of fulfilling its safety function for all design basis accidents. Assessment of this event determined the safety significance to be minimal.

E. APPARENT CAUSE

A cause evaluation determined that this event was caused by a legacy issue and not attributed to any current day issues or engineering actions related to drawing errors. The Unit 3 wiring deficiency existed in the design drawings since the original circuit design was issued for construction in 1975. The deficiency existed in the plant since the original installation of the fire isolation switch in 1981.

F. CORRECTIVE ACTIONS

Immediate/Interim Corrective Actions - Upon identifying the drawing error on May 10, 2011, a fire protection system impairment was implemented as a compensatory action in accordance with SONGS Licensee Controlled Specification (LCS) 3.7.113.1. This compensatory action provided the required hourly fire watch patrol to monitor the affected Unit 3 alternate shutdown areas that could impact Charging Pump 3P190 in the event of a fire. On June 8, 2011, during the circuit wiring and breaker replacement work on 3P190, the error in the as-built field configuration was confirmed. 3P190 was subsequently returned to fully qualified status on June 14, 2011.

An extent of condition review determined that the same errors existed in the drawings and field wiring for the other two Unit 3 charging pump circuits (Train B and swing alignment); however, fire isolation capability for these circuits is not credited for Appendix R safe shutdown. These errors were also corrected. The deficiency did not exist in the Unit 2 drawings.

Long Term Corrective Actions - A cause evaluation was performed. Since this event was caused by a legacy issue and not attributed to any current day issues or engineering actions related to drawing errors, no additional corrective actions are necessary.

G. SAFETY ASSESSMENT

The safety significance of this event was determined to be minimal.

While the incorrect wiring impacted the Appendix R qualification of the Unit 3 Train A Charging Pump 3P190, it did not affect other design functions. Charging Pump 3P190 remained operable and capable of fulfilling its safety function for all design basis accidents.

The incremental core damage probability and incremental large early release probability risk due to the wiring error were calculated to be 1.0E-7 and less than 1.0E-09, respectively. This is a very small risk increase mainly due to the low frequency of Anticipated Transient Without Scram (ATWS) and fire-induced Loss of Coolant Accident (LOCA) events, limited accident mitigating function of charging pumps credited in Probabilistic Risk Assessment (PRA) (e.g., auxiliary pressurizer spray), and the availability of HPSI to mitigate small LOCAs.

H. ADDITIONAL INFORMATION

Previous Similar Events – There was a reportable event identified in 2009 in which a fire isolation fuse was mis-wired due to a labeling error introduced during a 2004 design change impacting the Appendix R qualification of the SONGS Unit 2 Train A Emergency Diesel Generator. This previous event, however, did not have the same underlying cause as the event reported in this LER; i.e., latent wiring error introduced during original installation due to an incorrect construction drawing.