

March 4, 2005

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

Subject: Docket Nos. 50-361
Licensee Event Report No. 2005-001
San Onofre Nuclear Generating Station, Unit 2

Gentlemen:

This submittal provides Licensee Event Report (LER) 2005-001 describing an automatic reactor trip event that occurred at Unit 2 on February 3, 2005. The reactor trip and subsequent initiation of the Auxiliary Feedwater System are reportable in accordance with 10CFR50.73(a)(2)(iv)(A). These events did not affect the health and safety of either plant personnel or the public.

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,



Unit 2 LER No. 2005-001

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

1. FACILITY NAME San Onofre Nuclear Generating Station (SONGS) Unit 2	2. DOCKET NUMBER 05000-361	3. PAGE 1 OF 3
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4. TITLE
Automatic Reactor Trip Due to Unit Auxiliary Transformer Differential Relay 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
02	03	2005	2005-001-00						None	
									FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE	1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
		20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
10. POWER LEVEL	99	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)(vi)	
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)(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 D. P. Breig, Station Manager, Nuclear Generation	TELEPHONE NUMBER (Include Area Code) 949-368-9263
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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					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO		MONTH	DAY	YEAR

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

On February 3, 2005, at 1223 PST, Unit 2 was operating at about 99 percent power when a phase C differential current protection relay for Unit Auxiliary Transformer (UAT) 2XU1 tripped the Main Generator. An automatic Turbine Trip and automatic Reactor Trip followed as designed. The Auxiliary Feedwater System automatically started as expected on a Reactor Trip from full power. There were no complications experienced during the event and no other safety systems were actuated or required.

The Unit trip was initiated by the UAT 2XU1 phase C differential relay. Subsequent comprehensive testing and inspections of the UAT 2XU1, phase C protection circuit, and Digital Fault Recorder (DFR) components have not revealed any defects or degraded conditions. The most likely cause of the trip has been determined to be an invalid signal introduced during DFR testing, which was in progress at the time of the trip.

As corrective action, SCE has placed administrative restrictions on DFR testing. The phase C differential relay and DFR isolation circuit boards for Unit 2 were replaced as precautionary actions. SCE will assure that associated electrical protection circuits are not in service or that the DFR is completely isolated from electrical protection circuits prior to DFR testing.

This event was of very low to no safety significance because all safety systems responded as designed.

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Plant: San Onofre Nuclear Generating Station (SONGS) Unit 2
 Event Date: February 3, 2005
 Reactor Vendor: Combustion Engineering
 Mode: Mode 1 – Power Operation
 Power: 99 percent

Description of Event:

On February 3, 2005, at 1223 PST, Unit 2 was operating at about 99 percent power when the Unit Auxiliary Transformer (UAT) 2XU1 phase C differential current protective relay [RLY] tripped the Main Generator [TB] output breakers. An automatic Turbine Trip and automatic Reactor Trip followed as designed.

As expected following a reactor trip from full power, Steam Generator [SG] levels decreased to the Emergency Feedwater Actuation Signal (EFAS) [JB] setpoint and all three Auxiliary Feedwater System [BA] pumps started. However, Main Feedwater [SJ] and normal heat removal remained in service throughout the event. There were no complications experienced and no other safety systems were actuated or required.

SCE reported this event to the NRC in accordance with 10CFR50.72(b)(2)(iv)(B) and 10CFR50.72(b)(3)(iv)(B)(6) for actuation of the Reactor Protection System (RPS) [JC] and the Auxiliary Feedwater system. This follow-up Licensee Event Report is provided in accordance with 10CFR50.73(a)(2)(iv)(A).

Cause of Event:

This event was caused when the UAT 2XU1 phase C differential current protective relay tripped the Main Generator. As discussed below, SCE was not able to conclusively determine the conditions that caused the differential relay trip signal.

SCE conducted a failure modes analysis of the UAT 2XU1 differential relay and thoroughly investigated probable causes of the trip. SCE determined that an electrical fault or component failure on the UAT 2XU1 Phase C circuitry would cause a trip. However, subsequent comprehensive testing and inspections of the UAT 2XU1 circuitry and electrical protection components did not reveal any defects or degraded conditions.

SCE also investigated the possibility that testing of the Digital Fault Recorder (DFR) [XR], which was in progress at the time of the trip, introduced an invalid signal that caused the trip. Test Technicians (utility, non-licensed) reported that relays could be heard actuating in the nearby trip cabinets immediately after depressing a "power on" test pushbutton on their test equipment. The test equipment was connected to the UAT 2XU1 neutral over current protection circuitry when it was energized. An identical step was performed immediately prior to the trip without incident. The DFR test equipment, procedures, and protective isolation devices used during the DFR testing were thoroughly inspected and tested with satisfactory results.

The most likely cause of the differential relay actuation was an invalid signal associated with DFR testing due to an intermittent component failure and the lack of complete isolation between the DFR and the transformer protection circuits.

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Corrective Actions

1. SCE has temporarily placed administrative restrictions on DFR testing.
2. As precautionary actions, the UAT 2XU1 phase C differential relay and DFR isolation circuit boards were replaced even though no degraded conditions in these components were found.
3. Current to the UAT 2XU1 phase C differential relay was monitored during the Unit restart to determine if any erratic behavior exists under operating conditions. No issues that could have caused the trip were identified.
4. For future work on digital fault recorders, SCE will assure that associated electrical protection circuits are not in service or that the DFR is completely isolated from electrical protection circuits prior to testing.

Safety Significance:

Since all safety systems responded as designed, this event had very low to no safety significance. These events did not affect the health and safety of either plant personnel or the public.

Additional Information:

In the past three years, there have been four previous events that involved electrical trips of the Main Generator:

1. The Main Generator tripped due to a personnel error when a test connection was applied to the wrong terminal within a Main Generator relay protection cabinet (LER 2-2003-001).
2. The Main Switchyard breaker tripped due to personnel error when testing was performed on the wrong switchyard relay. This event resulted in a trip of the Main Transformer output breaker and a trip of the Main Generator (LER 3-2002-001).
3. An electrical fault within the Phase A Isophase Bus caused a trip of the Main Generator. A mechanical failure of a newly installed structural component and resulting electrical fault within the isophase bus was caused by an inadequate design (LER 2-2004-004).
4. On April 4, 2004, the Main Generator tripped while attempting to synchronize to the grid following an outage. This event, which was not reportable in an LER, was caused by an incorrectly wired current transformer.

Based on the assessment of the cause of the February 3, 2005 event, SCE determined the corrective actions for these other events would not be expected to prevent the reactor trip reported in this LER.