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GNRO-2013/00004

February 27, 2013

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

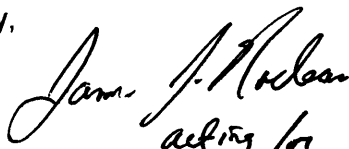
SUBJECT: Licensee Event Report 2012-008-00 Reactor Protection System Actuation  
Due to a Main Turbine Generator Trip  
Grand Gulf Nuclear Station, Unit 1  
Docket No. 50-416  
License No. NPF-29

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2012-008-00 which is a final report. This report is submitted in accordance with Title 10 *Code of Federal Regulations* 50.73(a)(2)(iv)(A).

This letter contains no new commitments. If you have any questions or require additional information, please contact Christina L. Perino at (601) 437-6299.

Sincerely,

  
acting for C.L. Perino

CLP/ras

Attachment: Licensee Event Report (LER) 2012-008-00

cc: (see next page)

cc: U. S. Nuclear Regulatory Commission  
ATTN: Mr. Elmo E. Collins, Jr.  
Regional Administrator, Region IV  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

U. S. Nuclear Regulatory Commission  
ATTN: Mr. Alan Wang, NRR/DORL  
Mail Stop OWFN/8 B1  
11555 Rockville Pike  
Rockville, MD 20852-2378

NRC Senior Resident Inspector  
Grand Gulf Nuclear Station  
Port Gibson, MS 39150

**Attachment to**

**GNRO-2013/00004**

**Licensee Event Report (LER) 2012-008-00**

<b>NRC FORM 366</b> (10-2010)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>			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 <a href="mailto:infocollects.resource@nrc.gov">infocollects.resource@nrc.gov</a> , 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.																																							
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)																																														
<b>1. FACILITY NAME</b> Grand Gulf Nuclear Station, Unit 1					<b>2. DOCKET NUMBER</b> <b>05000 416</b>		<b>3. PAGE</b> 1 OF 5																																							
<b>4. TITLE</b> Reactor Protection System Actuation due to a Main Turbine Generator Trip																																														
<b>5. EVENT DATE</b>			<b>6. LER NUMBER</b>			<b>7. REPORT DATE</b>			<b>8. OTHER FACILITIES INVOLVED</b>																																					
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	N/A																																				
12	29	2012	2012 - 008 - 00			02	27	2013	N/A	N/A																																				
<b>9. OPERATING MODE</b>  <div style="text-align: center; font-size: 24px;">1</div>			<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>																																											
<b>10. POWER LEVEL</b>  <div style="text-align: center; font-size: 24px;">100</div>			<table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="text-align: right; font-size: small;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>								<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)(viii)(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 checked="" 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 type="checkbox"/> OTHER	<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
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<b>12. LICENSEE CONTACT FOR THIS LER</b>																																														
FACILITY NAME <b>Jeff Seiter / Acting Licensing Manager</b>								TELEPHONE NUMBER (Include Area Code) <b>(601) 437-2344</b>																																						
<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																																					
A	TB	XCT	I157X	Y	A	SB	RV	1133	Y																																					
<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO						<b>15. EXPECTED SUBMISSION DATE</b>																																								
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<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</b>																																														
<p>On December 29, 2012, at 00:18 Central Standard Time, Grand Gulf Nuclear Station was operating in Mode 1 at 100 percent thermal power when an unexpected Reactor SCRAM occurred due to a Main Generator trip. All systems responded as expected with the exception of Safety Relief Valve (SRV) 1B21F047A, which was slow to close, and high pressure feedwater heater start-up outlet valve 1N21F010B, which did not open. The shift immediately entered the appropriate Off Normal Event Procedures. Reactor water level was controlled using the normal condensate/feedwater system throughout the event. All control rods inserted after Reactor Protection System signals were received. There were no Emergency Core Cooling System actuations. The plant was stabilized with pressure control on the main turbine bypass valves, and level controlled on the start-up level control valve. The plant responded to the trip as designed with the exception of the one SRV and one start-up outlet valve noted above. The cause of the SCRAM was not initially determined. Additional monitoring equipment was installed to detect a similar condition. Following a second SCRAM on January 4, 2013, the cause was determined to be grounding of the Main Generator 'A' Phase Neutral Current Transformer. There were no adverse effects on the health and safety of the public.</p>																																														

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Grand Gulf Nuclear Station, Unit 1	05000 416	YEAR	SEQUENTIAL NUMBER	REV. NO.	2 OF 5
		2012 -- 008 -- 00			

**NARRATIVE**

**A. REPORTABLE OCCURRENCE**

This Licensee Event Report (LER) is being submitted pursuant to Title 10 Code of Federal Regulations (10 CFR) 50.73(a)(2)(iv)(A) for an automatic actuation of the Reactor Protection System (EIS:JC) (RPS). Telephonic notification was made to the U.S. Nuclear Regulatory Commission (NRC) Emergency Notification System on December 29, 2012, within 4 hours of the event pursuant to 10 CFR 50.72(b)(3)(iv)(A).

**B. INITIAL CONDITIONS**

At the time of the event the reactor was in operational mode 1 with reactor power at 100 percent. There were no additional inoperable structures, systems, or components at the start of the event that contributed to this event. Post event it was discovered that Safety Relief Valve (EIS:RV) (SRV) 1B21F047A failed to reclose automatically as anticipated when the reseal reactor pressure decayed below the setpoint. The SRV closed automatically within approximately ten minutes.

**C. DESCRIPTION OF OCCURRENCE**

On December 29, 2012, at 00:18 Central Standard Time (CST), Grand Gulf Nuclear Station was operating in Mode 1 at 100 percent thermal power when an unexpected Reactor SCRAM occurred due to a Main Generator (EIS:TB) trip. All systems responded as expected with the exception of Safety Relief Valve (SRV) 1B21F047A, which was slow to close automatically, and high pressure feedwater heater start-up outlet valve (start-up outlet valve) 1N21F010B, which did not open automatically when the start-up level control valve (EIS:LCV) was placed in service. SRVs opened at the onset of the event to control reactor pressure, as designed. Operations immediately entered the appropriate Off Normal Event Procedures (ONEPs). Reactor water level was controlled using the normal condensate/feedwater system (EIS:SD/SJ) throughout the event. All control rods (EIS:ROD) inserted after the appropriate channels of the main turbine control fast closure signals generated by the RPS were received. There were no Emergency Core Cooling System (ECCS) actuations. The plant was stabilized with pressure control on the main turbine bypass valves (EIS:PCV), and level controlled on the start-up level control valve. The plant responded to the trip as designed with the exception of the one SRV and the one start-up outlet valve noted above.

**D. APPARENT CAUSE**

The cause of the event was not determined initially since the relay issue or fault was evaluated to be intermittent in nature. Following a second SCRAM on January 4, 2013, it was determined that the Main Generator 'A' Phase Neutral Current Transformer

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**D. APPARENT CAUSE (continued)**

(EISS:XCT) (CT) experienced partial grounding due to inadequate clearance between the micarta plate bolts and bottom of the CT allowing the conductors to come in contact with a bolt providing a shunt path to ground. This was caused by inadequate workmanship and work instructions not specifying the clearance during installation.

**E. CORRECTIVE ACTIONS**

Operating Experience (OE) searches, Entergy Transmission, Power Control System (PCS)/General Electric (GE) vendor support, modification history, and Entergy Fleet challenges were used to identify possible causes and/or failure modes that could be analyzed without destructive testing or destructive modification. Initial, testing, troubleshooting, and inspection did not confirm a specific failure mode, so the relay issue or fault was determined to be intermittent in nature. These actions isolated the possible failure modes to an unnecessary trip of Unit Phase Differential Relay 1N41M701A (EISS:87), an internal fault of a Current Transformer (EISS:XCT) (CT) or a fault in the CT to relay circuitry, but did not identify a failure mode.

Active components such as the 1N41M701A, B, and C Unit Phase Differential Relays were replaced to eliminate relay intermittent operation issues. Monitoring equipment was installed in the CT Circuitry to monitor plant performance and to capture data from any future transients that might occur intermittently.

After the root cause was identified following the SCRAM on January 4, 2013, the following corrective actions were identified:

Removal and/or thread cutting of the micarta plate bolts to ensure minimum cold clearance of 0.5 inch between the CT and the micarta plate bolts was completed on January 6, 2013.

For each main generator CT, the Post Maintenance Test special requirement planning notes will be revised to ensure that 0.5 inch cold clearance is maintained between the micarta plate bolts and the main generator CTs.

Plant personnel will perform boroscopic inspection of CTs and add work instruction steps that include hold points to ensure adequate cold clearance of 0.5 inch is maintained between the micarta plate bolts and the main generator CTs.

Applicable drawings will be revised to incorporate a minimum cold clearance of 0.5 inch to be maintained between the CT and micarta plate bolts.

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## F. SAFETY ASSESSMENT

The event posed no threat to public health and safety as the RPS performed as designed. Although the event was a SCRAM with Complications, the SRV closed within approximately ten minutes. The 1N21F010B start-up outlet valve was reset and returned to service and did not prevent Operations from controlling the reactor water level. All other safety systems responded as designed.

Immediate actions performed by the Operations staff were adequate and appropriate in placing and maintaining the reactor in a safe shutdown condition. Reactor pressure peaked at 1090.4 pounds per square inch gauge (psig), minimum reactor pressure was 671.7 psig, and reactor water minimum level was recorded as 7.9 inches wide range. Thus, these two critical parameters did not challenge any design or safety limit.

Nuclear safety was not significantly compromised because safety related equipment necessary to safely shutdown the unit performed its safety function.

SRV 1B21F047A lifted as expected along with ten other SRVs on Reactor Pressure. However, SRV 1B21F047A failed to reclose automatically as anticipated when the reseal pressure was reached. Operator actions were taken to close the valve by placing the handswitch to Close and pulling the fuse (EIIS:FU) to the division 1 solenoid (EIIS:PSV). Pressure eventually bled off the exhaust port allowing the SRV to close automatically. Had the pressure not bled off, the SRV would have remained open, thereby depressurizing the Reactor Vessel (EIIS:RPV). Should this have occurred, the Operating crew would not have had control of reactor pressure. The depressurization would also have violated the cool-down limits of the vessel.

During the event, no Technical Specification defined Safety Limits were challenged.

Radiological Safety was not affected since there was no radiological release to the public during the event. Actuation of SRVs did cause the Drywell Fission Product Monitor Particulate channel to alarm, as expected. This elevated particulate condition soon returned to the pre-SCRAM level. Containment airborne radiation levels did not rise to a level which required posting the containment due to SRV actuation.

Response of the crew did not challenge established industrial safety protocol or requirements. There was no impact to the safety of the public, industrial safety or radiological safety as a result of this event.

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**G. ADDITIONAL INFORMATION**

A second SCRAM occurred January 4, 2013. The cause was the same as the December 29, 2012, SCRAM and is addressed in LER-2013-001-00. The instruments installed during the December 29, 2012, SCRAM enabled the determination of the cause of both SCRAMs.

Prior to December 29, 2012, there had been no SCRAMs in the past 3 years due to CT grounding. CR-GGN-2008-01476 documents a CT-related SCRAM but was not caused by CT grounding. The CT that caused both the December 29, 2012, SCRAM and the January 4, 2013, SCRAM was installed between February and April 2012.

The cause of SRV 1B21F047A closing slowly was determined to be a foreign material exclusion plug that was left in the valve. CR-GGN-2013-00100 documents this issue and the corrective actions being taken.

The cause of start-up outlet valve 1N21F010B not opening was determined to be an electrical overload breaker trip. The breaker was reset and the valve was returned to service. CR-GGN-2012-13297 documents this issue and the corrective actions that were taken.