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GNRO-2013/00054

September 26, 2013

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

SUBJECT: Licensee Event Report 2013-003-00 Reactor Protection System and
Reactor Core Isolation Cooling Actuation Due to a High Reactor Pressure
Transient
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

Attached is Licensee Event Report 2013-003-00, 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 Mr. Christopher R. Robinson at (601) 437-7326.

Sincerely,

A handwritten signature in black ink, appearing to read "M. L. Richey", with a stylized flourish at the end.

MLR/slw

Attachment: Licensee Event Report (LER) 2013-003-00

cc: (see next page)

cc: U. S. Nuclear Regulatory Commission
ATTN: Mr. Steven A. Reynolds
Acting 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
Washington, DC 20555-0001

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

Attachment to

GNRO-2013/00054

Licensee Event Report (LER) 2013-003-00

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) (See reverse for required number of digits/characters for each block)											
1. FACILITY NAME Grand Gulf Nuclear Station, Unit 1						2. DOCKET NUMBER 05000 416			3. PAGE 1 OF 4		
4. TITLE Reactor Protection System and Reactor Core Isolation Cooling Actuation Due to a High Reactor Pressure Transient											
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		
07	30	2013	2013-003-00			09	26	2013	N/A		N/A
9. OPERATING MODE <div style="text-align: center; font-size: 2em;">1</div>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>								
			<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 20.2203(a)(2)(vi)			<input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(i)(B)			<input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(iii) <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> 50.73(a)(2)(v)(D)		
10. POWER LEVEL <div style="text-align: center; font-size: 2em;">100</div>											
12. LICENSEE CONTACT FOR THIS LER											
FACILITY NAME Christopher R. Robinson / Licensing Manager								TELEPHONE NUMBER <i>(Include Area Code)</i> (601) 437-7326			
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		
A	IT	TT	A857	Y	N/A	N/A	N/A	N/A	N/A		
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR
<input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO									N/A	N/A	N/A
ABSTRACT <i>(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)</i>											
<p>At 14:32 Central Daylight Time on July 30, 2013, Grand Gulf Nuclear Station experienced an unexpected Reactor SCRAM from 100% thermal power due to high reactor pressure detected by the Reactor Protection System. Operations staff immediately entered the appropriate off-normal event procedures. Reactor Core Isolation Cooling (RCIC) initiated and injected briefly during the transient. The RCIC initiation signal was valid, but not required to maintain the reactor vessel water level. Reactor levels were verified and RCIC was subsequently secured. All other systems operated as expected. Reactor pressure was controlled by discharging steam to the main condenser via the main turbine bypass valves. Reactor water level was controlled using the condensate and feedwater systems via the startup level control valve. No safety relief valves actuated. The cause of the SCRAM was a human performance-induced error due to inadequate troubleshooting activities on the Turbine Stress Evaluator (TSE). A temperature transmitter failure was not recognized nor corrected, thereby resulting in a false high turbine stress temperature signal. Upon restoration of the TSE, the incorrect signal forced turbine control valves in the closed direction and resulted in a high reactor pressure transient. Procedures and work orders are being revised to prevent recurrence of this event. There were no adverse effects to the health and safety of the public.</p>											

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Grand Gulf Nuclear Station, Unit 1	05000 416	YEAR	SEQUENTIAL NUMBER	REV. NO.	2 OF 4
		2013 -- 003 -- 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) and unplanned initiation of the Reactor Core Isolation Cooling (EIS:BN) (RCIC) system. The U.S. Nuclear Regulatory Commission (NRC) Headquarters Operations Center was notified by phone on July 30, 2013, within 4 hours of the event pursuant to 10 CFR 50.72(b)(2)(iv)(B) for the RPS actuation and within 8 hours of the event pursuant to 10 CFR 50.72(b)(3)(iv)(A) for initiation of RCIC during the initial transient.

B. INITIAL CONDITIONS

At the time of the event the reactor was in Mode 1 with reactor power at 100 percent thermal power. Failure of the Turbine Stress Evaluator (EIS:23) (TSE) 1N30N011B Temperature Transmitter (EIS:TT) was an unknown condition prior to the SCRAM.

C. DESCRIPTION OF OCCURRENCE

At 14:32 Central Daylight Time on July 30, 2013, Grand Gulf Nuclear Station (GGNS) experienced an unexpected Reactor SCRAM due to a high reactor pressure transient. The SCRAM occurred shortly after the TSE influence was turned on following maintenance to clear the "TSE STU Cab Failure" alarm. At the time, the plant was operating at 100 percent thermal power. Operations staff immediately entered the Emergency Procedure (EP) for Reactor SCRAM, the Reactor SCRAM Off-Normal Event Procedure (ONEP), and the Turbine Trip ONEP. The RCIC system initiated and injected during the transient due to a momentary drop in water level that was seen on two out of four channels. RCIC initiation was valid, but not required to maintain reactor water level as reactor feedwater (EIS:SJ) was in service and operating properly. Reactor level was verified and RCIC was subsequently secured. All other systems operated as expected. Reactor pressure was controlled by discharging steam to the main condenser (EIS:SG) via the main turbine bypass valves (EIS:PCV). Reactor water level was controlled using the condensate (EIS:SD) and feedwater systems via the startup level control valve (EIS:LCV). All control rods (EIS:ROD) inserted as designed. There were no actuations of safety relief valves (EIS:SRV) during this event. The highest noted pressure was approximately 1065 pounds per square inch gauge (psig) while the lowest noted reactor water level was -40 inches on narrow range indication channels.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Grand Gulf Nuclear Station, Unit 1	05000 416	YEAR	SEQUENTIAL NUMBER	REV. NO.	3 OF 4
		2013 -- 003 -- 00			

NARRATIVE

D. CAUSE

The cause of the SCRAM was a human performance-induced error due to inadequate troubleshooting activities on the Turbine Stress Evaluator (TSE). In response to a "TSE STU Cab Failure" alarm, Grand Gulf maintenance staff assumed that the alpha channel transmitter (1N30N011A) was the cause. Maintenance staff were pre-conditioned for this assumption based on recent TSE maintenance which revealed that the alpha channel transmitter was degraded but functional. That assumption was not validated through proper troubleshooting at the time of discovery. A failure mode analysis performed subsequent to this event identified that the bravo channel transmitter (1N30N011B) was the true failed component. Consequently, maintenance staff restored the TSE without the failure being repaired. Upon restoration, the TSE detected a 100% mismatch between the reference temperature signal and the actual steady-state full power temperature signal. The turbine control system responded, as designed, by stroking the turbine control valves in the closed direction. Reactor pressure increased to the RPS actuation setpoint. No situational or time pressures were identified that contributed to the event.

The cause of the automatic RCIC initiation was reactor water level decrease immediately following the SCRAM.

E. CORRECTIVE ACTIONS

The following corrective action to prevent recurrence was completed:

Revised model work orders 50025957, 50025958, and 50025959 for Preventative Maintenances 11A, 11B, and 12, respectively, to include restoration steps from the ARI.

The following corrective actions to prevent recurrence will be performed:

Revise Standard Operating Instruction (SOI) 04-1-01-N32-2, "Turbine Generator Control" to include a new step with instructions on how to turn the TSE on and off; and revise the Annunciator Response Instruction (ARI) to refer to SOI 04-1-01-N32-2 for instructions on turning the TSE on and off.

Revise procedure 02-S-01-41 "On Line Risk Assessment" to include the Activity Evaluation Checklist (attached to CA 18) for Low and Normal Risk Emergent Activities. Checklist shall include a PEER review by one of the following: Maintenance Manager, Work Week Manager or Shift Manager prior to the beginning of any emergent activity. Include provisions to ensure: the proper level of troubleshooting is performed per EN-MA-125 "Troubleshooting Control of Maintenance Activities," the 01-S-17-42 "Trip

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

U.S. NUCLEAR REGULATORY COMMISSION

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Grand Gulf Nuclear Station, Unit 1	05000 416	YEAR	SEQUENTIAL NUMBER	REV. NO.	4 OF 4
		2013 -- 003 -- 00			

NARRATIVE

Critical Program" is implemented, restoration steps are identified, and results are approved by Work Week Manager.

F. SAFETY ASSESSMENT

The event posed no threat to public health and safety as the RPS performed as designed. All safety systems responded as designed. The SCRAM signal was from reactor high pressure on channels B and C. Plots of Main Turbine Control Valve and bypass valve positions indicate that the Main Turbine Control Valves closed as the bypass valves opened to maintain reactor pressure as designed.

When the bypass valves reached full open, the control valves were continuing to close, which caused a corresponding increase in reactor pressure to the reactor high pressure SCRAM set point. As a result, an automatic SCRAM occurred due to a High Reactor Pressure of 1065 psig. All control rods inserted as designed. There were no actuations of safety relief valves during this event. The highest observed reactor pressure of 1065 psig is bounded by the existing analyzed event in the GGNS Updated Final Safety Analysis Report, Section 15.2.

At no time during the event were any Technical Specification Safety Limits violated or challenged. There were no Emergency Core Cooling System actuations or malfunctions.

Immediate actions performed by the Operations staff were adequate and appropriate in placing and maintaining the reactor in a safe shutdown condition.

Nuclear safety was not compromised because safety-related equipment performed their safety functions. Radiological safety was not affected, as there was no radiological release during the event.

The response of the crew did not challenge established industrial safety protocols or requirements. There was no impact to the health and safety of the public, industrial safety, or radiological safety as a result of this event.

G. ADDITIONAL INFORMATION

Condition Report (CR) CR-GGN-2013-4969 documents the unplanned RCIC initiation.

The 1N30N011B transmitter is model number TEV 315 from ABB.

Within the past 2 years, there were no similar events (i.e., SCRAM or RCIC initiation as a result of inadequate troubleshooting).