Entergy

Entergy Operations, Inc.
P. O. Box 756
Port Gibson, MS 39150

Marty L. Richey
Director, Nuclear Safety Assurance
Grand Gulf Nuclear Station
Tel. (601) 437-6787

GNRO-2012/00048

May 29, 2012

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

SUBJECT: Licensee Event Report 2012-003-00 ESF Actuation Due to Division III Bus Undervoltage following a Lightening Strike
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

Attached is Licensee Event Report (LER) 2012-003-00 which is a final report. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A).

This letter does not contain any commitments. Should you have any questions regarding the attached report, please call Christina L. Perino at 601-437-6299.

Sincerely,

MLR/cjj

Attachment: Licensee Event Report (LER) 2012-003-00

cc: (see next page)

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

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

U. S. Nuclear Regulatory Commission
ATTN: Mr. A. B. Wang, NRR/DORL (w/2)
Mail Stop OWFN 8 B1
Washington, DC 20555-0001

Attachment
To
GNRO-2012/00048

Licensee Event Report (LER) 2012-003-00

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	2. DOCKET NUMBER	3. PAGE
Grand Gulf Nuclear Station, Unit 1	05000 416	1 OF 3

4. TITLE

ESF Actuation Due to Division III Bus Undervoltage following a Lightning Strike

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
04	02	2012	2012	– 003	– 00	06	01	2012	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE

5

10. POWER LEVEL

000

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

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Christina Perino / Licensing Manager	601-437-6299

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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

14. SUPPLEMENTAL REPORT EXPECTED

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

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
N/A	N/A	N/A

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

On 4/2/12 at 1511 hours Central Daylight Time (CDT), Grand Gulf Nuclear Generating Station (GGNS) was in Mode 5 when a valid Engineered Safety Feature (ESF) actuation for emergency Alternating Current (AC) power to Division III 4160 Volt bus occurred due to degraded voltage. One of the two 500 (kilovolt) kV offsite feeder breakers tripped causing a drop in grid voltage which resulted in a trip of the ESF feeder breaker for Division III 4160 V bus. The High Pressure Core Spray (HPCS) Diesel Generator automatically started and energized the bus. The HPCS system was not running and no Emergency Core Cooling System (ECCS) initiation occurred during this event. Divisions I and II ESF power monitoring instrumentation responded to the grid voltage transient but no actuation setpoints were reached. Division I and II ESF 4160 Volt buses remained energized and shutdown cooling remained in service. The Technical Specifications required offsite power sources remained operable and in service during this event. The 500kV feeder that tripped was restored by the dispatcher at approximately 1515 CDT. The Division III bus was subsequently transferred back to offsite power and the HPCS Diesel Generator was secured.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV. NO.	
Grand Gulf Nuclear Station, Unit 1	05000 416	2012 -- 003 -- 00			2 OF 3

NARRATIVE

A. REPORTABLE OCCURRENCE

This LER is being submitted pursuant to 50.73(a)(2)(iv)(A) for a valid initiation of an Engineered Safety Feature (ESF). Telephone notification was made on April 2, 2012, to the NRC Emergency Notification System (ENS) within 8 hours of the event pursuant to 10 CFR 72(b)(3)(iv)(A).

B. INITIAL CONDITIONS

At the time of the event, the reactor was shutdown and the plant was in mode 5. There were no additional inoperable structures, systems, or components at the start of the event that contributed to this event.

C. DESCRIPTION OF OCCURRENCE

On 4/2/12 at 1511 hours CDT, Grand Gulf Nuclear Generating Station (GGNS) received a valid ESF (JE) actuation for emergency AC power to Division III 4160 Volt bus due to degraded voltage. Prior to the event, the reactor was in Mode 5 with Residual Heat Removal (RHR) (BO) A in shutdown cooling mode, Reactor Coolant System (RCS) temperature was being maintained at 80 – 100 degrees Fahrenheit (F) and RCS Pressure was 0 pounds per square inch gauge (psig).

One of the two 500 (kilovolt) kV offsite power source circuit breakers opened causing a transient in the plant electrical distribution system which resulted in a trip of the ESF feeder breaker for 4160 Volt Division III bus. The High Pressure Core Spray (HPCS) (BG) Diesel Generator automatically started and energized the bus. The HPCS system was not running and no ECCS initiation occurred during this event. Divisions I and II ESF power monitoring instrumentation sensed the grid voltage transient, but no actuation setpoints were reached. Division I and II ESF 4160 Volt buses remained energized and shutdown cooling remained in service. The Technical Specifications required offsite power sources remained operable and in service during the event. The 500kV power source circuit breaker that opened was restored by the dispatcher at approximately 1515 CDT. The Division III bus was subsequently transferred back to offsite power and the HPCS Diesel Generator was secured.

The lightning strike was due to the severe weather pattern present at the time. The lightning strike caused a 500kV line transient which resulted in a grid under voltage condition for the B, A, and C phase voltages on 4/2/12 at 15:11 hours.

At the time of the 500kV transmission line transient, the Franklin 500kV transmission grid voltage for phase B voltage dropped to 207723.3 volts, phase A voltage dropped to 511329.2 volts, and phase C voltage dropped to 504077.8 volts.

The GGNS plant ESF 4160 Volt Division III bus under voltage protection device for the Division III Diesel Generator HPCS system detected the B phase under voltage condition and opened plant feeder breaker 152-1705, the ESF feeder to plant Division III. Feeder breaker 152-1705 was feeding Division III at the time of the transmission line fault. The Division III Diesel Generator HPCS protective relaying is designed to initiate a trip to breaker 152-1705 and open the breaker upon detecting a Division III bus voltage at 73 percent (3036 volts AC) for zero seconds. The detection of the Division III under voltage condition caused the Division III Diesel Generator to start as designed to reenergize the plant Division III 17 AC bus. The plant Standby Service Water (SSW) Pump C started in support of the Division III Diesel Generator, as designed.

NARRATIVE

System Engineering determined that the GGNS Division III 4160 Volt ESF bus under voltage protection device properly detected the loss of a single phase (loss of voltage) upon the voltage reaching the appropriate set point and the logic actuated the appropriate protection systems to trip the incoming feeder breaker (152-1705).

During the response to the transient, the plant entered the Loss of AC Off-Normal Event Procedure (ONEP) as required and Shutdown Cooling continued to operate normally.

The Control Room Air Conditioning Unit (CRAC) A compressor tripped and was restarted in approximately two minutes. During this time CRAC B was tagged out of service. This was evaluated and determined to not be a loss of safety function because it was possible to restart the compressor and power was available

D. APPARENT CAUSE

The cause of the event was a lighting strike on the Franklin 500kV transmission line. The Entergy transmission operations center (TOC) reported at approximately 1512 hours, the Franklin Extra High Voltage (EHV) to Grand Gulf 500kV line tripped and locked out. The Franklin line is one of three offsite power sources available to GGNS. The line fault was sensed by the GGNS line relaying equipment and the fault was cleared by opening the GGNS 500kV circuit breakers J5240 and J5248. The TOC closed GGNS circuit breakers J5240 and J5248 upon clearing the fault. The line condition was normal after the breakers were closed and no further faults were detected by the GGNS Franklin line relaying. The 500kV circuit breakers remained closed.

E. CORRECTIVE ACTIONS

Condition Report (CR) CR-GGN-2012-04887 was written to document and investigate the event. The evaluation determined that all equipment performed as expected. No additional corrective actions were issued.

F. SAFETY ASSESSMENT

An analysis of the transmission system data along with a review of response of plant equipment and protective systems concludes all plant equipment and systems operated correctly for this condition. There were no safety system functional failures. Shutdown cooling was not lost during this event. There were no adverse effects on the health and safety of the public as a result of this event.

G. ADDITIONAL INFORMATION

Previous Occurrences – There has not been any occurrence of an event or condition in the past three years at Grand Gulf Nuclear Station involving the actuation of a ESF due to a grid disturbance. The corrective action response addressed the extent of the cause of this event.