



**ENTERGY**

Entergy Operations, Inc.  
P.O. Box 756  
Port Gibson, MS 39150  
Tel 601 437 6400

July 6, 1992  
U.S. Nuclear Regulatory Commission  
Mail Station P1-137  
Washington, D.C. 20555

**W. T. Cottle**  
Vice President  
Operations  
Grand Gulf Nuclear Station

Attention: Document Control Desk

SUBJECT: Grand Gulf Nuclear Station  
Unit 1  
Docket No. 50-416  
License No. NPF-29  
Reactor Scram Due To Lightning Strike  
LER 92-010-00

GNRO-92/00079

Gentlemen:

Attached is Licensee Event Report (LER) 92-010 which is an interim report.

Yours truly,

WTC/RR/cg  
attachment

cc: Mr. D. C. Hintz (w/a)  
Mr. J. L. Mathis (w/a)  
Mr. R. B. McGehee (w/a)  
Mr. N. S. Reynolds (w/a)  
Mr. H. L. Thomas (w/o)

Mr. Stewart D. Ebnetter (w/a)  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta St., N.W., Suite 2900  
Atlanta, Georgia 30323

Mr. P. W. O'Connor  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Mail Stop 13H3  
Washington, D.C. 20555

9207140255 920706  
PDR ADDOCK 05070416  
S PDR

bcc: Mr. P. W. Alberstadt (w/a)  
Mr. C. W. Angle (w/a)  
Mr. C. A. Bottemiller (w/a)  
Mr. R. W. Byrd (w/a)  
Mr. L. F. Daughtery (w/a)  
Mr. M. A. Dietrich (w/a)  
Mr. J. L. Ensley (ESI) (w/a)  
Mr. J. J. Fisicaro (ANO) (w/a)  
Mr. J. O. Fowler (w/a)  
Mr. C. R. Hutchinson (w/a)  
Mr. L. W. Laughlin (w/3) (w/a)  
Ms. F. K. Mangan (w/o)  
Mr. J. R. McGaha (w/a)  
Mr. M. J. Meisner (w/o)  
Mr. R. V. Moomaw (w/a)  
Mr. D. L. Pace (w/a)  
Mr. R. L. Patterson (w/a)  
Mr. T. E. Reaves (w/a)  
Mr. J. L. Robertson (w/a)  
Mr. R. Ruffin (w/2)  
Mr. M. J. Wright (w/a)  
Mr. G. A. Zinke (w/a)  
Required Reading Coordinator (w/a)  
SRC Secretary (w/a)  
File (LCTS) (w/2)  
File (RPTS) (w/a)  
File (NL) (w/a)  
File (Central) (w/a) (6)

INPO Records Center (w/a)  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, Georgia 30339

Mr. F. A. Spangenberg (w/a)  
Illinois Power Company  
Clinton Power Station  
P.O. Box 678  
Clinton, Illinois 61727

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Grand Gulf Nuclear Station		DOCKET NUMBER (2) 0 5 0 1 0 4 1 6	PAGE (3) 1 OF 0 4
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TITLE (4)  
Reactor Scram Due to Lightning Strike

EVENT DATE (5)				LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	VEFF	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME(S)		DOCKET NUMBER(S)	
0 6	0 6	9 29	2	0 1 0	0 0 0	0 7	0 6	9 2			0 5 0 1 0 4 1 6	

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5 (Check one or more of the following) (11)

OPERATING MODE (9) 2	20.402(b)	20.408(i)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 0 5	20.406(a)(1)(i)	50.38(a)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.38(a)(2)	<input type="checkbox"/>	50.73(a)(2)(vi)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract - Show and in Text, NRC Form 306A)
	20.406(a)(1)(iii)	50.73(a)(2)(i)	<input type="checkbox"/>	50.73(a)(2)(vii)(A)	Updates
	20.406(a)(1)(iv)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(vii)(B)	LER 91-012
	20.406(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Riley Ruffin/Licensing Specialist	TELEPHONE NUMBER AREA CODE 6 0 1 4 3 7 - 2 1 6 7
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPPDS

SUPPLEMENTAL REPORT EXPECTED (14)

<input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 3400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On June 6, 1992 at approximately 1836 hours station licensed operators were increasing reactor thermal power following the fifth refueling outage. During the power ascension, the reactor scrambled due to an RPS actuation signal from the Average Power Range Monitoring System (APRM). In STARTUP the high neutron flux trip occurs at approximately 15 percent thermal power. Following the scram, vessel level decreased to approximately 14 inches. Level was restored by the Feedwater system and the plant was stabilized in accordance with plant procedures. Generation of a scram signal is believed to have been caused by an electrical transient in the APRM system. The transient was the result of an electrical storm in the vicinity of the plant. In a continuing effort to eliminate lightning induced transients, further studies are in progress to reduce the susceptibility of GGNS to the effects of lightning. No safety functions or components were compromised as a result of the event. A supplemental report will be submitted following the determination of the root cause. This report also serves as an update to LER 91-012.

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		--	0 1 0	--	0 0 0 2

TEXT (If more space is required, use additional NRC Form 305A's) (17)

**A. Reportable Occurrence**

On June 6, 1992 at approximately 1836 hours, an automatic Reactor Protection System (RPS) [JC] actuation occurred due to a lightning induced neutron monitoring spike. This event is being reported pursuant to 10 CFR 50.73(a)(2)(iv).

**B. Initial Conditions**

The plant was in Operational Condition 2 with reactor water at approximately 538 degrees F. The plant was in startup from the fifth refueling outage. Reactor power was approximately 5 percent. An electrical storm was in the plant vicinity.

**C. Description of Event**

On June 6, 1992 at approximately 1836 hours station licensed operators were increasing reactor thermal power following the fifth refueling outage (RFO5). During the power ascension, the reactor scrambled due to an RPS actuation signal from the Average Power Range Monitoring (APRM) System [IG]. In Mode 2 (STARTUP) the high neutron flux trip occurs at approximately 15 percent thermal power. Based on a review of the data, it was determined that a short duration spike occurred on the APRMs that resulted in trips on channels C, D, G, and H. However, evidence did not indicate a high flux condition at the time of the scram.

High Pressure Core Spray (HPCS) [BG] low water level channels (R and C) also received a trip signal during the storm. However, HPCS did not actuate due to the short duration of the signal. This symptom has been observed during other lightning induced transients at GGNS.

Following the scram, vessel level decreased to approximately 14 inches as indicated by General Electric Transient Recorder System (GETARS). Level was restored by the Feedwater system [SJ] and the plant was stabilized in accordance with plant procedures.

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TEXT (if more space is required, use additional NRC Form 3884's) (17)

**D. Apparent Cause**

Generation of a scram signal is believed to have been caused by an electrical transient in the APRM system. The transient was the result of an electrical storm in the vicinity of the plant.

The root cause of GGNS susceptibility to lightning induced transients has not been determined at this time.

As reported in LER 91-012, a task force is actively evaluating methods to reduce the susceptibility of GGNS to lightning induced transients.

**E. Corrective Actions**

A task force was assembled following the Scram, which occurred November 19, 1991, consisting of Plant Engineering, General Electric (GE) Consultant Engineers and a Noise Reduction Consultant Engineer. This task force provided the following recommendations that have been implemented or are in the process of being implemented.

- o Several ventilation radiation monitors that provide input to instrumentation within the neutron monitoring control panels were found not insulated from their respective ducts. This could be a potential path for noise to enter the neutron monitoring panels and therefore these monitors were insulated from the duct.
- o Ferrite Beads were installed on the Local Power Range Monitors (LPRM) [IG] cable to suppress high-frequency common mode noise on LPRM signal cables.
- o Magnetic shielding foil was installed around the splices of the LPRM signal cables (coaxial cable) to the containment penetration feed-through conductors at both the inboard and outboard side of the penetrations. This magnetic foil should reduce magnetic coupling of noise in the LPRM signal cables at the containment penetrations.
- o A short time delay was installed on the power supply monitoring card to allow small noise transients that may filter through the APRM power supply time to dissipate before tripping the power supply.

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		0	1	0	0	4

TEXT (if more space is required, use additional NRC Form 366A's) (17)

- o The panel chassis ground busses within each of the neutron monitoring control panel were strapped to the instrument ground bus (IGB). This should provide an environment which exhibits less noise in the neutron monitoring instrumentation within these control panels.
- o The neutrals of the Class 1E inverters that provide power to the neutron monitoring system were tied to the IGB. Existing GE specifications recommended the neutral of the neutron monitoring system power source be tied to the IGB.
- o Filter chokes were installed on the APRM reference to ground circuitry to suppress low frequency noise which may be induced in the LPRM cabling. However, slight oscillations were observed on the output side of the filter chokes and they were removed from service until troubleshooting could be completed and the problem resolved. Upon completion of the investigation and testing, the filter chokes will be returned to service.

In a continuing effort to eliminate lightning induced transients, further studies are in progress to reduce the susceptibility of GGNS to the effects of lightning. A supplemental report will be submitted following the determination of the root cause.

**F. Safety Assessment**

Based on a review of data, it was determined that all safety systems behaved as expected. Vessel water level decreased to a minimum of 14 inches, as indicated by GETARS, which was approximately 180 inches above the top of active fuel. No safety functions or components were compromised as a result of the event.

**G. Additional Information**

Subsequent to commercial operations, GGNS has experienced six scrams due to lightning strikes. The previous events were reported in LERs 88-012, 89-010, 89-016, 91-010, and 91-012. This report will also serve as an update report to LER 91-012 which was submitted December 18, 1991.

Energy Industry Identification System (EIIS) codes are identified in the text within brackets [ ].