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X YES (IX yes, complete EXPECTED SUBMISSION DATE) NO 016 310 8 ABSTRACT (Limit to 1400 spaces (a approximately filteen single space rypermitten lines) 116 116 116 116	Alasta	distances in case of the local distance in t			and the second second second		016 310 8	19	
On August 15, 1988 at 1553 hours the plant tripped on Average Power Range Monitors (APRM) Neutron Flux High signal. An electrical storm with lightning strikes was occurring in the general site area. Several APRM channels momentarily spiked high due to an inherent condition wit n the APRMs and/or the plant electrical grounding system which transmitted the voltage spikes to the APRMs. All plant systems responded as designed. The APRM cabinets were visually inspected for general condition and for the presence of grounding straps. No obvious discrepancies were observed. An engineering task force was assembled to investigate the root cause and recommend corrective actions to eliminate the problem. Preliminary results of a General Electric inspection team attributed the spike to a grounding strap for the plant security fence located on the roof of the Turbine and Control Buildings. The grounding strap was routed across the roof and down the side of the Control Building and then across the roof of the Auxiliary Building in close proximity to the signal cables of the APRM channels that spiked. It then tied in with another grounding strap which is tied to the plant grounding mat. The grounding strap has been relocated to a non-sensitive area to prevent interference with the APRMs. Further study of the cause and corrective actions is required and the results will be provided in a followup to this report by June 30, 1989. DIGAECM88E112201 - 3	Monitors (APRM) Ne strikes was occurr momentarily spiked plant electrical g APRMs. All plant systems inspected for gene obvious discrepand An engineering tas recommend correcti General Electric i the plant security Buildings. The gr the Control Buildi proximity to the s with another grour grounding strap has interference with is required and th June 30, 1989.	eutron Flux Hi ring in the ge d high due to grounding syst responded as eral condition cies were obse sk force was a ive actions to inspection tea y fence locate rounding strap ing and then a signal cables nding strap wh as been reloca the APRMs. F he results wil SSI20 PDR S	igh signal. eneral site an inheren tem which t designed. i and for t erved. issembled t o eliminate im attribut of the APR nich is tie ated to a n further stu l be provi	An elect area. Si t condition ransmitted The APRM he presend the probu- ed the sp oof of the d across roof of the d to the probu- on-sensit dy of the ded in a	trical sto everal APR on wit n d the volt cabinets ce of grou gate the r lem. Prel ike to a g e Turbine the roof a he Auxilia s that spi plant grou ive area t cause and	were vision inding stimulary and Continuing and con	lightning ls s and/or the es to the ually raps. No e and results of a strap for rol the side of ing in close then tied in t. The t ive actions		

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Α.	REPORTABLE OCCURRENCE			
	On August 15, 1988 at 1553 h Monitors (APRM) Neutron Flux to 10CFR50.73 (a)(2)(iv).	ours the plant trip High signal. This	ped on Average Power event is reported p	Range bursuant
в.	INITIAL CONDITION			
	The plant was in Operational power. A seasonal electrica			
с.	DESCRIPTION OF OCCURRENCE			
	On August 15, 1988 at 1553 hi Code IG) Neutron Flux High s strikes was occurring onsite observed by plant personnel APRM spikes recorded at the	ignal. An electric . Several actual 1 it the approximate	al storm with lightr ightning strikes wer time of the plant tr	ning re

APRM Channel	Division	Peak Indicated Flux (percent)
A	1	No spike
Β.	2	105
C	3	122
D	4	132
E	1	No spike
F	2	106
G	3	127
H	4	131

A full scram signal requires a trip of Division 1 or 3 in conjunction with a trip of Division 2 or 4. APRM channels C, D, G, and H exceeded their trip setpoints of 118 percent. The duration of the spikes was less than one-tenth of a second.

An examination of recorded reactor pressure, corr flow and control rod status shows no evidence that actual neutron flux increased. No potential causes for a rapid reactivity insertion to produce such a neutron flux spike could be identified. Thus, it was concluded that a voltage spike was induced by the electrical storm and transmitted to the APRM channels causing the plant trip.

The APRM cabinets and associated cables were visually inspected for general conditions and for the presence of grounding straps. No obvious discrepancies were observed. The Local Power Range Monitors (LPRM) which provide the flux signals to the APRMs were monitored during the restart to check for proper sensitivity and response after the voltage spike. No unusual conditions associated with the LPRMs were observed.

Attachment to AECM-88/0234

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	The ADDMe have a bistory a					64							kard					h1.			+ h			
	The APRMs have a history of the grounding system. Pre-	viou	15	110	ght	tnir	ng	st	orm	15	ha	ve	CI	aus	ed	\$1	mi	lar	r e	event	ts			
	on July 12, 1982 and July : when APRM channels D and H																							

A ground fault trip of a large fan was believed to have caused a voltage

D. APPARENT CAUSE

An inspection team from General Electric (GE) was on-site the week of November 7, 1988 to determine the root cause of the APRM grounding problems. Preliminary results of their inspection determined the cause to be the location of a grounding strap for the plant security fence on the roof of the Control and Turbine Buildings separating Unit 1 and Unit 2. GE engineers suspect that a lightning strike on or near the fence could create enough current in the grounding strap to create spikes in rearby cables.

The grounding strap was routed across the roof and down the side of the Control Building and then across the roof of the Auxiliary Building in close proximity to conduit runs containing Division 3 and 4 APRM signal cables. It then tied in with another grounding strap which is tied to the plant grounding mat.

Division 2 cables were located a little further away from the grounding strap while Division 1 cables were too far away to be affected by the grounding strap. This is consistent with the spikes recorded for each of the APRM channels during the event.

E. SUPPLEMENTAL CORRECTIVE ACTIONS

spike that was sensed by the APRMs.

An engineering task force was assembled to investigate the root cause and recommend corrective action to eliminate the problem. Walkdowns of LPRM cable runs, APRM cabinet common grounds, and a review of past improvements to the plant grounding system were begun.

As a result of the preliminary recommendations and findings from the GE team, the grounding strap for the fence has been relocated to prevent interference with the APRMs. Additional corrective actions may be necessary when the final, approved GE report is received.

Lightning protection for the plant will be investigated in conjunction with the GE report to determine the final corrective actions needed. The current security fence might be removed entirely from the Turbine and Control Building roofs when the revised Security Plan is approved and implemented in early 1989 incorporating Unit 2 into the Protected Area. A followup to this report will be provided by June 30, 1989.

Attachment to AECM-88/0234

(9-42)	LICENSEE EVENT REPORT (LER) TEXT CONTINUATION								U.S. NUCLEAR REGULATORY COMMISSION APPROVED OMB NO. 3150-0104 EXPIRES 5/31/98													
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F. SAFETY ASSESSMENT

A review of plant data shows that actual neutron flux did not increase. The APRMs tripped the plant on a Neutron Flux High signal induced by lightning strikes from an electrical storm.

This condition did not prevent the APRMs from performing their intended safety function, but did result in an unnecessary challenge to plant safety systems. All plant systems responded as designed. At no time was the health or safety of the public affected.



JOHN G. CESAR, JR. Depotor Nuclear Loeneing

November 30, 1988

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

Attention: Document Control Desk

Gentlemen:

SUBJECT: Grand Gulf Nuclear Station Unit 1 Docket No. 50-416 License No. NPF-29 Reactor Scram Induced by Lightning Strikes Affecting Neutron Monitoring System LER 88-012-01 AECM-88/0234

Attached is Licensee Event Report (LER) 88-012-01 which is an interim report.

Yours truly,

acira

JGC:aly Attachment

cc:	Mr. W. T. Cottle (w/a) Mr. T. H. Cloninger (w/a) Mr. R. B. McGehee (w/a) Mr. N. S. Reynolds (w/a) Mr. H. L. Thomas (w/o)									
	Mr. H. O. Christensen (w/a) Mr. Malcolm L. Ernst (w/a) Acting Regional Administrator U. S. Nuclear Regulatory Commission Region II 101 Marietta St., N. W., Suite 2900 Atlanta, Georgia 30323									
	Mr. L. L. Kintner, Project Manager (w/a) Office of Nuclear Reactor Regulation U. S. Nuclear Regulatory Commission Mail Stop 14820 Washington, D.C. 20555									
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