NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Brunswick Steam Electric Plant Unit 1	0 5 0 0 0 3 2 5	1 OF 0 3

TITLE (4) Unit 1 Reactor Scram and Unit 2 Reactor Protection System Actuation Resulting From Lightning Strikes During Inclement Weather Activity Preceding Hurricane Diana.

EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR		SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 9	1 0	8 4	8 4	—	0 2 5	— 0 0	1 0	1 0	8 4	Brunswick Unit 2	0 5 0 0 0 3 2 4
											0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 9 9	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
M. J. Pastva, Jr., Regulatory Technician	9 1 9 — 4 5 7 — 9 5 2 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	I J	Z	N 0 6 8	No							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On 9-10-84, at 0909, a Unit 1 automatic reactor scram and a primary containment Group 1 isolation occurred due to an instrument upscale actuation of Unit 1 reactor main steam line radiation high monitors 1-D12-RM-K603C and D. At the time, Unit 1 was at 99 percent power. At 0915, on 9-10-84, the Unit 2 Reactor Protection System (RPS) automatically initiated due to a neutron flux high signal to the reactor average power range monitoring system. At the time, Unit 2 was in a refuel/maintenance outage.

The events resulted from lightning striking the units' common Turbine Building structure heater bay semigantry crane and common electrical switchyard area, which induced electrical impulses into each unit's subject instrumentation.

After the Unit 2 event, the RPS trip signal was reset. During the Unit 1 scram recovery, reactor level briefly decreased to low level No. 1. The unit High Pressure Coolant Injection and Reactor Core Isolation Cooling Systems automatically started but did not inject. Reactor safety relief valve (SRV) F013G automatically lifted at the highest reactor pressure of 1105 psig, and SRVs F013A and E were manually opened to control reactor pressure. No sonic indication of SRV positions was available, although the SRV tailpipe temperature indicators were functioning properly.

Following passage of Hurricane Diana, subsequent reactor criticality on Unit 1 was established on 9-15-84.

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

On September 10, 1984, at 0909, a Unit 1 automatic reactor scram with a Primary Containment Isolation System (PCIS) Group 1 isolation occurred. An assessment of appropriate Unit 1 Control Room indications and alarm annunciations determined the event resulted from an instrument upscale actuation of the unit reactor main steam line radiation high monitors 1-D12-RM-K603C and D. These instruments respectively provide A2 and B2 logic channel input to the Reactor Protection System (RPS) and the Isolation Actuation Instrumentation System. At the time of this event, Unit 1 was operating at 99 percent power. Later the same day at 0915 an automatic initiation of the Unit 2 RPS occurred. An assessment of appropriate Unit 2 Control Room indications and alarm annunciations determined the event resulted from a high neutron flux signal to the Reactor Average Power Range Monitoring (APRM) System. At the time of this event, Unit 2 was in a refueling/ maintenance outage.

These events resulted from lightning strikes during inclement weather activity preceding Hurricane Diana. Lightning struck the units' common Turbine Building structure heater bay semigantry crane and areas within the units' common electrical distribution switchyard. It is believed the incurred lightning strikes caused electrical impulses to be induced into the electrical circuitry of the subject instrumentation, thereby resulting in each event.

Shortly after the Unit 2 event, the incurred RPS trip signal was reset.

Following the Unit 1 reactor scram, a reactor scram recovery was carried out in accordance with applicable plant procedures. During the scram recovery, reactor level briefly decreased to the reactor low level No. 1 setpoint of $\geq$ 162.5 inches. The unit reactor High Pressure Coolant Injection (HPCI) System and Reactor Core Isolation Cooling (RCIC) System automatically started but did not inject to the reactor because the low level No. 1 condition did not exist long enough for the required 3-6 second injection permissive to seal-in. Reactor safety relief valve (SRV) 1-B21-F013G automatically opened at the highest recorded reactor pressure of 1105 psig. SRVs B21-F013A and E were manually opened to control reactor pressure. In addition, during the scram recovery sonic probe position indication of the subject SRV automatic and manual opening did not function, although respective SRV tailpipe indications of valve openings were operable.

Following the Unit 1 reactor scram recovery, an actuation setpoint check and a functional test of the subject SRV sonic position indicators were performed with no problems found.

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

The Unit 1 SRV Acoustic Monitoring System (SRVAMS) was checked electrically by inducing a signal at the system instrumentation signal pre-amps in the Reactor Building and the SRVAMS response to acoustic signals was also checked. Both checks indicated proper system operation. The initial SRVAMS startup data was also reviewed and it was discovered that an important correlation between acoustic levels at 250 psig Reactor Pressure and 1000 psig Reactor Pressure was overlooked.

The initial setpoint of the SRVAMS was 250 millivolts as indicated on the system fluid flow detector (FFD) modules. This setpoint was selected arbitrarily based on system acoustic levels recorded during SRV actuation at 250 psig, Reactor Vessel Pressure. Since recorded maximum acoustic levels were 900 mV-1100 mV for all valves and the maximum valve crosstalk was approximately 30 mV, 250 mV was selected as an acceptable value. Three (3) valves were tested during system startup at 1000 psig reactor pressure while all the valves were tested at 250 psig reactor pressure. Correlating the three (3) valves tested at 1000 psig with their 250 psig test revealed a drastic SRVAMS output decrease at the 1000 psig SRV test. This decrease was to a value of approximately 1/5 initial 250 psig SRV test. This decrease can be explained due to a shift in the acoustic signal frequency content due to the higher steam flow velocities at 1000 psig. Since the acoustic detectors do not have a flat response spectrum but contain peaks at various frequencies with a resonants' frequency between 20-25 KHZ, this behavior can be explained. Also since each detector has its own response spectrum, some decrease while other channels may not decrease hardly at all. This was also observed while reviewing the initial SRVAMS startup data.

These results were confirmed with Philadelphia Electric Peachbottom Plant which has a system similar to Carolina Power & Light Company but with longer operational history.

Based on the above, a 100 mV setpoint was chosen to provide more reliable SRV open indication. This setpoint was implemented on Unit 1 following the unit scram recovery. Following the subsequent startup of Unit 1 on September 15, 1984, one Unit 1 SRV was tested and proper SRVAMS operation was observed. Appropriate plant procedures will be revised as required to reflect the new SRVAMS setpoint and enable a more accurate test of the SRVAMS operation.

The subject SRVAMS setpoint will be implemented on Unit 2 prior to completion of the ongoing Unit 2 refueling/maintenance outage.

CP&L

Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461-0429

October 10, 1984

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NRC Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DPR-71
LICENSEE EVENT REPORT 1-84-25

Gentlemen:

In accordance with Title 10 to the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. This report fulfills the requirement for a written report within thirty (30) days of a reportable occurrence and is in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,

C. R. Dietz, General Manager
Brunswick Steam Electric Plant

MJP/sdl/LETSDL

Enclosure

cc: Mr. R. C. DeYoung
Mr. J. P. O'Reilly

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