

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Brunswick Steam Electric Plant Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 2 5	PAGE (3) 1 OF 0 3
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TITLE (4) Reactor Protection System (RPS) Actuation While Attempting To Withdraw A Control Rod And While Attempting To Reset Initial RPS Actuation

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 4	3 0	8 7	8 7	0 1 0	0 0	0 5	2 9	8 7			0 5 0 0 0

OPERATING MODE (9) 5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 0 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)								

LICENSEE CONTACT FOR THIS LER (12)

NAME M. J. Pastva Jr., Regulatory Compliance Technician	TELEPHONE NUMBER AREA CODE: 9 1 9 4 5 7 - 2 3 1 5
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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

SUPPLEMENTAL REPORT EXPECTED (14) <input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH DAY YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

During the Unit 1 1987 refuel/maintenance outage, an automatic Reactor Protection System (RPS) trip occurred at 1221 hours on 4/30/87 due to intermediate range monitors (IRMs) A and E upscale signals while the RPS shorting links were removed for the performance of control rod/rod drive integrity verification testing. While the Unit 1 Control Operator (CO) was attempting to reset the incurred trip signal, a second RPS trip signal occurred at 1235 hours on 4/30/87. The second RPS trip signal was reset shortly thereafter and the involved testing was subsequently completed.

The event at 1221 hours is attributed to a spurious electronic noise spike, resulting from attempts to withdraw a control rod, which tripped IRMs A and E. The event at 1235 hours resulted from failure of the CO to verify the scram discharge volume (SDV) high level signal had reset prior to unbypassing the SDV high level trip logic in order to allow resetting of the RPS trip signal.

Prior to startup following completion of the ongoing Unit 1 outage, a plant modification will be installed to help alleviate the subject electronic noise problem. A similar modification will be installed on Unit 2 prior to completion of its next refuel/maintenance outage. Appropriate procedural revisions will be made and Operations real-time training will be conducted concerning the event at 1235 hours.

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

Initial Conditions

The Unit 1 1987 refueling/maintenance outage was in progress with reactor (EIIS/AC/RCT) fuel reloading completed. In addition, the reactor cavity was flooded and the fuel pool gates (EIIS/DA/GATE) were removed. Performance of control rod (EIIS/AA/ROD) check and control rod drive (CRD) (C11) (EIIS/AA/DRIV) testing periodic test (PT)-14.1A was in progress which individually verifies the control rod/CRD coupling integrity. This test involves removal of the Reactor Protection System (RPS) (EIIS/JC) shorting links (EIIS/JC/CBL1) to reconfigure the system logic actuation such that a single input will cause an RPS trip to occur.

Description of Events

During performance of the PT, it was discovered CRD 06-31 would not withdraw from its full-in position. Attempts were then initiated to withdraw the CRD through utilization of Section 8.1 of Reactor Control System (RMCS) (EIIS/JD) operating procedure (OP)-07 as prescribed by the PT. During these attempts, while performing the steps to move the CRD, spiking indications of reactor power by the intermediate range monitors (IRMs) occurred at 1221 hours on April 30, 1987, with actuation of the upscale trip setpoints of IRMs A and E which resulted in an automatic RPS trip signal. The Unit 1 CO became aware of this event through Control Room (EIIS/NA) indication and alarm annunciation. During the RPS trip recovery, the CO reset the automatic trip signal at 1223 hours and bypassed the CRD scram discharge volume (SDV) (EIIS/AA/TK) high water level automatic trip signal. At 1227 hours, the SDV High Water Level Control Rod Withdrawal Block signal, which occurred following the scram, cleared. In addition, the north and south "SDV Not Drained" alarm annunciators cleared. As a result, the CO perceived that normally expected SDV draining following reset of the scram at 1223 hours was in progress. At 1235 hours, he unbypassed (returned to normal) the CRD SDV high water level automatic trip logic, at which time the second RPS trip signal occurred. Shortly thereafter, he reset the trip signal and again bypassed the CRD SDV high water level automatic trip logic.

Investigation Summary

The IRM spiking and upscale trips of IRMs A and E are attributed to electronic noise induced into the circuitry of these monitors while manipulating the RMCS controls during efforts to withdraw CRD 06-31. Electronic noise during control rod selection or manipulation is a documented problem which affects the reactor power source range monitors (SRMs) as well as the IRMs on Unit 1. A similar event involving spurious upscale electronic noise spiking was reported in LER 1-85-045. On February 16, 1987, General Electric Company (GE) performed an investigation of this problem utilizing electronic noise spike suppressors across selected 120 Volt (V) alternating current (ac) relay coils of the RMCS and the CRD stabilizer solenoid valve coils. During the GE investigation it was found the spike suppressors significantly reduced the number of SRM/IRM electronic noise spikes during CRD selections and manipulations.

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

The RPS trip at 1235 hours is attributed to failure of the Unit 1 CO to observe that the "SDV High Water Level CRD Trip" alarm annunciator had not cleared. Reconstruction of activities in progress at the time of this event along with input by the involved CO support that he failed to differentiate among other lit annunciator panel lights in the same panel as the one for the subject annunciator. A review of the plant process computer printout indicated that at the time of this event, the SDV high level alarm/trip function channels had not reset. Consequently, it has been determined that the light for the subject annunciator was lit at the time of this event.

Corrective Actions

To reduce the amount of electronic noise induced into the circuitry of the Unit 1 SRMs and IRMs, a plant modification (PM 87-120) will be installed prior to startup of the unit following completion of the ongoing outage. A similar plant modification will be installed on Unit 2 prior to the end of the scheduled 1988 refueling/maintenance outage. This modification will involve the following:

1. Installation of electronic spike suppressor networks in parallel with selected 120 Vac relay coils at the RMCS.
2. Installation of suppressor networks in parallel with the coils on the four CRD stabilizer solenoid valves (1-C11-F007) (EIIS/AA/PSV).
3. Replacement of ground leads (EIIS/JD/CBL) on SRM and IRM instrument drawers (EIIS/JD/IMOD) determined to be contributory to the observed electronic noise problem.

Appropriate revisions to the plant annunciator procedures will be made to incorporate checks to be made by the CO prior to unbypassing the SDV high level trip function while attempting to reset a reactor trip signal. In addition, this event will be appropriately covered in Operations real-time training.

Event Assessment

During reactor startup, the RPS shorting links, by design, are installed, thus requiring two separate simultaneous spikes on opposite IRM channels to result in a reactor trip signal. In this case, spiking of IRM channels would place the unit into a shutdown condition which has been previously addressed within the plant safety analysis for each unit.

CP&L

Carolina Power & Light Company

Brunswick Steam Electric Plant
P. O. Box 10429
Southport, NC 28461-0429
May 29, 1987

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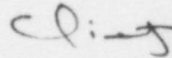
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BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DPR-71
LICENSEE EVENT REPORT 1-87-010

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/jlh

Enclosure

cc: Dr. J. N. Grace

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