

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Brunswick Steam Electric Plant Unit 2 DOCKET NUMBER (2) 0 5 0 0 0 3 2 4 PAGE (3) 1 OF 0 4

TITLE (4) Loss of Reactor Protection System (RPS) Bus A Due to Tripping of the Bus Alternate Power Supply Breakers, Electrical Protection Assemblies (EPA)-5 and 6

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	SEQUENTIA NUMBER	REVISION NUMBER		MONTH	DAY	YEAR	FACILITY NAMES		
0	8	0	0	1	3	0	9	0	DOCKET NUMBER(S)		
8	8	8	0	0	0	0	1	8	0 5 0 0 0		
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OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

20.402(b)	<input checked="" type="checkbox"/>	50.73(a)(2)(ix)	<input type="checkbox"/>	73.71(b)
20.406(a)(1)(i)	<input type="checkbox"/>	50.73(a)(2)(v)	<input type="checkbox"/>	73.71(c)
20.406(a)(1)(ii)	<input type="checkbox"/>	50.73(a)(2)(vi)	<input type="checkbox"/>	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.406(a)(1)(iii)	<input type="checkbox"/>	50.73(a)(2)(vii)(A)	<input type="checkbox"/>	
20.406(a)(1)(iv)	<input type="checkbox"/>	50.73(a)(2)(vii)(B)	<input type="checkbox"/>	
20.406(a)(1)(v)	<input type="checkbox"/>	50.73(a)(2)(ix)	<input type="checkbox"/>	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
<u>M. J. Pastva Jr., Regulatory Compliance Specialist</u>	<u>9 1 1 9 4 1 5 7 1 - 2 1 3 1 1 5</u>

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (if yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

At 0200, 0227, 0234, and 0400 hours on 8/2/88, while the Unit 2 Reactor Protection System (RPS) bus A was being supplied from the alternate power supply breakers, electrical protection assemblies (EPA)-5 and 6, the bus automatically deenergized due to tripping (opening) of the breakers on undervoltage. An RPS logic A scram signal, along with actuation of A logic to the Primary Containment Isolation System (PCIS) Groups 1, 2, 3, 6, and 8 and autoisolation of the Reactor Building Ventilation System and autostarting of the Standby Gas Treatment System, resulted. Unit 2 was at approximately 94% power, and the channel functional and calibration test of the bus normal power source supply breakers (EPA-1 and 2), Maintenance Surveillance Test (MST)-RPS21SA, was in progress. The High Pressure Coolant Injection System, Automatic Depressurization System, Residual Heat Removal/Low Pressure Coolant Injection System, the A and B core spray subsystems, and the Reactor Core Isolation Cooling System were in standby readiness. At 0519 hours on 8/2/88, power to the bus was aligned to the normal bus motor generator set, the incurred isolations were reset, and the affected systems were returned to normal. This event had minimal effect on plant safety.

EPA-5 and 6 functioned per design in response to switchyard voltage being at the low portion of its control schedule and normal variances in the 120-volt alternating current distribution to the breakers, which resulted in actuation of the breakers' undervoltage trip setpoint. By 1/13/89, a voltage regulating transformer will be installed on each unit to reduce the susceptibility of the EPA-5 and 6 breakers to normal voltage fluctuations.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Brunswick Steam Electric Plant Unit 2	DOCKET NUMBER (2) 05000324	LER NUMBER (3)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
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TEXT (if more space is required, use additional NRC Form 368A's) (17)

Initial Conditions

Unit 2 was operating at approximately 94% power. The unit 120-volt (V) alternating current (AC) Reactor Protection System (RPS) bus A (EIIS/JC/BU) was being supplied from the RPS alternate power source via output supply breakers, electrical protection assemblies (EPA)-5 and 6 (EIIS/JC/BKR) (in electrical series). This was done to permit performance of the channel functional and calibration test of the bus normal power output supply breakers, EPA-1 and 2 (EIIS/JC/BKR), in accordance with Maintenance Surveillance Test (MST)-RPS21SA. The 120 Vac to the EPA-5 and 6 breakers is normally supplied from 120/208 Vac distribution panel 2E7 (EIIS/ED/PNL), which is supplied from 450 Vac bus E7 (EIIS/ED/BU). The Unit 2 RPS bus B (EIIS/JC/BU) was being supplied from the bus normal power supply breakers, EPA-3 and 4. In addition, load testing of the Units 1 and 2 common 4150-volt (V) emergency (E) alternating current (ac) diesel generator (DG) No. 3 (EIIS/EK/DG) was in progress. The units' remaining DGs (Nos. 1, 2, and 4) were in standby readiness. The Unit 2 High Pressure Coolant Injection (HPCI) System (EIIS/BJ), Automatic Depressurization System (EIIS/*), Residual Heat Removal/Low Pressure Coolant Injection (RHR/LPCI) System (EIIS/BO), the A and B core spray subsystems (EIIS/BM), and the Reactor Core Isolation Cooling (RCIC) System (EIIS/BN) were in standby readiness.

Event Description

At 0200 hours on August 2, 1988, RPS bus A automatically deenergized due to tripping (opening) of EPA-5 and 6, which by design resulted in an RPS logic A reactor scram signal (concurrent RPS logic A and B reactor scram signals are required for an RPS control rod automatic insertion). The loss of RPS bus A deenergized the A logic of Primary Containment Isolation System (PCIS) (EIIS/BD) Groups 1, 2, 3, 6, and 8, thereby causing the appropriate inboard isolation valves of the affected groups to close along with automatic isolation of the Reactor Building Ventilation System (EIIS/VA/VLR) and automatic starting of the Standby Gas Treatment System trains 2A and 2B (EIIS/VA/BH).

At approximately 0225 hours, power was restored to RPS bus A following resetting and reclosing of the EPA-5 and 6 breakers; however, at approximately 0227 hours, the breakers tripped. The breakers were reset and reclosed to restore power to the bus and at 0234 hours, the breakers tripped again. At 0325 hours, the 120 Vac supply to EPA-5 and 6 was aligned to the breakers' alternate power supply source from distribution panel 2E8 (EIIS/ED/PNL) and power to RPS bus 2A was restored. At 0343 hours, the RPS bus 2A trip signal was reset. Subsequently, at 0400 hours, the 2A RPS bus tripped again. The Unit 2 Control Operator (CO) became aware of these events through Control Room alarm annunciation and indication of an undervoltage condition on bus E7. In

*EIIS system description unavailable.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Brunswick Steam Electric Plant Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 2 4 8 8	LER NUMBER (8)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	0 1 3	0 0 0	3	OF 0 4

TEXT (If more space is required, use additional NRC Form 3054's) (17)

each case, the tripping of EPA-5 and 6 was verified through local observation of the breaker positions.

At 0519 hours on August 2, 1988, the motor generator (MG) set (EIIS/JC/MG) of RPS bus A was started and aligned to supply the bus, the incurred PCIS group isolation signals were reset, and the affected systems were returned to normal. At 0530 hours on August 2, 1988, SBTG train 2A was secured and returned to standby readiness and the Reactor Building Ventilation System was returned to service. In addition, at 0546 hours, SBTG train 2B was secured and returned to standby readiness.

Event Investigation

The EPA breakers are designed to trip when an undervoltage, overvoltage, or underfrequency condition is detected and, as a result, are reactive to the unit switchyard grid, the unit main generator (EIIS/EL/GEN), and changing in-house loads. During these events, the EPA-5 and 6 breakers performed, per design, in response to changing power source conditions in order to separate the RPS bus A from the power source prior to undetected failures of power supply components. Plant conditions which are felt to have directly affected the power supply to the EPA-5 and 6 breakers are:

- A. The unit switchyard voltage, which is controlled in accordance with a voltage set schedule to range from 225.4 to 234.6 kilovolts (KV), was being operated on the low end of the range.
- B. The load testing (loading and unloading) of DG No. 3 may have introduced voltage transients on the 480 Vac power supply to distribution panel 2E7. 2E7 is powered from emergency bus E7 (EIIS/EK/BU), which is ultimately powered from 4160 Vac bus E3 (EIIS/EK/BU), with DG No. 3 as the backup supply to bus E3.
- C. Manual or automatic starting and stopping of auxiliary distribution system loads may have caused the 120 Vac distribution system voltages to vary by several percent. This coupled with the low switchyard voltage could have resulted in reaching the undervoltage trip setpoint of the EPA-5 and 6 breakers (109.5 +/- 0.5 volts).

Corrective Action

Use of the alternate source EPA-5 and 6 breakers to supply RPS bus A or B is an infrequent lineup utilized to allow maintenance or repair activities involving the EPA-1-4 breakers or the respective MG set of either bus. As there is presently no means by which to regulate voltage to EPA-5 and 6, utilizing the breakers for electrical lineups increases the susceptibility of the breakers to fluctuations in system voltage and other plant load changes which may result in tripping of the involved RPS bus.

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FACILITY NAME (1) Brunswick Steam Electric Plant Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 2 4 8 8	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		8 8	0 1 3	0 0	0 4	OF 0 4

TEXT (if more space is required, use additional NRC Form 208A's) (17)

In order to reduce the susceptibility of EPA-5 and 6 to voltage fluctuations, plant modifications will be implemented on each unit to install a voltage regulating transformer in the power supply to the breakers. The expected date for completion of this action is January 13, 1989.

Event Assessment

Occurrence of this event under other reasonable and credible alternative conditions would not have been more severe.

A prior similar event, which occurred on July 23, 1986, was reported in LER 2-86-018.



Carolina Power & Light Company

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

September 1, 1988

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10CFR50.73

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

BRUNSWICK STEAM ELECTRIC PLANT UNIT 2
DOCKET NO. 50-324
LICENSE NO. DPR-62
LICENSEE EVENT REPORT 2-88-013

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-1C22, September 1983.

Very truly yours,

J. L. Harness, General Manager
Brunswick Steam Electric Plant

MJP/bvc

Enclosure

cc: Mr. B. C. Buckley
Dr. J. N. Grace
BSEP NRC Resident Office

IE22
11