

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)
Automatic Reactor Scram on Low Level No. 1 Following Loss of Electrical Bus 1D

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)																																																																																				
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">OPERATING MODE (9)</td> <td style="width:15%;">THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)</td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> </tr> <tr> <td>POWER LEVEL (10)</td> <td>20.402(b)</td> <td>20.405(c)</td> <td><input checked="" type="checkbox"/></td> <td>50.73(a)(2)(iv)</td> <td>73.71(b)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>0 4 4</td> <td>20.405(a)(1)(i)</td> <td>50.36(c)(1)</td> <td></td> <td>50.73(a)(2)(v)</td> <td>73.71(c)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>20.405(a)(1)(ii)</td> <td>50.36(c)(2)</td> <td></td> <td>50.73(a)(2)(viii)</td> <td>OTHER (Specify in Abstract below and in Text, NRC Form 366A)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>20.405(a)(1)(iii)</td> <td>50.73(a)(2)(ii)</td> <td></td> <td>50.73(a)(2)(viii)(A)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>20.405(a)(1)(iv)</td> <td>50.73(a)(2)(iii)</td> <td></td> <td>50.73(a)(2)(viii)(B)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>20.405(a)(1)(v)</td> <td>50.73(a)(2)(iv)</td> <td></td> <td>50.73(a)(2)(ix)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>												OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)											POWER LEVEL (10)	20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)							0 4 4	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)(viii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)								20.405(a)(1)(iii)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(A)									20.405(a)(1)(iv)	50.73(a)(2)(iii)		50.73(a)(2)(viii)(B)									20.405(a)(1)(v)	50.73(a)(2)(iv)		50.73(a)(2)(ix)							
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LICENSEE CONTACT FOR THIS LER (12)

NAME M. J. Pastva, Jr., Regulatory 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 NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS
X	E A	Z I S I 2 0 2		N					

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)

On 4/2/86, at 2134, feeder breaker 1-AD7 from the Unit 1 unit auxiliary transformer to the unit 4160 Vac bus 1D automatically opened. Loss of bus 1D tripped the master and slave feeder breakers to Units 1 and 2 common emergency 4160 Vac bus E-1 and the E-1 emergency diesel generator automatically started and reenergized E-1. Loss of bus 1D also caused loss of operating Unit 1 reactor condensate pumps 1A and 1C, condensate booster pump 1B, and feedwater heater drain pumps 1A and 1C. Reactor level decreased and on 4/2/86, at 2135, while at 47% power, an automatic reactor scram and primary containment isolations Groups 2, 6, and 8 occurred on low level No. 1. Bus 1D was reenergized shortly thereafter and a scram recovery was carried out. The Reactor Condensate System was utilized to control reactor level. At the time of this event, Unit 2 was in a refuel/maintenance outage.

An extensive investigation was unable to reveal a definitive cause of the 1-AD7 feeder breaker trip. Electrical component problems were identified during the investigation. Although no definite correlation was found between the problems and the breaker trip, a potential cause of the event was evaluated as resulting from a malfunction induced by a dc ground or a failure of the 27-UX (bus undervoltage device). To address these concerns, repairs were made to clear the ground alarms prior to subsequent startup and the 27-UX device was monitored to verify its proper operation. Other corrective actions were appropriately taken to resolve remaining identified problems.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		8 6	-- 0 1 0	-- 0 0	0 2	OF	0 3

TEXT (If more space is required, use additional NRC Form 365A's) (17)

On April 2, 1986, at 2134, feeder breaker 1-AD7 from the Unit 1 unit auxiliary transformer (UAT) to the unit 4.16K Vac bus 1D automatically opened to deenergize the bus. Loss of bus 1D deenergized Units 1 and 2 common emergency 4.16K Vac bus E-1 which resulted in a loss of power to the following Units 1 and 2 E-1 loads:

Unit 1

- Conventional Service Water (CSW) Pump Motor 1B
- Nuclear Service Water Pump Motor 1A
- Residual Heat Removal (RHR) Pump Motor 1C
- RHR Service Water Pump Motor 1C
- Reactor Core Spray Pump Motor 1A
- Control Rod Drive Pump Motor 1A

Unit 2

- CSW Pump Motor 2C
- RHR Service Water Pump Motor 2C
- RHR Pump Motor 2C

Following deenergization of E-1, the bus emergency diesel generator (DG No. 1) automatically started and reenergized E-1. Loss of bus 1D also resulted in loss of power to the following: Reactor Protection System motor generator (MG) set 1A (due to the loss of E-1), feedwater condensate pumps 1A and 1C, feedwater condensate booster pumps 1A and 1C, feedwater heater drain pumps 1A and 1C, and main turbine condenser circulating water pumps 1B and 1D. Loss of condensate pump 1C caused condensate booster pump 1B to trip which resulted in the tripping of the operating unit steam-driven reactor feed pump 1B. At the time, the other unit steam-driven reactor feed pump 1A was under equipment clearance. Reactor level decreased to the low level (LL) No. 1 setpoint and an automatic reactor scram occurred on April 2, 1986, at 2135. In addition, primary containment isolations Groups 2, 6, and 8 occurred due to the LL No. 1. Shortly after the scram, the unit main generator tripped resulting in automatic closure of the feeder breaker 1-AD5 to bus 1D from the unit startup auxiliary transformer (SAT). At the time of this event, Unit 1 was operating at approximately 44% power, and Unit 2 was in a refueling/maintenance outage.

A reactor scram recovery was carried out in accordance with procedure. Reactor level was controlled through use of the Reactor Condensate System. On April 3, 1986, at 0027, the unit was placed into cold shutdown.

Following repowering of bus 1D from the SAT, an attempt to separate DG No. 1 from bus E-1 revealed the DG could not be disengaged. A preliminary investigation revealed auxiliary position switch device 52S had failed to change state when the SAT 1-AD5 feeder breakers to bus 1D closed. The trip of UAT feeder break 1-AD7 along with the failure of 52S device thereby resulted in the DG No. 1 start and bus tie logic sensing that bus 1D was deenergized.

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Consequently, DG No. 1 could not be secured. The device actuation crank was manually positioned, and on April 3, 1986, at 0330, DG No. 1 was separated from bus E-1 and returned to standby. Inspection of the 52S device showed the switch operating link/tie bar operating crank connector stud had become disengaged from the crank and prevented the crank from operating the device when SAT feeder breaker 1-AD5 closed. This is attributed to the connector stud fastening nut unthreading from the stud, which then allowed the stud to disengage from the device crank. The investigation was unable to determine when or under what circumstances the 52S device crank connector stud fastening nut became unfastened.

An extensive investigation of the UAT 1-AD7 breaker to bus 1D trip did not reveal the cause of the trip. Areas covered by this investigation include the following: electrical switchgear and breaker component inspections, design and function of electrical bus monitoring and trip function instrumentation, and the consideration of possible component failures which could have led to a trip of the breaker. This investigation also covered identification and repair of dc grounds.

The subject 52S auxiliary switch, ITE Imperial Corp. Type L2, was appropriately repaired, tested, and returned to service. Breaker auxiliary switch and position switches for the following Units 1 and 2 plant 4.16 kV buses were inspected for potential problems which may affect operability of the switches: 1B, 1C, 1D, 2B, 2C, 2D, common A, common B, E-1, E-2, E-3, and E-4. Based on the results of the inspections, preventive maintenance was performed to resolve problems which could lead to failures similar to that experienced with the subject 52S device. Work Request/Job Orders have been initiated to resolve other minor problems identified during this inspection. In addition, preventive maintenance procedures relative to breaker compartment checkouts of ITE manufactured 4.16 kV switchgear will be appropriately revised to help reduce the probability of future similar auxiliary switch and position switch failures.

Although no definite cause of failure could be determined, potential causes were identified with some dc grounds or the improper actuation of the 27-UX (bus undervoltage device) relay. Activities necessary to clear the dc ground alarm were performed prior to startup and the proper functioning of the 27-UX device was verified during bus transfer during the startup.



Carolina Power & Light Company

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

May 2, 1986

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SERIAL: BSEP/86-0583

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 1-86-010

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. K. Dietz, General Manager
Brunswick Steam Electric Plant

MJP/jc

Enclosure

cc: Dr. J. N. Grace

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