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 4

TITLE (4) Inadequate Logic System Functional Testing of the Units 1 and 2 Common AC Emergency Buses' Degraded and Under-Voltage Relays and Loss of Emergency Bus E-1

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 1	0 8	8 5	8 5	—	0 0 3	— 0 0	0 2	0 7	8 5	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 8 8	20.402(b)		20.406(c)	X	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)		50.36(c)(1)	X	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 - 2 3 1 5

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)

		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 1-8-85, it was determined that adequate surveillance testing procedures did not exist to functionally verify operability of degraded voltage and loss of voltage actuation relay circuitry on Units 1 and 2 common emergency ac electrical E-buses 1-4. The applicable technical specification (T/S) to these relays is T/S 4.3.3.2. Standing instructions to trip the master-slave feeder breakers of the subject E-buses on bus degraded voltage and to trip any operating unit Residual Heat Removal System or Core Spray System pump on loss of power to the subject F buses ware implemented. Also, special procedures were developed to functionally verify operability of the concerned logic.

On 1-10-85, at 1318, while preparing to perform the special procedure (a logic system functional test) on the degraded voltage relays of E-bus E-1, the master-slave feeder breakers to the bus automatically opened. The emergency bus diesel generator reenergized E-1 within ten seconds. Unit 1 Group 3 and 6 isolations occurred. Within 32 minutes, the master-slave feeder breakers to E-1 were reclosed.

At the time of this procedural deficiency discovery and the loss of E-1, Units 1 and 2 were operating at respective power levels of 88 and 99 percent.

IE 22
1/1

NRC Form 366
(9-83)

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

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

On January 8, 1985, a plant On-Site Nuclear Safety group review of various logic system functional test procedures revealed that procedures did not exist to functionally verify the operability of degraded voltage and loss of voltage actuation relay circuitry on the Units 1 and 2 common emergency ac electrical E-buses 1-4. The surveillance requirement is referenced in Technical Specification 4.3.3.2. Procedures existed which proved operability of the degraded voltage relays (27 DVA, B, and C) for each E-bus and the breaker trip coil; however, procedures did not exist to test the instantaneous auxiliary tripping relay device, 94, located in the logic trip system. In addition, procedures did not exist to test the E-buses 1-4 undervoltage relays, 27/59 E's, to show the E-bus input to the RHR and core spray pump trip circuitry. At the time, Units 1 and 2 were operating at respective power levels of 88 and 99 percent.

Following this determination, plant standing instructions were implemented to establish continuous monitoring of the subject E-bus voltages. These instructions specified manual tripping of the master-slave feeder circuit breakers to the buses if the bus voltages decreased to less than 3750 Vac for greater than ten seconds. In addition, plant standing instructions were implemented and plant equipment caution tags were affixed requiring minimizing use of plant Residual Heat Removal (RHR) System and Core Spray System pumps and to manually trip, within ten seconds, any operating RHR or Core Spray System pump in the event of a loss of power to the associated E-bus.

Plant special procedures were developed, approved, and performed which adequately tested the subject relay logic circuitry. Results of the tests showed the logic circuitry was functioning properly and requirements of Technical Specification 4.3.3.2 were satisfied.

A review of prior plant events relative to the plant E-buses revealed that, within the last three previous years, the E-bus 27 DV relay logic circuitry has performed satisfactorily when challenged. The events describing these challenges are described in LER 1-84-16 involving E-bus E-3, LER 2-84-2 involving E-bus E-4, and LER 1-82-72 involving E-buses E-1 and E-2.

The subject procedural deficiencies are attributed to insufficient management and procedural controls to ensure technical adequacy of the subject logic system functional tests. In 1979, it was recognized load-shedding logic of the plant E-buses 1-4 should be functionally tested. Appropriate plant periodic test procedures were revised to incorporate steps to provide functional testing of load-shedding relay logic circuitry. However, during the subject procedural revision, testing of the E-bus load-shedding capability relative to the units' RHR and Core Spray Systems was not taken into account.

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

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

It was determined the risk of possible plant equipment damage to the RHR and the Core Spray Systems resulting from such testing was unacceptable. Consequently, testing of the RHR and Core Spray System 27/59 E relay logic circuitry was omitted from plant test procedures. Sufficient guidelines and controls did not exist at that time to ensure required testing was promptly implemented through revisions to existing plant procedures or by development of new appropriate plant procedures. In 1982, reference LER 1-82-72, it was determined that Technical Specification required surveillance of E-bus degraded and undervoltage relays was not being performed. This finding prompted a review of Technical Specification and associated plant periodic test (PT) procedures. However, this review did not encompass verification of sufficient procedural overlap of multiple plant PT procedures to meet system logic functional testing requirements.

A comprehensive program has been developed which will ensure the technical adequacy of existing and future procedures relative to logic system functional testing. This corrective action is embodied within the Maintenance Surveillance Test (MST) procedure rewrite effort which addresses the following key elements:

1. The scope is defined to assess and rewrite logic system functional tests for instrument-related requirements identified with the technical specification.

2. The MST program provides explicit instructions relative to the development, technical content, and comprehensiveness of the associated procedures.

3. The MST program provides for the development of administrative hierarchy procedures which will sustain the quality of existing procedures and provide for the incorporation of new procedures associated with future plant modification.

The following scheduled commitments are associated with this corrective action:

   a. The MST program is in progress with an expected completion date of October 31, 1985.

   b. The MST Writer's Guide relative to channel system testing is complete.

   c. The MST Writer's Guide relative to logic system functional tests is expected to be completed by March 1, 1985.

4. Appropriate plant surveillance test procedures will be revised to include logic system functional testing of the subject logic circuits. This action is expected to be completed by June 7, 1985.

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

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

On January 10, 1985, at 1318, while making preparations to perform a logic system functional test of degraded voltage relays of E-bus E-1, the master-slave feeder circuit breakers to the bus automatically opened. Unit 1 Group 3 and 6 primary containment isolations occurred. The Unit 1 main condenser off-gas steam jet air ejector 1A tripped. The Unit 2 primary containment drywell coolers automatically shut down. The Units 1 and 2 common augmented off-gas treatment bypass valve automatically opened. Within ten seconds, emergency diesel generator (DG) No. 1 automatically started and reenergized E-1. The affected Units 1 and 2 systems were restarted and returned to service. The incurred loss of the off-site power supply to E-1 resulted in a loss of 4160 Vac power supply to the following Units 1 and 2 emergency bus E-1 loads:

Unit 1	Unit 2
Nuclear Service Water Pump Motor 1A	CSW Pump Motor 2C
Conventional Service Water (CSW) Pump Motor 1B	RHR Service Water Pump Motor 2C
Residual Heat Removal (RHR) Pump Motor 1C	RHR Pump Motor 2C
Reactor Core Spray Pump Motor 1A	
RHR Service Water Pump Motor 1C	
Control Rod Drive Pump Motor 1A	

Within 32 minutes of the event, the master-slave feeder circuit breakers to E-1 were reclosed and DG No. 1 was secured and returned to standby. At the time of this event, Units 1 and 2 were operating at respective power levels of 88 and 99 percent.

The E-1 bus loss of preferred power source resulted from an actuation of the bus instantaneous auxiliary tripping relay, device 94. While disconnecting terminal wires on the 94 device, trip contacts in the device inadvertently closed. The terminal wires were being disconnected to allow actuation of the 94 coil without tripping the master and slave feeder breakers. As a result, the slave circuit breaker and its corresponding master circuit breaker to E-1 automatically opened. The inadvertent closure of the trip contacts in the 94 device is attributed to inherent sensitivity of the device. During development of the special test procedure utilized for the subject testing, the sensitivity of the 94 device was not realized.

Appropriate revisions were made to the involved special test procedure to eliminate physical contact with the 94 device and the subject testing was satisfactorily completed.

CP&L

Carolina Power & Light Company

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

February 7, 1985

FILE: B09-13510C
SERIAL: BSEP/85-0172

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 1-85-003

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/mcg/LETCG2

Enclosure

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

IE22
1/1