CP&L

Carolina Power & Light Company

Brunswick Nuclear Project
P. O. Box 10429
Southport, N.C. 28461-0429
May 2, 1991

FILE: B09-13510C 10CFR50.73
SERIAL: BSEP/91-0195

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

BRUNSWICK STEAM ELECTRIC PLANT UNIT 2
DOCKET NO. 50-324
LICENSE NO. DPR-62
LICENSEE EVENT REPORT 2-91-002

Gentlemen:

In accordance with Title 10 of 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 submitted in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,

J. W. Spencer, General Manager
Brunswick Nuclear Project

WRT/

Enclosure

cc: Mr. S. D. Ebneter
Mr. N. B. Le
BSEP NRC Resident Office

IE22 1/1

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Brunswick Steam Electric Plant Unit 2	05000324	01 OF 04

TITLE (4) IRM D SPIKES UPSCALE DURING DC GROUND ISOLATION PROCEDURES CAUSING A FULL RPS TRIP

EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR		SEQ. NO.		REV. NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	02	91	91	-	002	-	00	05	02	91		

OPERATING MODE (9)	4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)							
			20.402(b)		20.405(c)	X	50.73(a)(2)(iv)		73.71(b)
POWER LEVEL (10)	000		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 and Text)
			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
WILLIAM R. TOLER, REGULATORY COMPLIANCE SPECIALIST	(919) 457-2701

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)

At approximately 0959 hours (EST) on April 2, 1991, an unexpected trip in Reactor Protection System (RPS) Trip System B, coincident with an expected trip in RPS Trip System A, was incurred and a consequential full RPS trip was received. The expected trip was incurred when power to the automatic scram logic of RPS Trip System A was deenergized during dc ground isolation procedures. The full RPS trip was reset shortly thereafter.

The direct cause of the unexpected trip was Intermediate Range Neutron Monitoring (IRM) channel D spiking upscale. A signal noise, created by the RPS Trip System A scram relays deenergizing, was induced into the IRM D detector circuitry. IRM channel D was declared inoperable and a Work Request/Job Order (WR/JO 91-AGPA1) was initiated to troubleshoot IRM D for incoming noise and repair as necessary. Metal Oxide Varistors (MOVs) have been installed across the coils of the associated scram relays on a temporary basis until permanent installation can be effected. MOVs have proven to be effective in suppressing high voltage spiking. Additional corrective action included initiating an Adverse Condition Report (ACR B91-177) to assess the performance of IRMs.

The safety significance of this event was minimal as control rods were fully inserted in the core prior to the full RPS trip. Previous similar occurrences have been reported in LERs 1-84-034, 1-85-031, 1-85-045, 2-86-014, 1-87-010, 2-88-009 and 1-89-002.

EVENT

Intermediate Range Neutron Monitoring (IRM) channel D spiked upscale during performance of dc ground isolation procedures incurring an unexpected trip in Reactor Protection System (RPS) Trip System B, coincident with an expected trip in RPS Trip System A, resulting in a full RPS trip.

INITIAL CONDITIONS

Unit 2 was in cold shutdown with all control rods fully inserted. The shutdown cooling mode of the Residual Heat Removal System (RHR loop A) was maintaining the reactor temperature at approximately 119 degrees fahrenheit. Plant electricians and the Battery & Distribution System engineer were assisting operations personnel with dc ground hunting in accordance with Operating Procedure OP-51. Procedures that would incur an expected trip in RPS Trip System A were in progress.

DESCRIPTION OF EVENT

At approximately 0959 hours (EST) on April 2, 1991, an unexpected trip in RPS Trip System B, coincident with an expected trip in RPS Trip System A, was incurred and a consequential full RPS trip was received. At this time, circuit breaker 19 on 125V DC Distribution Panel 12A, located in the Control Room backpanel area, was opened (deenergized) to perform a ground check on the 2A 125/250V DC switchboard. This distribution panel (Circuit breaker 19) supplies power to the automatic scram logic (channels A1 & A2) of RPS Trip System A. Since the RPS is a fail-safe system, in that any discontinuity (deenergized condition) in a trip system causes a trip in that system, a trip in RPS Trip System A was expected upon opening circuit breaker 19. Opening this breaker should have only incurred a trip in RPS Trip System A; however, a simultaneous unexpected trip in RPS Trip System B was also incurred when circuit breaker 19 was opened. It was suspected that IRM channel D spiking upscale was the cause of the unexpected trip. This unexpected trip in Trip System B, coupled with the expected trip in Trip System A, resulted in the full RPS trip. The full RPS trip was reset shortly thereafter.

INVESTIGATION OF EVENT

At 1035 hours (EST) on April 2, 1991, following a pre-evolutionary briefing, the circumstances of the event were duplicated with identical results achieved. It was verified that the IRM D local trip light was received and that there was an IRM upscale alarm in RPS Trip System B. IRM channel D was declared inoperable and a Work Request/Job Order (WR/JO 91-AGPA1) was subsequently initiated for troubleshooting and repair of IRM D.

Troubleshooting determined that noise is generated when RPS (Trip Systems A & B) scram relays (2-C72-K14A through H) deenergize. A high voltage spike is created by the collapsing field when the coil is deenergized. This was also the case when the scram reset relays (2-C72-K19A through D) were reset. In fact, noise spikes were considerably higher on the IRM chart recordings for the scram reset relays. The noise spike generated when the expected trip in RPS Trip System A occurred was induced into the input cable to the J1 connector of IRM Drawer channel D. This signal noise was coupled through cabling common to the RPS Trip System A cabinet (panel P609) and the Radiation Monitoring System cabinet (panel P606). Both of these cabinets are located in the Control Room backpanel area.

It was also noted during troubleshooting that Metal Oxide Varistors (MO"s) were not installed across the coils of these relays. Previous experience with MOVs installed on the Unit 2 Average Power Range Neutron Monitoring (APRM) K12 scram relays has proven that MOVs are successful in reducing the amplitude of voltage spikes. MOVs are designed such that they do not conduct current at the operating voltage of the relay. Thus, they will not interfere with the normal operation of the relays. MOVs resist current flow in the 120 VAC range so that when energized, current will flow through the coil. When the coil is deenergized, a high voltage is created which the MOV will shunt. During troubleshooting, MOV devices installed across the subject relay coils were effective in suppressing the high voltage spiking. Based on troubleshooting and successful past experience, it was determined that MOVs should be installed across the coils of relays 2-C72-K14A through H and 2-C72-K19A through D.

CAUSE OF EVENT

The direct cause of the unexpected trip in RPS Trip System B, and consequential full RPS trip, was IRM D spiking upscale to its trip setpoint. A spurious electronic noise spike was induced into the IRM D channel circuitry, through the RPS Trip System A scram relays deenergizing, when circuit breaker 19 on 125V DC Distribution Panel 12A was opened. The high voltage spike was created by the collapsing field when the associated scram relay coils deenergized.

CORRECTIVE ACTION

(Recovery Action) The full RPS trip was reset after circuit breaker 19 on 125V DC Distribution Panel 12A was closed.

(Compensatory Action) Metal Oxide Varistors (MOVs) have been installed across the coils of scram relays (2-C72-14A through H) and scram reset relays (2-C72-K19A through D) on a temporary basis until a plant modification for permanent installation can be developed. Permanent installation is expected to be completed by February 28, 1992.

(Remedial Action) Troubleshooting IRM channel D for incoming noise and necessary repairs is in progress per WR/JO 91-AGPA1. It is expected that IRM channel D will be returned to operable status prior to unit startup.

(Corrective Action To Preclude Repetition) An Adverse Condition Report (ACR B91-177) has been issued to Technical Support to assess the performance of IRMs (as well as Source Range Monitors). Response to ACR B91-177 is expected by May 20, 1991.

ASSESSMENT OF EVENT

The RPS is designed to initiate protective action when conditions arise that threaten the integrity of the fuel or the nuclear system process barrier. The RPS will automatically scram the reactor when an out-of-tolerance variable (or channel failure) is sensed in each of the two trip systems. In the event described in this report, the RPS responded as designed (full RPS trip) when trips were incurred in Trip System A and B.

The safety significance of this event was minimal as control rods were fully inserted in the core prior to the full RPS trip. Also, the upscale trip of IRM D occurred in a conservative fashion with a full RPS trip initiation.

This event is reportable per 10CFR 50.73 (a)(2)(IV) because an unplanned actuation of the RPS occurred. Specifically, IRM channel D spiked upscale causing RPS Trip System B to incur an unexpected trip and consequential full RPS trip. Previous similar occurrences, involving spurious electronic noise being induced in the IRM circuitry, have been reported in LERs 1-84-034, 1-85-031, 1-85-045, 2-86-014, 1-87-010, 2-88-009 and 1-89-002.

EIIS CODES

SYSTEM/COMPONENT	EIIS
Intermediate Range Neutron Monitor	IG
Reactor Protection System	JC
DC Distribution Panel	EJ/PL
Control Rods	AA
Residual Heat Removal	BO