CP&L

Carolina Power & Light Company

Brunswick Nuclear Project
P. O. Box 10429
Southport, N.C. 28461-0429
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U.S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DPR-71
LICENSEE EVENT REPORT 1-91-005

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

bcc: Mr. R. M. Coats
Mr. C. W. Crawford
Mr. A. B. Cutter
Mr. S. D. Floyd
Ms. R. S. Gatewood
Mr. W. P. Guarino
Mr. M. D. Hill
Mr. M. A. Jones
Mr. B. P. Leonard
Mr. A. M. Lucas
Mr. M. R. Oates
Mr. H. A. Pollock
Mr. J. J. Sheppard
Mr. W. W. Simpson
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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 1	05000325	01 OF 05

TITLE (4) NONCONSERVATIVE SETPOINT FOR HIGH STEAM FLOW ISOLATION INSTRUMENT RESULTS IN MANUAL ISOLATION OF HPCI.

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
02	27	91	91	-	005	-	00	03	28	91		

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)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
POWER LEVEL (10)	35		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 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 2306 hours EST on February 27, 1991, the High Pressure Coolant Injection (HPCI) Steam Supply Inboard Isolation Valve (1-E41-F002) and the Suppression Pool Suction Valve (1-E41-F042) were manually closed. This action was required since the minimum number of operable channels was not satisfied for HPCI high steam flow trip system B. The HPCI system was declared inoperable at the time of isolation pursuant to the HPCI Technical Specification limiting Condition for Operation (LCO).

The HPCI system was manually isolated when the existing setpoint for Steam Line High Flow instrument, 1-E41-PDTS-N005-2, was determined to have been established in the nonconservative direction (equivalent to approximately 330% steam flow). Technical Specifications require that the HPCI steam line isolate at </= 300% steam flow.

The nonconservative setpoint was caused from less than adequate allowance in an interim setpoint (implemented by Plant Modification 89-055) to account for error induced by the formation of "loop seals". The subject differential pressure transmitter sensing line had been improperly routed causing the formation of loop seals. The routing problem was corrected during the recently completed refueling outage and a new isolation setpoint was calculated. 1-E41-PDTS-N005-2 was satisfactorily recalibrated by 0856 hours EST on February 28, 1991. HPCI was subsequently placed in standby at approximately 1136 hours EST on the same date. The safety significance of this event is considered minimal. A previous occurrence is reported in LER 1-88-014.

EVENT

The High Pressure Coolant Injection system (EIIS/BJ) was declared inoperable when the Steam Supply Inboard Isolation Valve (EIIS BJ/ISV) and the Suppression Pool Suction Valve (EIIS/BJ/ISV) were manually closed. This action was taken when the setpoint of one of the two high steam flow isolation instruments was determined to be nonconservative.

INITIAL CONDITIONS

Unit 1 was operating at 35% power. Startup testing was ongoing following a 22 week scheduled refueling outage. The regularly scheduled, post outage High Pressure Coolant Injection (HPCI) System Operability Test (PT-09.2) was in progress. HPCI/RCIC High Flow Instrument Line Reroute Plant Modification (PM 88-021) Acceptance Testing, to measure HPCI steamline elbow tap differential pressure in conjunction with PT-09.2, was complete. Performance data, obtained during the acceptance testing, had been gathered to be used as baseline data for calculating new 300% steam flow setpoints for the HPCI high steam flow instrumentation.

The Reactor Core Isolation Cooling System (EIIS/BN), Automatic Depressurization System, Core Spray (EIIS/BM), and the Residual Heat Removal/Low Pressure Coolant Injection (EIIS/BO) systems were operable and in standby readiness.

DESCRIPTION OF EVENT

At approximately 2108 hours EST on February 27, 1991, the Unit 1 operations Shift Foreman was notified by Technical Support personnel that the existing setpoint for HPCI Steam Line High Flow instrument (EIIS/BJ/PDT), 1-E41-PDTS-N005-2, (trip unit channel B) was determined to have been established incorrectly in the nonconservative direction (equivalent to approximately 330% steam flow). Trip unit channel B was subsequently declared inoperable pursuant to the Isolation Actuation Instrumentation Technical Specification Limiting Condition for Operation (LCO). Efforts to recalibrate 1-E41-PDTS-N005-2 were pursued; however, the channel could not be restored to operable status within the allowable two hours. At 2306 hours EST on February 27, 1991, the HPCI Steam Supply Inboard Isolation Valve (1-E41-F002) and the Suppression Pool Suction Valve (1-E41-F042) were manually closed. This action was required since the minimum number of operable channels was not satisfied for HPCI high steam flow trip system B. HPCI was declared inoperable at the time of manual isolation pursuant to the HPCI Technical Specification LCO.

INVESTIGATION OF EVENT

The HPCI system includes differential pressure transmitters that detect high steam flow conditions to the turbine. The differential pressure (dp) transmitters are connected by instrument sensing lines to an elbow tap in the associated steam line. The signals (calibrated to setpoints that relate steam mass flow rate to dp) from these transmitters generate an isolation signal at 300% normal flow. The 300% flow analytic limit for determining instrument setpoints is an historically accepted value selected to be above potential transient flow rates that can occur during system startup, but below the flow expected for a pipe break. Technical Specifications require that the HPCI steam line isolate at </= 300% steam flow. Trip units for the Unit 1 HPCI dp transmitters are 1-E41-PDTS-N004-2 (trip channel A) and 1-E41-PDTS-N005-2 (trip channel B).

A visual inspection of the instrument sensing lines for the HPCI and RCIC high steam flow dp transmitters had been performed on January 10, 1988, for Unit 2, and February 1, 1988, for Unit 1. These inspections were performed to substantiate what appeared, from reviewing the associated isometric drawings, to be "loop seals" at the piping elbow taps. Instrument drift problems with the Unit 2 dp transmitters led to the review of the isometric drawings. It was determined that several of the instrument sensing lines were improperly routed (high points in the lines) causing the formation of loop seals. The concern being that a compressible leg of vapor might form between the loop seal and the high point in the line, possibly, causing an error in the dp sensed by the pressure transmitter. On February 5, 1988, projects to reroute the instrument sensing lines were initiated. More conservative setpoints were established, by Engineering Evaluation Reports (EERs), to account for the potential offsets that could be caused by the improper instrument line routing. The revised setpoints were calculated using the same methodology as utilized initially during unit startup. These setpoints were established, on a temporary basis, until modifications could be implemented to reroute the affected lines. The old setpoint for 1-E41-PDTS-N005-2 (205 inches of water) was lowered to 141.75 inches of water.

On May 27, 1988, Technical Support personnel met with the NRC Resident Inspector to discuss concerns he had with the EERs that had been written because of the loop seal issue. The Resident Inspectors concern was that since some of the setpoints had been lowered to ensure that they were less than 300% flow, the old setpoints must have been above 300%. It was explained to the Resident Inspector that the setpoints were lowered to ensure conservatism and to ensure that instrument drift would not make the setpoint higher than 300%, not because they were thought to be above the 300% value. This concern led to an investigation (verified the setpoints utilizing a different methodology) to prove that the old setpoints were acceptable. During this investigation, it was discovered that the high steam flow instrumentation on the RCIC systems of Units 1 and 2 had been established in the nonconservative direction (greater than 300%) since unit startup. One of the two instruments on the Unit 2 HPCI system was also found with a nonconservative setpoint (see LER 1-88-014). As a result of this investigation, new temporary setpoints were established and the affected HPCI/RCIC trip units were readjusted. The setpoint for 1-E41-PDTS-N005-2 remained at 141.75 inches of water. Meanwhile, a plan was established to perform tests (special procedures) on the HPCI and RCIC systems to determine the actual elbow dp at 100% steam flow conditions and to extrapolate more realistic trip setpoints. This action was being taken because it was believed that the method used to calculate the new setpoints had been overly conservative. The special procedure for the Unit 1 HPCI system was completed on July 11, 1988. Brunswick Steam Electric Plant (BSEP) calculation, titled "High Steam Flow Setpoint Calculation", dated 2-8-89, was prepared and new setpoints were calculated for the HPCI/RCIC high steam flow instrumentation based on the special procedure test data. These new setpoints were established on a permanent basis by setpoint change Plant Modification (PM) 89-055 (completed on July 23, 1989). PM 89-055 was implemented on an interim basis until the instrument sensing lines could be corrected. The setpoint for Unit 1 HPCI Steam Line High Flow instrument 1-E41-PDTS-N005-2 was raised to 214 inches of water.

The HPCI dp transmitter instrument sensing lines were among the HPCI/RCIC high steam flow instrument lines that were rerouted by Plant Modification (PM) 88-021 during the recently completed Unit 1 refueling outage. This modification eliminated the high points (resulting in loop seals) in the Unit 1 HPCI/RCIC instrument sensing lines by rerouting the lines such that there was a constant downward slope from the elbow taps to the transmitters. After correcting the instrument line configurations, PM 88-021 Acceptance Testing acquired baseline data for calculating new dp values that correspond to the Technical Specification allowable values. For the 1-E41-PDTS-N005-2 trip unit, the new setpoint was calculated to be 174 inches of water. The setpoint (214 inches of water) implemented by Plant Modification 89-055 was determined to be in the nonconservative direction at this time. The other Unit 1 HPCI/RCIC high steam flow instrument setpoints were satisfactory.

CAUSE OF EVENT

The HPCI system was manually isolated when the existing setpoint for HPCI Steam Line High Flow instrument, 1-E41-PDTS-N005-2, was determined to have been established in the nonconservative direction. The nonconservative setpoint was caused from less than adequate allowance in the setpoint, implemented by Plant Modification 89-055 (completed on July 23, 1989), to account for possible error induced by the formation of loop seals.

CORRECTIVE ACTION

(Remedial Action) The differential pressure transmitter (E41-PDT-N005) sensing line has been rerouted by PM 88-021 on Unit 1 and a new isolation setpoint calculated using the data gathered during HPCI System Operability Testing. The 1-E41-PDTS-N005-2 trip unit was satisfactorily recalibrated by 0856 hours EST on February 28, 1991. HPCI was subsequently placed in standby at approximately 1136 hours EST on the same date.

(Compensatory Action) The instrument sensing line routing problem has not been corrected on Unit 2; therefore, a review of the high steam flow instrument setpoint data was performed. This review was necessary since the Unit 2 HPCI/RCIC setpoints were also recalculated based on the special procedure test data. Review of the data revealed two HPCI turbine runs were actually performed to measure steam line elbow dp in 1986. For RCIC, only one test was performed. Based on test data for both HPCI runs being consistent, and the instrument loop having the least potential for error (dp transmitter 2-E41-PDT-N005 does not have loop seals), it was determined there was no reason to question the adequacy of the current Unit 2 HPCI high steam flow instrumentation setpoints. Review of the special procedure test data for the RCIC high steam flow instrumentation did not reveal any specific reason to consider the existing setpoints nonconservative, therefore, no immediate actions were taken. However, since finding the setpoint for 1-E41-PDTS-N005-2 in the nonconservative direction does cast some doubt, it was determined that taking additional measurements would be prudent. This additional information would provide assurance that the existing setpoints calculated for the RCIC high steam flow instrumentation were conservative. It is expected these additional measurements will be obtained during a scheduled RCIC turbine run prior to May 29, 1991.

(Corrective Action To Preclude Repetition) Unit 2 HPCI/RCIC High Steam Flow Reroute Plant Modification 88-022 has been developed for rerouting the affected Unit 2 instrument sensing lines (see LER 1-88-014). This modification is currently planned for implementation in 1993; however, as a result of this event, an evaluation for inclusion during the upcoming refueling outage (B210R1) will be performed. The Unit 2 refueling outage is scheduled to commence on September 7, 1991.

EVENT ASSESSMENT

The significance of this event is considered minimal. The other Emergency Core Cooling Systems (ECCS) and RCIC were operable during the period HPCI was isolated. Although the Technical Specification value of 300% would have been exceeded, the nonconservative setpoint of the HPCI Steam Line High Flow instrument (1-E41-PDTS-N005-2) would have allowed isolation of the steam line during the design basis break. The isolation capability of HPCI was not eliminated, just delayed. The expected flow rate during pipe breaks is far in excess of the flow rate (approximately 330%) that 1-E41-PDTS-N005-2 would have actually tripped and isolated the HPCI system. A previous similar occurrence was reported in LER 1-88-014.