



Carolina Power & Light Company

Brunswick Nuclear Project
P. O. Box 10429
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JUN 22 1992

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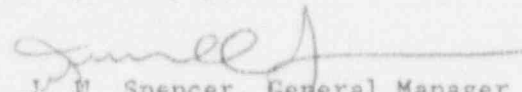
U.S. Nuclear Regulatory Commission
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BRUNSWICK STEAM ELECTRIC PLANT UNIT 1
DOCKET NO. 50-325
LICENSE NO. DRP-71
LICENSEE EVENT REPORT 1-94-015

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

ST/

Enclosure

cc: Mr. S. D. Ebnetter
Mr. R. H. Lo
BSEP NRC Resident Office

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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) Brunswick Steam Electric Plant
Unit 1

DOCKET NUMBER (2)
05000325

PAGE (3)

1

TITLE (4) RWCU Isolation Due to High Differential Flow Which Occurred During RWCU System Restoration

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
05	23	92	92	-	015	-	00	06	22	92	

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)									
04		20.402(b)		20.405(c)		X		50.73(a)(2)(v)		73.71(b)	
POWER LEVEL (10)		20.405(a)(1)(i)		50.36(c)(1)				50.73(a)(2)(v)		73.71(c)	
0		20.405(a)(1)(ii)		50.36(c)(2)				50.73(a)(2)(vi)		OTHER (Specify in Abstract and Text)	
		20.405(a)(1)(iii)		50.73(a)(2)(i)				50.73(a)(2)(vii)(A)			
		20.405(a)(1)(iv)		50.73(a)(2)				50.73(a)(2)(viii)(B)			
		20.405(a)(1)(v)		50.73(a)(2)(ii)				50.73(a)(2)(ix)			

LICENSEE CONTACT FOR THIS LER (12)

NAME Steve F. Tabor, Regulatory Compliance Specialist

TELEPHONE NUMBER

(919) 457-2178

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

EXPECTED SUBMISSION

MONTH

DAY

YEAR

YES (If yes, complete EXPECTED SUBMISSION DATE)

X

NO

DATE (15)

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

On May 23, 1992, at approximately 1249 hours (EDT), the Reactor Water Cleanup (RWCU) system Outboard Isolation Valve, 1-G31-P004, isolated during return of the RWCU system to service. Investigation of the event has determined that an actual high differential flow condition was created at pump start. The resulting high differential flow instrumentation signal exceeded the high differential flow steam leak detection instrumentation RWCU isolation trip setpoint. Consequently, following an approximate 38 second time delay, the 1-G31-P004 isolation logic was actuated and the valve closed per design. Efforts to stabilize system flow following pump start and prior to system isolation were not successful due to insufficient pump back pressure. Insufficient pump back pressure existed because the pertinent procedure did not require closure of the discharge Orifice Bypass Valve prior to RWCU pump start while in the reject lineup. The RWCU system operating procedure has been revised to prevent recurrence.

This event is of minimal safety significance in that the affected valve operated in accordance with its safety design function, which is to isolate primary containment when monitored variables exceed preselected operational limits. Inadvertent valve closure is in the safe direction and does not pose a safety concern. Additionally, prior to and during the event Reactor vessel level control was being accomplished by Control Rod Drive system injection and batch processing of vessel inventory to Radwaste via the B loop shutdown cooling mode of the Residual Heat Removal system. Previous similar events involving high differential flow isolations have been reported in Licensee Event Reports 2-88-003, 2-88-010, 2-90-011, and 2-91-010.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)
Brunswick Steam Electric Plant Unit 1	05000325	YEAR		SEQ NO.		2
		92		015		

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

INITIAL CONDITIONS

On May 21, 1992, at approximately 0400 hours (EDT), the RWCU system was shutdown and placed under clearance to replace the RWCU Outboard Isolation valve, 1-G31-F004, torque switch components. On May 22, 1992, following completion of the valve maintenance, RWCU system filter backflushing and piping/differential flow instrumentation fill and vent procedures were initiated in preparation for system restoration.

On May 23, 1992, the Unit 1 reactor was in cold shutdown. The shutdown cooling mode of the Residual Heat Removal (RHR) system (loop B) was maintaining appropriate reactor coolant temperature. The Reactor Water Cleanup (RWCU) system was shutdown. Reactor vessel level control was being accomplished by Control Rod Drive system injection and batch processing of vessel inventory to Radwaste via the B loop shutdown cooling mode of the Residual Heat Removal (RHR) system.

EVENT NARRATIVE

On May 23, 1992, at approximately 0700 hours, filling and venting the RWCU system was complete. At approximately 0905 hours, while performing the RWCU system return to service operating procedure, the 1A RWCU pump breaker tripped during the initial pump start attempt. A Work Request Job Order was initiated to investigate and resolve the cause of the 1A RWCU pump breaker trip. In an effort to continue RWCU system restoration, at approximately 0905 hours, the 1B RWCU pump was started; however, due to what the involved Operations personnel believed to be low flow, the 1B pump tripped immediately following the pump start attempt. Based on experience with efforts to prevent pump trip due to low flow, Operations performed a gravity drain alternately to Radwaste and the Main Condenser. Additionally, Maintenance vented the RWCU pump flow transmitter, 1-G31-FT-N036. At 1249 hours, after partially closing the RWCU Reject Flow Control Valve, 1-G31-F033, the 1B RWCU pump was restarted. Approximately 38 seconds after initiation of the pump start, the RWCU Outboard Isolation valve, 1-G31-F004, began to close and the 1B RWCU pump tripped. By design, closure of the 1-G31-F004 and actuation of associated limit switches generated a pump trip signal to the 1B RWCU pump control logic. The RWCU Inboard Isolation valve, 1-G31-F001, remained open. At approximately 1306 hours, Operations completed shutdown of the RWCU system per plant operating procedure.

On May 23, 1992, an investigation to determine the cause of the unplanned isolation was initiated. The investigation effort included testing of the RWCU differential flow steam leak detection instrumentation and associated annunciator logic and a review of RWCU system parameters as recorded by the Emergency Response Facility Information System (ERFIS) computer data base. Testing of the differential flow instrumentation and associated annunciator logic confirmed that the isolation logic system was functioning properly after the event. A review of the ERFIS data revealed that an actual high differential flow condition was created when the 1B RWCU pump was started. During the period from the start of the pump to the pump trip, the sensed RWCU system inlet flow was verified to be between 222-233 gpm while the reject flow was believed to be approximately 75 gpm. This flow differential is greater than the 43 gpm isolation setpoint. Per design, the RWCU high differential flow steam leak detection instrumentation alarm units actuated due to the high differential flow. The alarm units triggered the RWCU inboard and outboard isolation valve isolation timers. Due to allowable tolerances between the isolation timer setpoints, the isolation of one of the RWCU system isolation valves may occur without the isolation of the other valve. Setpoint verification of each of the isolation timers associated with the inboard and outboard isolation valves confirmed that both timers were within acceptable setpoint tolerance. However, in this case the timer associated with the 1-G31-F004 valve isolation logic timed out approximately 1.8 seconds before the 1-G31-F001 timer. Consequently the 1-G31-F004 isolation command signal was generated and the valve closed which caused the pump to trip prior to actuation of the 1-G31-F001 valve isolation command signal.

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TEXT CONTINUATION**

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FACILITY NAME (1)	DOCKET NUMBER (2)	LIC. NUMBER (5)				PAGE (3)
Brunswick Steam Electric Plant Unit 1	05000325	YEAR	SEQ NO.	REV NO.	3	
		92	015	00		

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

On May 25, 1992, following verification that the RWCU isolation logic was functioning properly, preparations were made to return the RWCU system to service. The RWCU system was realigned to support system startup and instrumentation was installed to monitor the RWCU differential flow circuit response. The additional monitoring data would be used to determine the specific cause of the transient. Additionally, the Technical Support RWCU System Engineer was stationed in the Control Room to support Operations personnel during the system return to service. At approximately 1806 hours, the RWCU system return to service was initiated. Immediately following start of the 1B RWCU pump, in a manner very similar to the isolation event, system differential flow increased to a level above the high differential flow steam leak detection setpoint. In an effort to lower differential flow, system reject flow was increased by throttling open the RWCU Reject Flow Control valve, 1-G31-F033. Although high differential flow decreased to a level below the isolation logic actuation setpoint, total system flow had increased to approximately 225 gpm. In an effort to lower total system flow to approximately 100 gpm, the Orifice Bypass Valve, 1-G31-F031 was throttled closed. While attempting to stabilize system flow, the pump low flow setpoint was reached causing the 1B RWCU pump to trip. At approximately 1844 hours, the RWCU system was shutdown. At approximately 2000 hours, the RWCU system return to service operation was re-initiated. Based on system response to the previous effort to reduce differential flow prior to starting the 1B RWCU pump, the Orifice Bypass valve, 1-G31-F031, was closed to provide increased pump back pressure. Increased back pressure was determined necessary to properly pressurize the pump discharge piping during the system startup process. To further ensure proper pump back pressure, the Control Operator made a conscious effort to reduce the time required to achieve system flow to the vessel. Following pump start, proper RWCU system flow was achieved and the system successfully returned to service.

CAUSE OF EVENT

The high differential flow condition which resulted in actuation of the high differential steam leak detection instrumentation and isolation of the 1-G31-F004 valve was caused by inadequate pump back pressure. The RWCU operating procedure allowed opening of the Orifice Bypass Valve, 1-G31-F031, prior to pump start. With the 1-G31-F031 valve open prior to pump start, adequate back pressure was not placed on the RWCU pump. A lack of pump back pressure does not support prompt pressurization of the pump discharge piping and consequently timely equalization of RWCU system inlet and outlet flow does not occur.

CORRECTIVE ACTIONS

Revisions to the Units 1 and 2 RWCU System Operating Procedures, 1/2-OP-14, have been performed to ensure closure of the Orifice Bypass Valve, 1-G31-F031, prior to RWCU pump start while in the reject line up.

SAFETY ASSESSMENT

This event is of minimal safety significance. The RWCU outboard isolation valve functioned in accordance with the intended safety design function which is to isolate primary containment when monitored variables exceed preselected operational limits. Inadvertent valve closure was in the safe direction and did not pose a safety concern. Reactor vessel level control was being accomplished by Control Drive System injection and batch processing of vessel inventory to the Radwaste system via the B loop shutdown cooling mode of RHR.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)				PAGE (3)	
Brunswick Steam Electric Plant Unit 1	05000325	YEAR		SEQ NO.		REV NO.	4
		92		015		00	

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

PREVIOUS SIMILAR EVENTS

Previous similar events involving high differential flow isolations have been reported in Licensee Event Reports 2-88-003, 2-88-010, 2-90-011, and 2-91-010.

EIIS COMPONENT IDENTIFICATIONSystem/ComponentEIIS Code

RWCU
1-G31-FO04
PCIS
RHR

CE
CE/ISV
JM
BO