

# CP&L

Carolina Power & Light Company

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

October 1, 1990

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SERIAL: BSEP/90-0670

10CFR50.73

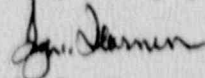
U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555

BRUNSWICK STEAM ELECTRIC PLANT UNIT 2  
DOCKET NO. 50-324  
LICENSE NO. DPR-62  
SUPPLEMENTAL LICENSEE EVENT REPORT 2-90-004

Gentlemen:

In accordance with Title 10 of the Code of Federal Regulations, the enclosed Licensee Event Report is submitted. The original report fulfilled the requirement for a written report within thirty (30) days of a reportable occurrence and was submitted in accordance with the format set forth in NUREG-1022, September 1983.

Very truly yours,



J. L. Harness, General Manager  
Brunswick Nuclear Project

TMJ/

Enclosure

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

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PDR ADOCK 05000324  
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**LICENSEE EVENT REPORT (LER)**

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 (F-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  
Brunswick Steam Electric Plant Unit 2

DOCKET NUMBER (2)  
0 5 0 0 0 3 2 4

PAGE (3)  
1 OF 0 4

TITLE (4)  
Manual Reactor SCRAM Due to Failure of Safety Relief Valve "G" to Close During Startup Testing

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)
03	13	90	90	004	02	10	01	90		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9) 2

POWER LEVEL (10) 0 0 7

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(e)	<input checked="" type="checkbox"/> 20.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.35(e)(1)	<input type="checkbox"/> 20.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.35(e)(2)	<input type="checkbox"/> 20.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 20.73(a)(2)(i)	<input type="checkbox"/> 20.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.73(a)(2)(ii)	<input type="checkbox"/> 20.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.73(a)(2)(iii)	<input type="checkbox"/> 20.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: Terri M. Jones, Specialist - Regulatory Compliance

TELEPHONE NUMBER: 9 1 9 4 5 7 - 2 0 3 9

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
X	AD	RV	T020	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15): 0 3 1 9 9 1

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

At 0536 on March 13, 1990, a manual scram was initiated due to the failure of safety/relief valve (SRV) B21-F013G to close during startup testing. Reactor power was approximately 7% and reactor pressure was approximately 250 psig. The 11 unit SRV's were being cycled in accordance with plant procedures to verify operability per Technical Specification 3.5.2. Ten of the eleven SRV's had been successfully tested prior to this failure. A normal scram recovery was conducted per plant procedures and no automatic safety actuations or isolations occurred. Reactor vessel level was maintain using the feedwater system. The investigation determined that the solenoid valve which allows remote manual operation of B21-F013G was inoperable. The solenoid would allow the SRV to be opened, but would not allow timely closure of the SRV. The solenoid valve was replaced, the unit returned to the required testing conditions and the SRV was successfully tested. The solenoid valve was sent to Wyle Laboratory and the root cause was determined to be failure of the solenoid disc to properly realign with its seat after de-energization. A potential cause of the failure to reseal is "dirt" which was embedded in the rubber pad located on the backseat. An investigation into the source of the material is continuing. A supplement will be issued by March 19, 1991, to provide the results of this investigation. This event had minimal safety significance as the Unit is analyzed for a stuck open SRV at 100% power.

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 900 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3160-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Brunswick Steam Electric Plant Unit 2	DOCKET NUMBER (2) 05000324	LER NUMBER (6)			PAGE (3)	
		YEAR 90	SEQUENTIAL NUMBER 004	REVISION NUMBER 02	02	OF 04

TEXT (if more space is required, use additional NRC Form 895A's) (17)

EVENT:

A Unit 2 manual reactor scram during safety relief valve (SRV) testing due to the failure of SRV B21-F013G to close.

INITIAL CONDITIONS:

Unit 2 was at approximately 7% power and at 272 psig performing startup testing following a refueling/recirculation piping replacement outage. Manual cycling of the SRV's was being performed in accordance with plant procedure Periodic Test (PT) 11.1.2. This test manually cycles each valve open and closed to verify valve operability. Ten of the eleven valves had been successfully tested, with only B21-F013G remaining to be tested.

EVENT DESCRIPTION

At approximately 0500 on March 13, 1990, SRV testing in accordance with PT-11.1.2 was initiated to verify SRV operability. This testing is performed following each refueling outage per Technical Specification 3.5.2, by opening each valve from the control room using the remote manual control switch (one at a time), verifying steam flow, and then shutting the valve from the control room. The first ten valves were successfully cycled between 0500 and 0534.

At 0535, SRV B21-F013G was opened from the RTGB, steam flow was verified, and the switch was placed in the "close" position. The Control Operator (CO) noted that the valve did not go closed and cycled the valve several times in accordance with Abnormal Operating Procedure (AOP)-30, Safety/Relief Valve Failure. These attempts failed to close the valve and at 0536, a reactor scram was manually inserted in accordance with AOP-30. At approximately 0537, SRV B21-F013G closed at a pressure of approximately 230 psig. A normal scram recovery was conducted per Emergency Operating Procedures Path 2, Low Power Scram. During this event, the maximum indicated pressure was 279 psig and the level was maintained between 172 inches and 193 inches (normal 182.5-192.5 inches). There were no automatic challenges to any safety systems and level was maintained using the feedwater system.

EVENT INVESTIGATION

Following the event, an investigation was initiated to determine the cause of the B21-F013G failure to close on a "close" signal from its remote manual control switch. Initial troubleshooting centered on the solenoid valve (Target Rock Model 1/2 SMS-A-01-1) used to port air to the pilot assembly for remote manual operation. The solenoid valve was removed from the SRV and taken to the maintenance shop for investigation by plant maintenance and technical support personnel.

Troubleshooting activities began by developing a testing methodology. A new spare solenoid valve was obtained from stock and hooked up to a test rig. Test conditions simulated the installed conditions as near as possible, including a 125 VDC power source and an air supply of approximately 113 psig. Air pressure was applied to the inlet port of the test solenoid and no leakage was identified. When power was applied to the solenoid coil, the solenoid valve repositioned,



LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

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 (F-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (3)

PAGE (3)

Brunswick Steam Electric Plant Unit 2

YEAR	SEQUENTIAL NUMBER	REVISION NUMBER
90	004	020

0500032490-004-0203 OF 04

TEXT IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 892A's (17)

allowing air to enter the test volume (simulating the SRV opening). Power was then removed from the coil and the solenoid valve repositioned again, venting air from the test volume. If this had been installed on an actual SRV, this venting of the air pressure would have allowed the spring pre-loading to close the SRV. This test was conducted four times to verify test repeatability.

Following verification of the testing methodology, the solenoid removed from SRV B21-F013G was connected to the test rig. The first observation noted when air was applied to the solenoid was a leak from the exhaust port. The solenoid coil was then energized and the solenoid valve repositioned, allowing air to enter the test volume (simulated valve opening). Air leakage was still noted around the exhaust port, but the leakage did not appear to be affecting the testing. Following verification that the solenoid correctly repositioned to the "open" position, power was removed from the solenoid coil. No immediate change was observed. The leak at the exhaust port continued and the pressure in the test volume slowly decreased. This test was also performed several times with the same results. Based on this testing, it was determined that the solenoid was the cause of the failure of SRV B21-F013G to close.

The solenoid valve which was removed from the SRV was shipped to Wyle Laboratory for inspection and root cause determination. The root cause investigation was conducted by Target Rock with assistance from Wyle and Carolina Power & Light. Initial test results confirmed the results found at BSEP in that, the solenoid would open but would not reseal correctly. The inability to reseal was attributed to the disc not realigning with its seat properly after de-energization. A visual inspection showed that "dirt" was embedded in the rubber pad located on the backseat and that loose "dirt" was also found in the vicinity. Per the Target Rock personnel performing the inspection, the debris found in the solenoid was "dirt" and not metal shavings, chips, etc... The solenoid was cleaned out, and the dirt disposed of therefore, it is not available for analysis. Further investigation is necessary to determine the source of this material and other potentially affected equipment. A search of SRV work requests was made to determine if this was a repetitive failure problem and no other similar failures were identified.

CORRECTIVE ACTIONS

The solenoid valve for SRV B21-F013G was replaced and the unit was restarted and returned to test pressure (approximately 250 psig), where the SRV was successfully tested. A supplement to this report will be issued by March 19, 1991, providing the results of the investigation and any additional corrective actions.

EVENT ASSESSMENT

Unit 2 is analyzed for a stuck open SRV at 100% power which fails to shut, therefore this event is bounded. The testing in progress when this failure occurred is designed to assure SRV operability prior to reaching high power levels where one or more SRV failures could create a more significant event. As such, operation within the analysis was assured. The testing met its purpose and the event had minimal safety significance.

**LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION**

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)  Brunswick Steam Electric Plant Unit 2	DOCKET NUMBER (2)  0 5 0 0 0 3 2 4	LER NUMBER (6)			PAGE (3)	
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		9 0	0 0 4	0 2	0 4	OF 0 4

TEXT (If more space is required, use additional NRC Form 288A's) (17)

EIIS

System/Component

Code

Safety Relief Valve	AC/RV
Feedwater	SJ
Solenoid Valve	AC/V
125 VDC Power	EI
Air Supply	LD
Pilot Assembly	None Found
Reactor Scram	JC
Steam Flow	FI