



Carolina Power & Light Company

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

April 29, 1991

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

BRUNSWICK STEAM ELECTRIC PLANT UNIT 1 & 2  
DOCKET NO. 50-325 & 50-324  
LICENSE NO. DRP-71 & DPR-62  
LICENSEE EVENT REPORT 1-91-009

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

GT/

Enclosure

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

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENT\* 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 (BSEP)  
Unit 1

DOCKET NUMBER (2)  
05000325

PAGE (3)

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TITLE (4) DUAL UNIT REACTOR SHUTDOWN AND RESULTING LOW REACTOR VESSEL WATER LEVEL ISOLATION OF THE UNIT 1 PRIMARY CONTAINMENT ISOLATION SYSTEM GROUPS 2, 6, & 8 AND AUTOMATIC REACTOR SCRAM SIGNAL, DURING THE MANUAL SCRAM.

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	
3	28	91	91	- 09	- 00	4	29	91	BSEP UNIT 2	05000324	

OPERATING MODE (9) 1

POWER LEVEL (10) 100

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)
		X	
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)(vi)	OTHER (Specify in Abstract and Text)
20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(vii)(A)	
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME GLEN THEARLING, REGULATORY COMPLIANCE SENIOR SPECIALIST

TELEPHONE NUMBER

(919) 457-2039

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS

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 March 22, 1991, at 0530 #1 Emergency Diesel Generator (DG) was removed from service for repairs. By March 28, 1991, at 1823 preparations for a dual Unit Reactor shutdown were initiated because #1 DG's camshaft was damaged during the repairs to its camshaft bearings. The camshaft of #1 DG required repairs projected to take longer than the seven days allowed by the Technical Specification (ending March 29, 1991, at 0530).

It was planned to shutdown Unit 1 Reactor by manual Scram from 19% Reactor power due to the inoperable neutron monitoring, Intermediate Range Monitors (IRM) "A" & "C", which upon entering the Start-up Mode would have required a half Scram signal in the "A" Reactor Protection System (RPS). During the manual Scram the Reactor Vessel level momentarily shrank to below the Low Level 1 setpoint for Primary Containment Isolation System (PCIS) groups 2,6,& 8 isolations and the automatic Reactor Scram setpoint.

The Unit 2 Reactor was also shutdown by manual Scram, when during the shutdown IRM "B" & "D" failed requiring a half Scram signal in the "B" Reactor Protection System (RPS).

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT (IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 366A'S) (17)

## INITIAL CONDITIONS

Both Units were at 100% Reactor Power With all Emergency Core Cooling Systems Operable.

## EVENT DESCRIPTION FOR UNIT 1

On March 28, 1991, at 1909 Unit 1 Reactor commenced power reduction for a normal Reactor shutdown from 100% Reactor power to Cold Shutdown (see attachment 1), as required by Plant Technical Specification 3.8.1.1 Action b.3. During repairs to the #1 DG camshaft bearings, the camshaft was damaged. The camshaft of #1 DG required repairs projected to take longer than the seven days allowed by Technical Specification 3.8.1.1 Action b.3 (ending March 29, 1991 at 0530). ILM "A" and "C" were inoperable requiring a half Scram Signal to be sealed in when the Reactor entered the Start-up Mode, so it was decided to use the manual Scram option of General Procedure (GP)-05 to complete the shutdown. On March 29, 1991, at 0145 with Reactor power at 19% the Reactor was manually Scrammed and all Reactor Control Rods fully inserted. During the transient of the Reactor Scram, Reactor Vessel level shrank to  $\approx 160"$ . This is below the Reactor Vessel Low Level 1 isolation setpoint, and resulted in a PCIS group 2,6, and 8 isolation signal, and an automatic Reactor Scram. As designed all PCIS group 2,6, and 8 valves, that were not already closed isolated. This Reactor Vessel water level excursion also resulted in level increasing to  $\approx 210"$ , which is above the trip setpoint (208") of the Reactor Feed Pumps (RFP), the Reactor Core Isolation Cooling (RCIC) system, and the High Pressure Coolant (HPCI) system. Only the 1B RFP was in operation at this time and it was restarted without incident and Reactor Vessel water level was stabilized in the normal operating band (182"-192"). The PCIS group 2,6, and 8 isolations were reset and the Unit shutdown continued without incident to Cold Shutdown at 1530 on March 29, 1991.

## EVENT DESCRIPTION FOR UNIT 2

On March 29, 1991, at 0222 Unit 1 had stabilized after it's shutdown using a manual scram and Unit 2 Reactor commenced power reduction for a normal Reactor shutdown from 100% Reactor power to Cold Shutdown (see attachment 2), as required by Plant Technical Specification 3.8.1.1 Action b.3. This was required because during repairs to the #1 DG camshaft bearings, the camshaft was damaged. The camshaft of #1 DG required repairs projected to take longer than the seven days allowed by Technical Specification 3.8.1.1 Action b.3 (ending March 29, 1991 at 0530). At 0943 the Reactor was subcritical ( $\approx 1\%$ ) when, while placing the Reactor Feedwater System Startup Level Control Valve (SULCV) in service, a Reactor Feedwater System excursion resulted in Reactor Vessel level increasing to greater than the turbine trip setpoint (208") of the Reactor Feed Pumps (RFP), Reactor Core Isolation Cooling System (RCIC), and High Pressure Coolant Injection System (HPCI). Only the "A" RFP was in operation at this time. At 1004, the "B" RFP was placed into service and the initial placement of the SULCV into service was completed. At that time, the Reactor Vessel level remained above 182". At 1026, it was identified by the Shift Technical Advisor (STA), the Shift Foreman, and the Operator that actual Reactor Vessel water level had decreased to  $\approx 168"$ , while the pen on the level recorder had stuck at 187". The Operator placed the SULCV in manual to restore Reactor Vessel water level. A low level (165") half RPS trip in the "B" channel was received prior to Reactor vessel level being

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raised. Reactor Vessel water level was restored to normal (ie; 182 - 192"), the SULCV was returned to automatic and controlled level in the normal operating band.

At 0955 on March 29, 1991 with Reactor power = 1%, IRM "D" started to oscillate severely and was declared inoperable. At this same time, when IRM "B" was shifted to range 6 from 7 it pegged the indication upscale. As required by Technical Specifications, due to the failure of IRMs B,D, and with IRM F already inoperable, a half Scram signal was sealed into the B RPS System. It was decided to use the manual Scram option of GP-05 to complete the shutdown. The Reactor was manually Scrammed at 1037 on March 29, 1991, and all Reactor Control Rods were verified fully inserted. The Reactor achieved Cold Shutdown at 0335 on March 30, 1991.

## EVENT CAUSE

1. The dual Unit shutdowns were required by Technical Specifications, because during repairs to #1 DG camshaft bearings, the camshaft was damaged. This resulted in repairs that required longer than the seven days allowed by the Technical Specifications Limiting Condition for Operation Action statement.
2. The Unit 1 Reactor Vessel low water level signal that resulted in the PCIS group 2,6, and 8 isolations and an automatic Reactor Scram signal was the result of level shrink when the reactor was manually Scrammed from 19% Reactor power.

## CORRECTIVE ACTION

1. Restore #1 DG to Operable status prior to Reactor Startup.
2. Prior to Startup repair the inoperable IRMs as needed to meet the units Technical Specification Startup requirements.
3. Revise GP-05 to address Reactor Vessel level shrink as an expected cause of automatic Isolation/Scram signals if a Reactor shutdown with manual Scram is used while in the Run Mode.
4. The investigation of the operation of both unit's SULCVs found they operated as expected.

## EVENT ASSESSMENT

1. Both Units were shutdown due to the requirements of Technical Specifications 3.8.1.1.
2. The Unit 1 PCIS/RPS Low Level 1 signal, caused by the momentary level shrink, that resulted in the automatic isolations of PCIS groups 2,6, and 8, and the Reactor Scram signal, is not considered of safety significance since all safety systems functioned as designed.

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## E.I.L.S. CODES

Emergency Diesel Generator  
Reactor Protection System  
Startup Level Control Valve  
Reactor Feed Pump  
Feedwater Level Control System  
Reactor Core Isolation Cooling System  
High Pressure Coolant Injection System

EK  
JE  
SD/LCV  
SJ/P  
JK  
BN  
BJ

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TEXT (IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC FORM 365A'S) (17)

## ATTACHMENT 1

### UNIT 1 EVENT TIME LINE

March 28, 1991

1823 Started preparations for a dual Unit shutdown.  
1909 Started Unit 1 Reactor power reduction from 100%.

March 29, 1991

0145 With Unit 1 at 19% Reactor power inserted a manual  
Scram. Momentary Reactor Vessel level transient results  
in: 1) PCIS Group 2, 6, & 8 isolations.  
2) Automatic Scram Signal.  
3) 1B RFP trip.

0154 Unit 1B RFP restarted.

0200 Unit 1 PCIS Group 2, 6, & 8 isolations reset.  
Unit 1 Reactor vessel level stable in normal band.

0530 End of 7 days permitted by Technical Specifications to restore  
#1 DG without starting shutdown of both Units. (Unit is  
already in Hot Shutdown)

1530 Unit 1 Reactor in Cold Shutdown.

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## ATTACHMENT 2

### UNIT 2 EVENT TIME LINE

March 28, 1991

1823

Started preparations for a dual Unit shutdown.

March 29, 1991

0200

Unit 1 Reactor shutdown with stable conditions.

0222

Unit 2 Reactor shutdown commenced from 100% power.

0530

End of 7 days permitted by Technical Specifications to restore #1 DG without starting shutdown of both Units. (Unit 2 has 12 hours to reach Hot Shutdown)

0914

Unit 2 Reactor Mode switch taken to Start-up/Hot Standby

0929

Unit 2 began Reactor pressure reduction to allow placing SULCV in service.

0943

Unit 2 high Reactor Vessel water level trip of 2A RFP.

0951

Unit 2 High Reactor Vessel water level trips reset and began rolling 2B RFP.

0955

Unit 2 IRM's "B" & "D" inoperable, with Reactor power at  $\approx 1\%$ .

1002

2B RFP feeding the Reactor Vessel through the SULCV.

1004

Unit 2 SULCV in automatic.

1026

Unit 2 Operators take action to restore low Reactor Vessel water level as low level half RPS trip comes in.

1034

Unit 2 Reactor Vessel level in normal operating band with SULCV returned to automatic.

1037

Unit 2 manual Reactor Scram used for shutdown. (Unit 2 in Hot Shutdown)

March 30, 1991

0335

Unit 2 Reactor in Cold Shutdown.