



NOV 26 2003

SERIAL: BSEP 03-0160

10 CFR 50.73

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2  
Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62  
Licensee Event Report 1-2003-002

Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.73, Progress Energy Carolinas, Inc. submits the enclosed Licensee Event Report. This report fulfills the requirement for a written report within sixty (60) days of a reportable occurrence.

Please refer any questions regarding this submittal to Mr. Edward T. O'Neil,  
Manager – Support Services, at (910) 457-3512.

Sincerely,

A handwritten signature in black ink, appearing to read 'David H. Hinds'.

David H. Hinds  
Plant General Manager  
Brunswick Steam Electric Plant

MAT/mat

Enclosure:

Licensee Event Report 1-2003-002

IE22

Document Control Desk  
BSEP 03-0160 / Page 2

cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II  
ATTN: Mr. Luis A. Reyes, Regional Administrator  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW, Suite 23T85  
Atlanta, GA 30303-8931

U. S. Nuclear Regulatory Commission  
ATTN: Mr. Eugene M. DiPaolo, NRC Senior Resident Inspector  
8470 River Road  
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission  
ATTN: Ms. Brenda L. Mozafari (Mail Stop OWFN 8G9) (Electronic Copy Only)  
11555 Rockville Pike  
Rockville, MD 20852-2738

Ms. Jo A. Sanford  
Chair - North Carolina Utilities Commission  
P.O. Box 29510  
Raleigh, NC 27626-051

## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to the information collection.

## 1. FACILITY NAME

Brunswick Steam Electric Plant (BSEP), Unit 1

## 2. DOCKET NUMBER

05000325

## 3. PAGE

1 OF 4

## 4. TITLE

Oscillation Power Range Monitor (OPRM) Inoperability Due To Inadequate Confirmation Count Performance

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	05	2003	2003	-- 002 --	00	11	26	2003	BSEP, Unit 2	05000324
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more)							
1			20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
10. POWER LEVEL			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
94			20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)		X	50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	OTHER Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)			50.73(a)(2)(v)(C)	
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)		X	50.73(a)(2)(i)(B)			50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)	

## 12. LICENSEE CONTACT FOR THIS LER

## NAME

Mark A. Turkal, Lead Engineer - Licensing

## TELEPHONE NUMBER (Include Area Code)

(910) 457-3066

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

## 14. SUPPLEMENTAL REPORT EXPECTED

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		MO	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO						

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 5, 2003, Progress Energy Carolinas, Inc. (PEC) received notification from GE Nuclear Energy (GENE) of a reportable condition in accordance with 10 CFR 21.21(d) (i.e., SC03-20, "Stability Option III Period Based Detection Algorithm Allowable Settings," dated October 4, 2003). SC03-20 identified the potential for numerous, unexpected confirmation count resets in the event of an instability condition. These confirmation count resets could result in the inoperability of Technical Specification (TS) Table 3.3.1.1-1, "Reactor Protection System Instrumentation," Function 2.f, "OPRM Upscale." Therefore, at 1100 Eastern Daylight Time (EDT) on October 5, 2003, the Unit 1 and Unit 2 Oscillation Power Range Monitor (OPRM) channels were declared inoperable in accordance with TS 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," and an alternate method to detect and suppress thermal hydraulic instability oscillations was placed into effect as directed by Condition I of TS 3.3.1.1. PEC is preparing modifications to implement the recommendations of SC03-20 and return the OPRM Upscale function to operable status for both Units. The safety significance of this occurrence is considered minimal.

The apparent cause of the event is an incomplete analysis, performed by GENE, when establishing the OPRM's period based detection algorithm (PBDA).

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	YEAR	1. SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2003	-- 002 --	00	

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Energy Industry Identification System (EIIIS) codes are identified in the text as [XX].

**INTRODUCTION**

On October 5, 2003, Progress Energy Carolinas, Inc. (PEC) received notification from GE Nuclear Energy (GENE) of a reportable condition in accordance with 10 CFR 21.21(d) (i.e., SC03-20, "Stability Option III Period Based Detection Algorithm Allowable Settings," dated October 4, 2003). SC03-20 discusses a condition of the stability Option III Period Based Detection Algorithm (PBDA) which can result in numerous, unexpected confirmation count resets in the event of an instability condition.

At the time of the notification, Unit 1 was in Mode 1, operating at approximately 94 percent of rated thermal power (RTP) and Unit 2 was in Mode 1, operating at approximately 96 percent of RTP. These are the maximum achievable power levels for each unit based on the current status of extended power uprate (EPU) implementation.

At 1100 Eastern Daylight Time (EDT) on October 5, 2003, PEC declared the Oscillation Power Range Monitor (OPRM) [IG] Upscale trip (i.e., Function 2.f of Technical Specification (TS) Table 3.3.1.1-1) inoperable in accordance with TS 3.3.1.1, "Reactor Protection System (RPS) Instrumentation" [JC]. An alternate method to detect and suppress thermal hydraulic instability oscillations was placed into effect as directed by Condition I of TS 3.3.1.1. Although considered inoperable, the OPRM Upscale trip remains armed and functional.

At 1254 EDT on October 5, 2003, the NRC was notified (i.e., Event Number 40226), in accordance with 10 CFR 50.72(b)(3)(v)(A), of this event. Based on the information contained in SC03-20, this was considered a condition that could have prevented the fulfillment of the safety function of a system that is needed to shut down the reactor and maintain it in a safe shutdown condition.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(v)(D) as a condition that could have prevented the fulfillment of the safety function of a system that is needed to mitigate the consequences of an accident. Additionally, the event is being reported in accordance with 10 CFR 50.73 (a)(2)(i)(B) as operation which was prohibited by the plant's TSs. The OPRM Upscale trip has been considered operable, with the potential for numerous, unexpected confirmation count resets, since Unit 1 startup from the spring, 2002, refueling outage and Unit 2 startup from the spring, 2003, refueling outage when the Stability Option III modifications were implemented.

**EVENT DESCRIPTION**

In support of EPU, PEC implemented modifications to revise the Brunswick Steam Electric Plant (BSEP) thermal-hydraulic stability long-term solution from the Boiling Water Reactor Owners' Group (BWROG) Enhanced Option I-A to the BWROG Option III solution. Stability Option III was implemented on Unit 1 in spring, 2002, and on Unit 2 in spring, 2003.

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2003	-- 002 --	00	

**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

Stability Option III relies upon the OPRM Upscale trip function to automatically detect and suppress anticipated thermal-hydraulic power oscillations, thus providing protection from exceeding the fuel Minimum Critical Power Ratio (MCPR) Safety Limit. One of three algorithms (i.e., the algorithm credited by the safety analysis and governed by the TSS) used in generating the OPRM Upscale trip is the PBDA. The PBDA is an algorithm which provides a scram if there are a sufficient number of neutron flux oscillations, in a given period of time.

The technical bases for the PBDA was defined by GENE and supplied to licensees as safety related documentation in licensing topical reports. Specifically, NEDO-32465-A, Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications, August 1996, defines the PBDA period confirmation adjustable variables for the OPRM to be the period tolerance and the conditioning filter cutoff frequency. The period tolerance could be adjusted in the range of 100 to 300 msec, and the conditioning filter cutoff frequency could be adjusted in the range of 1.0 to 2.5 Hz. Subsequent plant-specific evaluations extended the period tolerance range, on the low end, to 50 msec and the cutoff frequency, on the high end, to 3.0 Hz.

On July 24, 2003, a slow growing core wide instability event occurred at Nine Mile Point (NMP) Unit 2. As a result of investigation of this instability event it was determined that numerous, unexpected PBDA confirmation count resets had occurred. Based on their analyses, GENE could confirm that performance of the OPRM with settings other than period tolerance of 100 msec or higher and cutoff frequency of 1.0 Hz would prevent exceeding the MCPR Safety Limit for all anticipated instability events.

Upon receipt of SC03-20, PEC confirmed the following OPRM settings.

Variable	Unit 1	Unit 2
Period Tolerance	100 msec	50 msec
Cutoff Frequency	3.0 Hz	3.0 Hz

As a result, the OPRM Upscale trip function was declared inoperable on each unit.

**EVENT CAUSE**

Although GENE has not performed a formal root cause evaluation for this condition, based on available information, it is believed that the root cause is an incomplete analysis, performed by GENE, when establishing the PBDA.

**CORRECTIVE ACTIONS**

1. Engineering Changes (i.e., EC 46335 for Unit 1 and EC 46730 for Unit 2) are in progress to revise the Unit 1 and 2 OPRM variables to the settings recommended in SC03-20. These modifications will be

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2003	-- 002 --	00	

**NARRATIVE** (If more space is required, use additional copies of NRC Form 366A) (17)

implemented and the OPRM Upscale trip functions returned to operable status by December 31, 2003, for both Unit 1 and Unit 2.

2. Plant procedure 0MST-OPRM21R, "OPRM Tuning," will be revised in accordance with the recommendations of SC03-20. This procedure revision will be implemented by December 31, 2003.

**SAFETY ASSESSMENT**

The safety significance of this occurrence is considered minimal.

As discussed in SC03-20, there is no threat of fuel failure as a result of this condition. In addition, although considered inoperable, the OPRM Upscale trip function was fully operational and would have continued to protect the plant from thermal-hydraulic instabilities throughout the operating range. Although considered inoperable, the OPRM Upscale trip remains armed and functional. If such protection was not provided, operators are trained to recognize instabilities and to take appropriate actions should instability occur.

**PREVIOUS SIMILAR EVENTS**

LER 1-2002-001, dated January 20, 2003, documents a condition where the Unit 1 OPRM Upscale trip function was declared inoperable due to a non-conservative setpoint associated with the PBDA. This condition was identified by GENE in SC02-21, "Stability Option III: OPRM Tmin Specification," dated November 22, 2002. The corrective actions associated with LER 1-2002-001 could not have reasonably been expected to prevent the condition reported in the LER.

**COMMITMENTS**

Those actions committed to by PEC in this document are identified below. Any other actions discussed in this submittal represent intended or planned actions by PEC. They are described for the NRC's information and are not regulatory commitments. Please notify the Manager - Support Services at BSEP of any questions regarding this document or any associated regulatory commitments.

1. Engineering Changes (i.e., EC 46335 for Unit 1 and EC 46730 for Unit 2) are in progress to revise the Unit 1 and 2 OPRM variables to the settings recommended in SC03-20. These modifications will be implemented and the OPRM Upscale trip functions returned to operable status by December 31, 2003, for both Unit 1 and Unit 2.
2. Plant procedure 0MST-OPRM21R, "OPRM Tuning," will be revised in accordance with the recommendations of SC03-20. This procedure revision will be implemented by December 31, 2003.