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10 CFR 50.73

August 9, 2018

Serial: RA-18-0088

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

Subject: Brunswick Steam Electric Plant, Unit No. 1
Renewed Facility Operating License No. DPR-71
Docket No. 50-325
Licensee Event Report 1-2018-003

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

This document contains no regulatory commitments.

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 832-2487.

Sincerely,

A handwritten signature in blue ink, appearing to read "W. R. Gideon", followed by the word "for" in a smaller, cursive script.

William R. Gideon

MAT/mat

Enclosure: Licensee Event Report

cc (with enclosure):

U. S. Nuclear Regulatory Commission, Region II
ATTN: Ms. Catherine Haney, Regional Administrator
245 Peachtree Center Ave, NE, Suite 1200
Atlanta, GA 30303-1257

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

U. S. Nuclear Regulatory Commission
ATTN: Mr. Dennis J. Galvin
11555 Rockville Pike
Rockville, MD 20852-2738

Chair - North Carolina Utilities Commission **(Electronic Copy Only)**
4325 Mail Service Center
Raleigh, NC 27699-4300
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LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@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 an 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

Setpoint Drift in Main Steam Line Safety/Relief Valves Results in Two Valves Inoperable

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
06	11	2018	2018	- 003	- 00	08	09	2018	Facility Name	Docket Number
										05000
										05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. Power Level	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
100	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(iii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> Other (Specify in Abstract below or in NRC Form 366A)		

12. Licensee Contact for this LER

Licensee Contact

Lee Grzeck, Manager – Regulatory Affairs

Telephone Number (Include Area Code)

(910) 832-2487

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
D	SB	RV	T020	Y					

14. Supplemental Report Expected		15. Expected Submission Date		Month	Day	Year
<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)	<input checked="" type="checkbox"/> No					

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On June 11, 2018, BSEP received the results of testing of eleven main steam line safety relief valves (SRVs) removed from Unit 1 during the spring 2018 refueling outage. Two of the eleven valves were found to have as-found lift setpoints of their pilot valves outside the +/-3 percent tolerance required by Technical Specification (TS) 3.4.3. TS 3.4.3 requires ten of the eleven installed SRVs to be operable. Since less than ten SRVs were operable, this event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B) as operation prohibited by the plant's TS. All 11 of the SRV pilot valves were replaced with certified spares before the startup of Unit 1.

The direct cause of the out of tolerance as-found lift setpoints was corrosion bonding of the SRV pilot discs-to-the pilot seats. The root cause of the corrosion bonding was an inadequate procedure and work order instructions. Corrective actions include revising associated procedures to include sufficient detail to ensure consistent surface preparation and proper quality checks of surface condition are performed prior to platinum coating.

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	YEAR 2018	SEQUENTIAL NUMBER - 003	REV NO. - 00

NARRATIVE

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

Background*Initial Conditions*

At the time of the event, Unit 1 was in Mode 1 (i.e., Power Operation), at approximately 100 percent of rated thermal power (RTP).

Reportability Criteria

Unit 1 Technical Specification (TS) 3.4.3 requires at least 10 of 11 main steam [SB] line safety/relief valves (SRVs) to be operable. Per Surveillance Requirement (SR) 3.4.3.1, each valve is required to open within +/- 3 percent of its opening setpoint. As-found testing of the valves indicated that two of the valves had lift setpoints outside this tolerance. Consequently, the plant operated in a condition which is prohibited by the TS, that is, with fewer than the required number of SRVs having lift setpoints within the +/-3 percent tolerance. Therefore, the condition is being reported per 10 CFR 50.73(a)(2)(i)(B) as operation in a condition prohibited by the plant TSs.

Event Description

During the spring 2018 Unit 1 refueling outage, all 11 Model 7567F Target Rock Two-Stage pilot valve assemblies in the SRVs were replaced with certified spares. The removed SRV pilot valves were sent to National Technical Systems (NTS) to determine the as-found set pressure. On June 11, 2018, test results were reported to BSEP. The test results showed that two of the 11 valves actuated at pressures outside of the +/-3 percent tolerance allowed by TS 3.4.3. The test data for the valves found out of tolerance are shown below.

Valve ID	TS Setpoint (psig)	As-Found Lift Pressure (psig)	Percent Difference
1-B21-F013B S/N 1082	1,150	1,218	5.91
1-B21-F013G S/N 1081	1,130	1,225	8.41

Event Cause

The change in SRV lift setpoints resulted from corrosion bonding of the SRV pilot discs-to-the pilot seats. Corrosion bonding between the pilot disc and seat is an inherent problem with the two-stage SRV design used at BSEP. BSEP mitigates corrosion bonding of SRVs by coating each pilot disc surface with platinum. The integrity of the platinum coating is critical to mitigating corrosion bonding. The platinum coating of these SRVs was found to be degraded in large areas of the pilot disc, including the seating surface; which was

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		YEAR	SEQUENTIAL NUMBER	REV NO.
Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	2018	- 003	- 00

NARRATIVE

caused by circumferential machining marks in the substrate surface that led to increased circumferential cracking of the platinum coating.

Based on the above, the root cause of the out of tolerance as-found lift setpoints was attributed to the lack of sufficient detail in a procedure and work order instructions to ensure consistent surface preparation and proper quality checks of surface condition prior to platinum coating.

Safety Assessment

The purpose of the safety/relief valves (SRVs) is to provide overpressure protection for the reactor coolant system. The as-found condition of the Unit 1 SRVs was compared to cases analyzed in the Brunswick Unit 1 Cycle 21 Reload Safety Analysis Report (RSAR). Each as-found SRV was bounded by the opening pressures assumed in the analysis; therefore, the overall RSAR analysis bounds the overall as-found condition of the SRVs.

The results from the RSAR analysis demonstrate that the pressure limits are not exceeded for the overpressurization events. Therefore, it is concluded that the Unit 1 Cycle 21 SRVs always remained capable of performing their safety function of preventing overpressurization of the reactor coolant system.

Based on the foregoing analysis, it is concluded that this event had no adverse impact on nuclear safety.

Corrective Actions

The following corrective actions were completed.

- The 11 Unit 1 SRV pilot assemblies were replaced with refurbished and certified spares during the 2018 refueling outage.

The following corrective actions are currently planned. Any changes to the corrective actions and schedules noted below will be made in accordance with the site's corrective action program.

- Procedure 0CM-VSR509, "Main Steam Relief Valves Target Rock Model 7567 Air Operators and Pilot Assembly Disassembly, Inspection, and Reassembly," will be revised to include additional guidance for pilot disc machining and preparation for platinum coating. The procedure revision is currently scheduled to be complete by October 22, 2018.

Previous Similar Events

A review of LERs for the past three years identified the following previous similar events associated with SRVs with as-found lift setpoints outside of TS allowable limits.

- LER 2-2017-003, dated August 3, 2017, reported Unit 2 operation prohibited by TSs due to three of the eleven valves found with lift setpoints of their pilot valves outside the +/-3 percent tolerance required by TS 3.4.3.

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

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Brunswick Steam Electric Plant (BSEP), Unit 1	05000325	2018	- 003	- 00

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- LER 2-2015-002, Revision 1, dated June 26, 2015, reported Unit 2 operation prohibited by TSs due to three of the eleven valves found with lift setpoints of their pilot valves outside the +/-3 percent tolerance required by TS 3.4.3.

The direct cause of the events reported in these LERs was corrosion bonding. The disc preparation process continues to be refined to achieve optimal SRV performance. Previous corrective actions continue to be enhanced by industry best practices.

Commitments

No regulatory commitments are contained in this report.