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10 CFR 50.73

May 28, 2019

Serial: RA-19-0227

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

Subject: Brunswick Steam Electric Plant, Unit No. 2
Renewed Facility Operating License No. DPR-62
Docket No. 50-324
Licensee Event Report 2-2019-002

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. Jerry Pierce, Manager – Nuclear Support Services, at (910) 832-7931.

Sincerely,

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
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U. S. Nuclear Regulatory Commission
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NRC FORM 366 (04-2018) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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.

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/)

1. Facility Name	2. Docket Number	3. Page
Brunswick Steam Electric Plant (BSEP), Unit 2	05000324	1 OF 3

4. Title

Manual Reactor Protection System Actuation and Specified System Actuation

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
03	30	2019	2019	- 002	- 00	05	28	2019		05000
									Facility Name	Docket Number 05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
023	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Jerry Pierce, Manager – Nuclear Support Services	(910) 832-7931

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

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No				

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

At 17:47 Eastern Daylight Time (EDT) on March 30, 2019, with Unit 2 in Mode 1 at approximately 23 percent power and main turbine startup in progress, high temperature was sensed at main turbine bearing 9. A manual main turbine trip and manual actuation of the Reactor Protection System (RPS) were initiated in response to the high bearing temperature. All control rods inserted as expected during the scram. When the scram was inserted, reactor water level dropped below the Low Level 1 (LL1) actuation setpoint. Per design, the LL1 signal resulted in automatic actuation of the Primary Containment Isolation System (PCIS) with closure of Group 2, 6, and 8 isolation valves. Operators manually closed the Main Steam Isolation Valves (MSIVs), in anticipation of low condenser vacuum, prior to the Group 1 PCIS signal being received. All systems responded as designed. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event that resulted in valid actuations of RPS and PCIS.

The direct cause of this event was insufficient lubricating oil supply to the main turbine bearing 9 which caused the bearing to overheat; leading to the manual scram. The most probable cause for the insufficient oil flow was design differences which resulted in a misalignment between the lower half bearing flow channel and the oil supply port in the main turbine 9 bearing housing. Corrective actions include a procedure change to ensure that lubricating oil supply oil flow is not restricted as a result of bearing replacement.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Brunswick Steam Electric Plant (BSEP), Unit 2	05000324	2019	- 002	- 00

NARRATIVE

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

Background

Initial Conditions

At the time of the event, Unit 2 was in Mode 1 (i.e., Power Operation), at approximately 23 percent of rated thermal power (RTP). There was no inoperable equipment that contributed to the event.

Reportability Criteria

The Reactor Protection System (RPS) [JC] and Primary Containment Isolation System (PCIS) [JM] actuations are being reported in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual or automatic actuation of systems listed in 10 CFR 50.73(a)(2)(iv)(B). The event was initially reported to the NRC on March 30, 2019 (i.e., Event Number 53966).

Event Description

At 17:47 Eastern Daylight Time (EDT) on March 30, 2019, with Unit 2 in Mode 1 at approximately 23 percent power and main turbine startup in progress, high temperature was sensed at main turbine [TA] bearing 9. A manual actuation of the RPS was initiated in response to the high bearing temperature. The scram was uncomplicated with all systems responding normally. Reactor water level reached low level 1 (LL1) due to the reactor trip. Per design, the LL1 signal resulted in Group 2 (i.e., floor and equipment drain isolation valves), Group 6 (i.e., monitoring and sampling isolation valves), and Group 8 (i.e., shutdown cooling isolation valves) isolations. Operators manually closed the Main Steam Isolation Valves (MSIVs), in anticipation of low condenser vacuum, prior to the Group 1 PCIS signal being received.

Event Cause

The direct cause of this event was insufficient lubricating oil supply to main turbine bearing 9 which caused the bearing to overheat; leading to the manual scram. The most probable cause for the insufficient oil flow was design differences which resulted in a misalignment between the lower half bearing flow channel and the oil supply port in the main turbine 9 bearing housing.

As a result of planned maintenance on the main turbine during the 2019 Unit 2 refueling outage, it was determined that main turbine bearing 9 required replacement. Main turbine bearings are provided cooling and are lubricated by way of the Main Turbine Lube Oil System [TD]. During preparations for Unit 2 startup, an Auxiliary Operator identified low oil flow in the drain pot of main turbine bearing 9. The low flow condition was evaluated by plant staff and discussed with a vendor representative. Additionally, borescope inspections of the lubricating oil supply and return lines for bearing 9 were completed. Based on these actions, it was incorrectly concluded that the oil flow was sufficient and would improve as turbine shaft speed increased. When startup resumed, during the process of starting the main turbine, bearing 9 failed due to insufficient lubricating oil supply.

NARRATIVE

Based on subsequent inspection of the failed bearing and a second replacement bearing, it was concluded that the most probable cause for the insufficient oil flow was design differences which resulted in a misalignment between the lower half bearing flow channel and the oil supply port in the bearing housing.

Safety Assessment

There was no adverse impact on the health and safety of the public. The safety significance of this event is minimal. The automatic reactor trip was not complicated and all safety related systems operated as designed.

Corrective Actions

The following corrective actions were completed.

- Replacement of main turbine bearing 9 was completed on April 5, 2019.

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.

- The plant procedure used to perform inspections on the main generator exciter (i.e., 0PM-TRB523, "General Electric 2000 kVA Excitation Alternator") will be revised to ensure that supply channel on the bearing is aligned with the oil supply port such that oil flow is not restricted. This action is currently scheduled to be completed by September 25, 2019.

- The locations of the oil supply ports for main turbine bearings 9 and 10 will be determined and documented during the next bearing removal on each unit.

Previous Similar Events

There have been no events in the past three years in which insufficient lubricating oil supply resulted in an unplanned automatic actuation of a safety-related system or component.

Commitments

No regulatory commitments are contained in this report.