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RA-21-0271

10 CFR 50.73

October 4th, 2021

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-00011

Oconee Nuclear Station, Unit 2
Docket No. 50-270/DPR-47

Subject: **Licensee Event Report 2021-001-00**

Ladies and Gentlemen:

Duke Energy Carolinas, LLC, submits the enclosed Licensee Event Report 2021-001-00 in accordance with 10 CFR 50.73 for Oconee Nuclear Station, Unit 2 (ONS). This report describes a condition where the past inoperability of an emergency feedwater pump exceeded the time allowed by Technical Specifications. This event had no significance with respect to the health and safety of the public.

There are no regulatory commitments contained within this report.

Please refer any questions regarding this submittal to Laura Boyce, Senior Nuclear Engineer, Regulatory Affairs, at 864-873-6774.

Sincerely,

Steven M. Snider
Vice President
Oconee Nuclear Station

Enclosures: Licensee Event Report 2021-001-00

cc: J. Nadel, NRC Senior Resident Inspector, ONS
S. Williams, NRC Project Manager, ONS
NRC Regional Administrator, Region II

(08-2020)



LICENSEE EVENT REPORT (LER)

(See Page 3 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 FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk all: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Oconee Nuclear Station, Unit 2	2. Docket Number 05000 00270	3. Page 1 OF 3
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4. Title
2B Motor Driven Emergency Feedwater Pump Past Inoperability Resulted In Condition Prohibited by Technical Specifications

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
08	03	2021	2021	001	00	10	04	2021		05000
									Facility Name	Docket Number
										05000

9. Operating Mode 1	10. Power Level 100
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11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

OTHER (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact Laura Boyce, Senior Nuclear Engineer, Regulatory Affairs	Phone Number (Include area code) 864-873-6774
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13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS	Cause	System	Component	Manufacturer	Reportable to IRIS
X	EB	BLK	I005	Y	X	BA	P	B260	Y

14. Supplemental Report Expected

No Yes (If yes, complete 15. Expected Submission Date)

15. Expected Submission Date

Month	Day	Year

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On August 2, 2021 at 0430 EDT, the 2B motor driven emergency feedwater pump (MDEFWP or MDEFW pump) was removed from service for planned train maintenance. Unit 2 was in MODE 1 at 100 percent power. At 1714, the 2B MDEFW pump tripped while starting for a bump for rotation test following completion of planned maintenance. The cause of the 2B MDEFW pump trip was determined to be failure of a shorting block in the secondary circuit of the protective over current relay. The shorting screws on the block had loosened, allowing the circuit to intermittently open, causing arcing, and a distorted current waveform that tripped the protective over current relay. The cause of this event was discovered on August 3, 2021. Following repairs, the 2B MDEFW pump was declared OPERABLE at 2222 on August 4, 2021.

A subsequent cause evaluation determined that a similar 2B MDEFW pump trip on February 1, 2021 was also caused by the intermittent poor electrical connection due to the loose shorting screws. Although the 2B MDEFW pump passed the post-maintenance testing in February 2021 and successfully completed a subsequent surveillance in April 2021, the follow-up evaluation determined that the 2B MDEFW pump was inoperable from February 1, 2021 to August 4, 2021; which is longer than the technical specification (TS) limiting condition for operation (LCO) 3.7.5, Condition A, seven day allowed outage time. Therefore this condition is being reported as a condition prohibited by TS under 10 CFR 50.73(a)(2)(i)(B).



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

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1. FACILITY NAME Oconee Nuclear Station Unit 2	2. DOCKET NUMBER 05000- 00270	3. LER NUMBER		
		YEAR 2021	SEQUENTIAL NUMBER 001	REV NO. 00

NARRATIVE

BACKGROUND

The Emergency Feedwater (EFW) System [BA] consists of two motor driven EFW pumps [P] and one turbine driven EFW pump [P]; any one of which can provide the required heat removal capability. Thus, the requirements for diversity in motive power sources for the EFW System are met. The steam turbine driven EFW pump receives steam from either of the two main steam headers, upstream of the main turbine stop valves (TSVs) [V], or from the Auxiliary Steam System [SA] which can be supplied from any Unit's Main Steam System [SB]. The EFW System supplies a common header capable of feeding either or both steam generators [AB].

The EFW System mitigates the consequences of any event with a loss of normal feedwater [SJ]. The design basis of the EFW System is to supply water to the steam generator to remove decay heat and other residual heat by delivering at least the minimum required flow rate to the steam generators at 1064 psia for the MDEFW pumps and 1100 psig for the Turbine Driven Emergency Feedwater Pump (TDEFWP).

The EFW System is required by TS 3.7.5 - EFW System LCO 3.7.5 Three EFW pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3, MODE 4 when steam generator is relied upon for heat removal.

EVENT DESCRIPTION

On August 2, 2021 at 0430 EDT, the 2B MDEFW pump was removed from service for planned train maintenance. Unit 2 was in MODE 1 at 100 percent power. At 1714, the 2B MDEFW pump tripped while starting for a bump for rotation test following completion of planned maintenance.

The cause of the August 2, 2021 2B MDEFW pump trip was determined to be failure of a shorting block in the secondary circuit of the protective over current relay. The shorting screws on the block had loosened, allowing the circuit to open intermittently, causing arcing, and a distorted current waveform that tripped the protective over current relay. The cause of this event was discovered on August 3, 2021.

The affected shorting block was replaced, shorting screws were tightened, and shorting jumpers were installed to eliminate the problem. The pump was successfully tested following the repair and declared operable at 2222 on August 4, 2021.

A subsequent cause evaluation determined that a similar 2B MDEFW pump trip on February 1, 2021 was also caused by the intermittent poor electrical connection due to the loose shorting screws. Although the 2B MDEFW pump passed the post-maintenance testing in February 2021 and successfully completed a subsequent surveillance in April 2021, the follow-up evaluation determined that the 2B MDEFW pump was inoperable from February 1, 2021 to August 4, 2021; which is longer than the technical specification (TS) limiting condition for operation (LCO) 3.7.5, Condition A, seven day allowed outage time.

For the time period from February 1, 2021 to August 4, 2021, either the 2A MDEFW pump and/or Unit 2 TDEFW pump was OPERABLE to provide the required heat removal capability.



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

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1. FACILITY NAME	2. DOCKET NUMBER		3. LER NUMBER		
Oconee Nuclear Station Unit 2	05000-	00270	YEAR	SEQUENTIAL NUMBER	REV NO.
			2021	001	00

NARRATIVE

CAUSAL FACTORS

The 2B MDEFW pump trip was a result of an intermittent poor electrical connection due to the loose current transformer (CT) shorting screws on the shorting block in the secondary circuit of the protective over current relay.

CORRECTIVE ACTIONS

1. The affected shorting block was replaced.
2. Shorting screws were tightened.
3. Shorting jumpers were installed.
4. Extent of condition reviews were completed of the secondary side wiring of the other MDEFW pumps for the use of shorting blocks and tightness of shorting block screws. There was no observed arcing or associated damage to the shorting blocks.

SAFETY ANALYSIS

The subject event was evaluated using the Oconee Probabilistic Risk Assessment (PRA) model and found to be of very low safety significance. For the time period from February 1, 2021 to August 4, 2021, either the 2A MDEFW pump and/or Unit 2 TDEFW pump was available to provide the required heat removal capability. Either of these pumps is sufficient to provide the required heat removal capability. Thus, it is concluded that the impact of this event on overall plant risk is insignificant and had no impact on public health and safety.

ADDITIONAL INFORMATION

Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]. This event is considered Industry Reporting and Information System (IRIS) reportable.

A review of Duke Energy's Corrective Action Program did not identify any Oconee LERs or events in the last three years that involved the same underlying concerns as this event.

There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.