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RA-24-0072

February 29, 2024 10 CFR 50.73

Attn: Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2746

Duke Energy Carolinas, LLC
Oconee Nuclear Station Unit 2
Docket Number: 50-270
Renewed Operating License: DPR-47

Subject: Licensee Event Report 270/2023-001, Revision 00 – Inappropriate Procedural Guidance for Planned Online Maintenance Results in Event or Condition that Could Have Prevented Fulfillment of a Safety Function

Licensee Event Report 270/2023-001, Revision 00, is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

There are no regulatory commitments associated with this LER.

If there are questions, or further information is needed, contact Laura Boyce, Regulatory Affairs, at (864) 873-6774.

Sincerely,

dc=com, dc=duke-energy, dc=ent, dc=nam, ou=Accounts, ou=Personal, ou=PNTransitional, cn=DAWilso (252825), email=David.Wilson2@duke-energy.com
I attest to the accuracy and integrity of this document.
2024.02.29 18:14:34 -05'00'

David A. Wilson
Manager, Nuclear Support Services
Oconee Nuclear Station

Enclosure: Licensee Event Report 270-2023-001 Rev.00

cc (w/Enclosure):

Ms. Laura Dudes, Administrator, Region II
U.S. Nuclear Regulatory Commission
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Atlanta, GA 30303-1257

Mr. Shawn Williams, Project Manager
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Mr. Jared Nadel
NRC Senior Resident Inspector
Oconee Nuclear Station

NRC FORM 366 (10-01-2023) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2024

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 email to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; email: oira_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.

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
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4. Title

Inappropriate Procedural Guidance for Planned Online Maintenance Results in Event or Condition that Could Have Prevented Fulfillment of a Safety Function

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	☐ 050	Docket Number
04	17	2023	2023	- 001 -	00	02	29	2024	Facility Name	☐ 052	Docket Number

9. Operating Mode	10. Power Level
1	100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

10 CFR Part 20	☐ 20.2203(a)(2)(vi)	**10 CFR Part 50**	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.1200(a)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	☐ 73.1200(b)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	☐ 73.1200(c)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)	☐ 73.1200(d)
☐ 20.2203(a)(2)(i)	**10 CFR Part 21**	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	**10 CFR Part 73**	☐ 73.1200(e)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.77(a)(1)	☐ 73.1200(f)
☐ 20.2203(a)(2)(iii)		☐ 50.73(a)(2)(i)(A)	☑ 50.73(a)(2)(v)(C)	☐ 73.77(a)(2)(i)	☐ 73.1200(g)
☐ 20.2203(a)(2)(iv)		☐ 50.73(a)(2)(i)(B)	☑ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)	☐ 73.1200(h)
☐ 20.2203(a)(2)(v)		☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)		

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

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Laura Boyce, Senior Nuclear Engineer, Oconee Regulatory Affairs	(864) 873-6774

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
D				Y						

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

16. Abstract (Limit to 1326 spaces, i.e., approximately 13 single-spaced typewritten lines)

On April 17, 2023, Oconee Unit 2 was operating at approximately 100 percent power. Planned maintenance began on the 2A Reactor Building Cooling Unit (RBCU) in the Unit 2 Reactor Building (RB) to clean the heat exchanger tubes. Sequenced steps resulted in a direct pathway from the Unit 2 Reactor Building to the environment through the Low Pressure Service Water (LPSW) return piping for less than one hour. At the completion of the maintenance, valve sequencing again resulted in a direct pathway from the Unit 2 RB to the environment through the LPSW supply and/or return piping for less than eight hours. Similar events occurred between April 18/19, 2023, for the cleaning of the 2C RBCU and March 2, 2023, for a leak repair on the 2B RBCU. The cause of these events was an error in applicable station procedure guidance which directed entry to TS 3.6.3 Condition C rather than entry to TS 3.6.1 Condition A. An immediate corrective action was taken to place station procedures for isolation of LPSW to the RBCUs on technical hold. Planned corrective actions include development of station procedure revisions to include appropriate TS condition entry guidance and training for licensed operators on application of Containment and Containment Isolation Valve Technical Specifications.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(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. LER NUMBER		
			YEAR	SEQUENTIAL NUMBER	REV NO.
Oconee Nuclear Station Unit 2	■ 050 ☐ 052	00270	2023	- 001	- 00

NARRATIVE

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

BACKGROUND

The Low Pressure Service Water (LPSW) system [BI, KG] provides cooling for essential and non-essential components in the Turbine Building (TB)[NM], Auxiliary Building (AB)[NF], and the Reactor Building (RB)[NH] and is required to be operable per Technical Specification (TS) 3.7.7. Units 1 and 2 have a shared system with three pumps supplying both units.

The three Reactor Building Cooling Units (RBCUs) [BK] are an engineered safety feature located in the RB [NH]. These units alone can provide design heat removal capacity following a loss-of-coolant accident with all three coolers operating by continuously circulating the steam-air mixture past the cooling tubes to transfer heat from the containment atmosphere to the low pressure service water and are required to be operable per TS 3.6.5.

Each RBCU is equipped with its own LPSW supply and return piping. The LPSW supply and return piping for each RBCU has a safety related function to serve as a closed-loop mechanical piping system inside containment forming the inside containment isolation barrier for the associated Reactor Building [NH] penetrations (Penetrations 30 and 34 for the 2A RBCU, Penetrations 32 and 35 for the 2B RBCU and Penetrations 31 and 33 for the 2C RBCU). These penetrations are equipped with isolation valves immediately outside the Unit 2 reactor building.

EVENT DESCRIPTION

On April 17, 2023, Oconee Unit 2 was operating at approximately 100 percent power. Planned maintenance began on the 2A RBCU in the Unit 2 Reactor Building to clean the heat exchanger tubes. The station procedure governing isolation for the work included the following sequence of steps:

1. close the outboard motor-operated isolation valve on the 2A RBCU LPSW supply line (2LPSW-16)
2. open a 1-inch vent valve inside the Unit 2 Reactor Building on the 2A RBCU LPSW supply line (2LPSW-532)
3. close the outboard motor operated isolation valve on the 2A RBCU LPSW return line (2LPSW-18)
4. open breakers to deactivate the outboard motor-operated isolation valves

These steps were sequenced with consideration for NRC Generic Letter 96-06 (Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions) which identified thermally induced overpressurization of isolated water-filled piping sections in containment could jeopardize the ability of accident- mitigating systems to perform their safety functions and could also lead to a breach of containment integrity via bypass leakage. Sequence steps 2 and 3 resulted in a direct pathway from the Unit 2 Reactor Building to the environment through the LPSW return piping when 2LPSW-532 was open concurrent with 2LPSW-18 being open. The duration of this condition was less than one hour. TS 3.6.3 Condition C was entered in accordance with guidance in the governing station procedure while 2LPSW-532 was open.

At the completion of the maintenance, valve sequencing again resulted in a direct pathway from the Unit 2 Reactor Building to the environment through the LPSW supply and return piping when a vent valve inside the Unit 2 Reactor Building was open concurrent with either 2LPSW-16 or 2LPSW-18 and 2LPSW-81 being opened for system fill and venting. The duration of this condition was less than eight hours.

A similar sequence of events was completed between April 18 and 19, 2023, for the cleaning of the 2C RBCU and the event timing/discussion is comparable. The duration of both the isolation and restoration sequences where valve alignments resulted in a direct pathway from the Unit 2 Reactor Building to the environment was less than one hour.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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Oconee Nuclear Station Unit 2	■ 050 ☐ 052	00270	2023	- 001	- 00

NARRATIVE

EVENT DESCRIPTION (CONT'D)
During an extent of condition review, it was discovered that a leak repair on the 2B RBCU, which occurred on March 2, 2023, utilized similar procedural controls, and implemented a similar sequence of events. The total duration of the isolation and restoration sequences where valve alignments resulted in a direct pathway from the Unit 2 Reactor Building to the environment was less than three hours.

REPORTABILITY
During times when both outboard isolation valve(s) and inboard vent valves were open during the planned maintenance evolutions for the 2A, 2B, and 2C RBCUs, the safety-related Structure, System, and Component (SSC) (containment) was inoperable as part of a planned evolution for maintenance done in accordance with approved procedure(s). However, the station did not recognize the impact to containment operability and the safety-related SSC (containment) was not declared inoperable as part of the planned evolution.

While none of the periods of containment inoperability exceeded Required Action times in applicable Conditions in TS 3.6.1, containment was inoperable as part of a planned evolution for maintenance, but the inoperability was not recognized in approved procedures. Therefore, there was an event or condition that could have prevented fulfillment of a safety function 10 CFR 50.73(a)(2)(v).

CAUSAL FACTORS
The cause of these events was an error in applicable station procedure guidance which directed entry to TS 3.6.3 Condition C rather than entry to TS 3.6.1 Condition A.

CORRECTIVE ACTIONS
Immediate:
Station procedures for isolation of LPSW to the RBCUs were placed on technical hold.

Planned:
1. Develop station procedure revisions for isolation of LPSW to the RBCUs to include appropriate TS condition entry guidance.
2. Provide training to licensed operators on application of Containment and Containment Isolation Valve Technical Specifications (TS 3.6.1 and TS 3.6.3, respectively).

SAFETY ANALYSIS
The inoperability of the Unit 2 containment resulting from the 2A RBCU cleaning activities was analyzed to determine its risk impact. It was determined the condition had a negligible impact to public health and safety. The applicable risk metric is LERF as the condition resulted in failing to satisfy the requirements established in TS 3.6.1 pertaining to operability of the containment structure. During isolation and restoration activities valves 2LPSW-532 and 2LPSW-18 were open concurrently resulting in a direct release pathway. The limiting orifice diameter for the vents used for isolation and restoration is approximately 0.75 inches. While this prevents operability of the containment from being achieved, the relatively small size of the release path would result in many core damage sequences failing to progress to a large early release. The time periods of applicability were limited to one hour during isolation and eight hours for restoration. An accident occurring during this limited window of time is very unlikely. Therefore, this event had a negligible impact to the health and safety of the public.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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NARRATIVE

SAFETY ANALYSIS (CONT'D)

The inoperability of the Unit 2 containment resulting from the 2C RBCU cleaning activities and the 2B RBCU leak repair were also analyzed to determine their risk impact. The configurations entered for the work were equivalent to that of the 2A RBCU cleaning activities. However, the durations of both the isolation and restoration sequences where valve alignments resulted in a direct pathway from the Unit 2 Reactor Building to the environment were less than one hour for the 2C RBCU cleaning and less than three hours for the 2B RBCU leak repair. Because less time was spent in the configurations of interest for the 2C RBCU cleaning activities and the 2B RBCU leak repair than the 2A RBCU cleaning activities, the risk analysis performed for the 2A RBCU cleaning activities bounds the risk associated with 2C RBCU cleaning activities and the 2B RBCU leak repair. Therefore, it can be concluded these events also had a negligible impact to the health and safety of the public.

ADDITIONAL INFORMATION

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

This event is considered INPO IRIS Reportable. There were no releases of radioactive materials, radiation exposures, or personnel injuries associated with this event.