Steven M. Snider
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RA-22-0063

February 8, 2022 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 Licenses: DPR-49

Subject: Licensee Event Report 270/2021-005, Revision 00 – Unit 2 Automatic Reactor Trip Due to Spurious Trip Signal Concurrent with System Testing

Licensee Event Report 270/2021-005, 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.

There are no unresolved corrective actions necessary to restore compliance with NRC requirements.

If there are questions, or further information is needed, contact Sam Adams, Regulatory Affairs, at (864) 873-3348.

Sincerely,

Steven M. Snider
Vice President
Oconee Nuclear Station

Enclosure: Licensee Event Report 270/2021-005 Rev.00

cc (w/Enclosure):

Ms. Laura Dudes, Administrator, Region II
U.S. Nuclear Regulatory Commission
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, GA 30303-1257

Mr. Shawn Williams, Project Manager
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Mail Stop O-08B1A
Rockville, MD 20852-2738

Mr. Jared Nadel
NRC Senior Resident Inspector
Oconee Nuclear Station

NRC FORM 366 (08-2020) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2023

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-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 ail: 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
Oconee Nuclear Station Unit 2	0500000270	1 OF 3

4. Title

Unit 2 Automatic Reactor Trip Due to Spurious Trip Signal Concurrent with System Testing

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
									NA	**05000**
12	10	2021	2021	005	00	02	08	2022	Facility Name	Docket Number
									NA	**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)
073	☐ 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)(ii)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
		☐ 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)
Sam Adams, Senior Nuclear Engineer, Oconee Regulatory Affairs	(864) 873-3348

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
N/A					N/A				

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

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

On December 10, 2021 at 0049 EST, with Unit 2 in MODE 1 at 73% power, an automatic reactor trip occurred. At the time of the trip, Unit 2 was in the process of power ascension following a refueling outage. The reactor trip was uncomplicated. Post-trip plant response was normal and plant conditions were controlled and maintained within the allowances of Technical Specifications with no safety system actuations.

Subsequent analysis determined the reactor tripped due to the 2B Reactor Protective System (RPS) channel being placed in “trip” via the Manual Trip Keyswitch during the performance of planned maintenance per procedure IP/2/A/0315/018B (TXS RPS Ch B Statalarm and Event Recorder Test and Manual Trip Keyswitch Test), and a concurrent momentary trip signal being received in the 2A RPS channel, thus satisfying the 2/4 trip logic. The momentary trip signal received in the 2A RPS Channel was determined to be caused by a short duration signal spike (200ms) on the 2NI-5 detector causing a Flux/Flow/Imbalance function trip in RPS Channel 2A.

This event was reported to the NRC on December 10, 2021, in Event Notification (EN) number 55638, as an 8-hour notification under 10 CFR 50.72(b)(2)(iv)(B) - Reactor Protection System (RPS) Actuation – Critical (Automatic Reactor Trip). The event is also reportable under 10 CFR 50.73(a)(2)(iv)(A) as an actuation of the RPS.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Oconee Nuclear Station Unit 2	0500000270	2021	005	00

NARRATIVE

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

BACKGROUND

The Oconee RPS [JC] functions are implemented through redundant sensors, measuring channels, logic, and actuation devices. These elements combine to form protective channels. Each protective channel is powered from a separate inverter-backed, safety-related power source. A total of four protective channels are implemented. The RPS initiates a reactor trip when any two of the four protective channels indicate that a trip is needed.

EVENT DESCRIPTION

On December 10, 2021 at 0049 EST, with Unit 2 in MODE 1 at 73% power, an automatic reactor trip occurred. At the time of the trip, Unit 2 was in the process of power ascension from a refueling outage. The reactor trip was uncomplicated. Post-trip plant response was normal and plant conditions were controlled and maintained within the allowances of Technical Specifications with no safety system actuations.

Subsequent analysis determined the reactor tripped due to the 2B Reactor Protection System (RPS) channel being placed in "trip" via the Manual Trip Keyswitch during the performance of planned maintenance per procedure IP/2/A/0315/018B (TXS RPS Ch B Statalarm and Event Recorder Test and Manual Trip Keyswitch Test), and a concurrent momentary trip signal being received in the 2A RPS channel, thus satisfying the 2/4 trip logic. The momentary trip signal received in the 2A RPS Channel was determined to be caused by a short duration signal spike (200ms) on the 2NI-5 detector [JI] causing a Flux/Flow/Imbalance function trip in RPS Channel 2A. 2NI-5 upper linear amplifier was replaced post trip.

Reportability

This event was reported to the NRC on December 10, 2021, in Event Notification (EN) number 55638, as an 8-hour notification under 10 CFR 50.72(b)(2)(iv)(B) - Reactor Protection System (RPS) Actuation – Critical (Automatic Reactor Trip). The event is also reportable as a 60-day written report under 10 CFR 50.73(a)(2)(iv)(A) as an actuation of the RPS.

CAUSAL FACTORS

A Cause Evaluation has determined that the Unit 2 Reactor Trip occurred due to a combination of:

1. The 2B RPS Channel [CHA] being placed in "trip" via the Manual Trip Keyswitch during performance of IP/2/A/0315/018B (TXS RPS Ch B Statalarm and Event Recorder Test and Manual Trip Keyswitch Test), and
2. a concurrent momentary flux/imbalance/flow trip signal being received in the 2A RPS Channel due to a 2NI-5 signal spike.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
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NARRATIVE

CORRECTIVE ACTIONS

Immediate:

1. Revised IP/2/A/0315/018 A,B,C,D TXS RPS Channel A,B,C,D Statalarm and Event Recorder Verification Test and Manual Trip Keyswitch Test procedures to separate the tests, allowing the “trip” portion to be performed during mode 3 and the alarm verification during mode 1 with a channel in “bypass.”
2. Replaced 2NI-5 upper linear amplifier.
3. Completed electrical testing for 2NI-5.

Planned:

1. Process procedure revision to change unit status for completion of Manual Trip Keyswitch portion for IP/1,2,3/A/0315/018 A,B,C,D TXS RPS Channel A,B,C,D Statalarm and Event Recorder Verification Test and Manual Trip Keyswitch Test procedures.
2. Training to Operations, Maintenance, and Engineering.
3. Address degradation issues found during electrical testing.

SAFETY ANALYSIS

The automatic reactor trip of Oconee Unit 2 on December 10, 2021 is considered to be an uncomplicated reactor trip event with no impact on public health and safety. The post-trip response was as expected with main feedwater flow to the steam generators maintained throughout the event. No Emergency Core Cooling System (ECCS) or other automatic safety system actuations occurred in response to this event and no other equipment problems were experienced that required unusual operator actions. It was noted that one main steam relief valve failed to fully reseat at the normal expected pressures; however, the steam leakage was relatively small, and no safety limits were challenged. The valve was subsequently reseated by following procedural guidance to incrementally lower steam generator pressure. A post-trip review found no procedural or human performance issues with the operator response to the event. With the exception of the Standby Shutdown Facility (SSF) Reactor Coolant Makeup Pump (RCMUP) [P], there were no important plant systems out of service or other safety significant activities being conducted at the time of the trip. The SSF RCMUP being out of service does not have a significant impact on core damage risk for a reactor trip event where all electrical power sources and normal RCP seal cooling are maintained. Therefore, it is it is concluded that the impact on core damage risk was very small and the event had no impact on public health and safety.

ADDITIONAL INFORMATION

A review of Duke Energy’s Corrective Action Program did not identify any Oconee LERs or events in the last 3 years that involved 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.