Ameren MISSOURI

Callaway Plant

March 7, 2022

ULNRC-06713

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

10 CFR 50.73

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
RENEWED FACILITY OPERATING LICENSE NPF-30
LICENSEE EVENT REPORT 2022-001-00
REACTOR TRIP DURING REACTOR TRIP BREAKER SURVEILLANCE TESTING

The enclosed licensee event report (LER) is submitted in accordance with 10CFR50.73(a)(2)(iv)(A) to report a reactor protection system actuation (reactor trip) and auxiliary feedwater actuation.

This letter does not contain new commitments.

Sincerely,

Fred Bianco
Senior Director, Nuclear Operations

Enclosure
LER 2022-001-00

cc: Mr. Scott A. Morris
Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. M. Chawla
Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop 08B1A
Washington, DC 20555-0001

Index and send hardcopy to QA File A160.0761

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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 https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. Facility Name	2. Docket Number	3. Page
Callaway Plant, Unit No. 1	05000483	1 OF 4

4. Title

Reactor Trip During Reactor Trip Breaker Surveillance Testing

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
										05000
01	07	2022	2022	- 001 -	00	03	07	2022	Facility Name	Docket Number
										05000

9. Operating Mode	10. Power Level
MODE 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)	☐ 50.36(c)(2)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	**10 CFR Part 73**
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(4)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(i)	**10 CFR Part 21**	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(1)(i)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(i)
☐ 20.2203(a)(2)(iii)	**10 CFR Part 50**	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.77(a)(2)(ii)
☐ 20.2203(a)(2)(iv)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2203(a)(2)(v)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	

☐ **Other** (Specify here, in Abstract, or in NRC 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include Area Code)
T. B. Elwood, Supervising Engineer, Regulatory Affairs and Licensing	314-225-1905

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	JG	RLY	T405	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 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

With the plant at full power on January 7, 2022, an undetected relay failure caused the solid-state reactor protection system (SSPS) to actuate during restoration from a Reactor Trip Breaker 'B' Trip Actuating Device Operational Test, thus resulting in an unplanned reactor trip.

The reactor trip was reported per Event Notification 55698 in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 50.72(b)(3)(iv)(A).

The cause of the reactor trip was that procedure OSP-SB-0001B, "Reactor Trip Breaker 'B' Trip Actuating Device Operational Test," did not include adequate instructions for verifying the absence of a "B" train General Warning trip signal prior to operating the "A" train Multiplexer Test Switch during test restoration. This was due to inadequate guidance for development of the procedure.

Corrective Actions include revising Operations surveillance procedures to include verification of green and amber test lights at panel SB032B during restoration and revising Operations and I&C surveillance procedures to include verification that contacts for relays that have actuated during the test have changed back to their normal state, prior to test restoration. Additional corrective actions include revising the procedure preparation process, improving the screening and incorporation of Operating Experience, improving lesson plans, conducting training, placing operator aids adjacent to the Multiplexer Test Switch, and requiring an inspection on other master relays.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Callaway Plant, Unit No. 1	05000-483	2022	- 001	- 00

NARRATIVE

1. DESCRIPTION OF STRUCTURE(S), SYSTEM(S), AND COMPONENT(S):

The systems and components affected by this event include the reactor protection system (RPS) and the solid-state protection system (SSPS).

The RPS at Callaway Plant initiates a unit shutdown, based on the values of selected unit parameters, to protect against violating the core fuel design limits and reactor coolant system pressure boundary design limits during anticipated operational occurrences and to assist the Engineered Safety Features systems in mitigating accidents.

2. INITIAL PLANT CONDITIONS:

Callaway was in MODE 1 at approximately 100% rated thermal power at the time of this event. No major safety related systems were out of service.

3. EVENT DESCRIPTION:

On January 7, 2022 at 1223 with the reactor at approximately 100% rated thermal power, the reactor automatically tripped as a result of a set of contacts internal to SSPS 'B' train Master Relay SB032CK524 that failed to close. Safety systems functioned as expected. The Operations staff responded to the event in accordance with applicable plant procedures. An ENS notification (EN# 55698) was made for this event at 1629 hours on January 7, 2022.

Prior to the reactor trip, Operations and Instrumentation and Control (I&C) personnel coordinated the performance of ISF-SB-00A32, "SSPS Trn B Functional Test," and OSP-SB-0001B, "Reactor Trip Breaker 'B' Trip Actuating Device Operational Test," to perform regularly scheduled Technical Specification surveillances on the "B" Train Solid State Protection System and "B" Train Reactor Trip Breaker. All steps in both procedures were performed as written, with I&C completing ISF-SB-00A32 as briefed prior to the performance of Section 6.4 of OSP-SB-0001B.

With I&C testing completed, Operations proceeded with the performance of Section 6.4 for the Trip Breaker 'B' Trip Actuating Device Operational Test (TADOT), which closes Reactor Trip Breaker Bypass Breaker "B" in order to conduct testing that opens Reactor Trip Breaker "B". By design, closing Reactor Trip Breaker Bypass Breaker "B" creates a General Warning signal which has the potential to trip the reactor if a second General Warning signal is received. After testing was completed and during the restoration of Section 6.4, once Reactor Trip Breaker "B" was closed, Reactor Trip Breaker Bypass Breaker "B" was opened.

In accordance with OSP-SB-0001B, Operations verified that Annunciator 76A, "SSPS B GENERAL WARNING," was clear and that the General Warning red light on panel SB029B for SSPS Train 'B' was off. These indications led Operators to believe that the General Warning signal was no longer present, and consequently, the Operators proceeded on with Step 6.4.45 to return the multiplexer test switch through "Inhibit" to the "A+B" position at SB029B. Moving the multiplexer test switch through "Inhibit" is known to generate a second General Warning signal, but this is required to restore SSPS to the normal configuration. When Operations performed Step 6.4.45 to place the multiplexer test switch through "Inhibit" at SB029B, a reactor trip occurred unexpectedly.

Per plant design, an auxiliary feedwater system actuation occurred as expected in response to the reactor trip. Also, consistent with plant response to a reactor trip from a high power level, a main feedwater isolation signal was generated.
Following the reactor trip, an erratic position indication was observed for one feedwater isolation valve, but the valve was subsequently confirmed to be closed. In addition, one intermediate range nuclear instrumentation channel failed. Other nuclear instrumentation channels functioned correctly to indicate the shutdown state of the reactor. These failures did not complicate the

Operators' response to the event.

After the immediate actions of procedure E-0, "Reactor Trip or Safety Injection," were performed, and once the plant was stabilized, Operations contacted I&C to investigate the cause of the failure. I&C discovered that the green test light was de-energized on panel SB032B. After reviewing the appropriate electrical drawings, failure of the 6-10 contacts for relay SB032CK524 was identified as a potential cause. With permission from Operations, relay SB032CK524 was mechanically agitated. This caused the green test light on SB032B to illuminate, indicating that the 6-10 contacts had previously not properly closed.

4. ASSESSMENT OF SAFETY CONSEQUENCES:

There were no actual nuclear, radiological, or personnel safety impacts associated with this event. The potential impact was on nuclear safety with respect to challenging the reactor trip system as well as any potential challenges to the plant due to the transient associated with a reactor trip. However, the reactor automatically tripped (i.e., shut down) per design, and all safety systems functioned as designed with the minor exceptions as described above in the Event Description section.

5. REPORTING REQUIREMENTS:

This LER is submitted pursuant to 50.73(a)(2)(iv)(A) to report a reactor protection system actuation during surveillance testing, as well as an auxiliary feedwater actuation. Specifically, 10 CFR 50.73(a)(2)(iv)(A) states in part, "The licensee shall report:

(A) Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section…

(B) The systems to which the requirements of paragraph (a)(2)(iv)(A) of this section are:

(1) Reactor protection system (RPS) including: reactor scram or reactor trip….

(6) PWR auxiliary or emergency feedwater system.

The Callaway plant RPS was actuated on January 7, 2022 at 1223. This fulfills the reporting requirement of 10 CFR 50.73(a)(2)(iv)(A) by actuation of the system specified in 10 CFR 50.73(a)(2)(iv)(B)(1).

A valid auxiliary feedwater system actuation was initiated after the reactor trip. This fulfills the reporting requirement of 10 CFR 50.73(a)(2)(iv)(A) by actuation of the system specified in 10 CFR 50.73(a)(2)(iv)(B)(6).

6. CAUSE OF THE EVENT:

The cause of the reactor trip was that procedure OSP-SB-0001B, "Reactor Trip Breaker 'B' Trip Actuating Device Operational Test," did not include adequate instructions for verifying the absence of a "B" train General Warning trip signal prior to operating the "A" train multiplexer test switch during test restoration. This was due to inadequate guidance for development of the procedure.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Callaway Plant, Unit No. 1	05000-483	2022	- 001	- 00

7. CORRECTIVE ACTIONS:

Corrective Actions include revising Operations surveillance procedures to include verification of green and amber test lights at panel SB032B (A) prior to operation of the multiplexer test switch and revising Operations and I&C surveillance procedures to include verification that contacts for relays that actuated during the test have changed back to their normal state prior to test restoration. Additional corrective actions include revising the procedure preparation process, improving the screening and incorporation of Operating Experience, improving lesson plans, conducting training, placing operator aids adjacent to the multiplexer test switch, and requiring an inspection on other master relays.

8. PREVIOUS SIMILAR EVENTS:

No previous occurrences of a reactor trip due to inadequate verification that a "B" ("A") train general warning trip signal did not exist prior to the operation of the "A" ("B") train multiplexer test switch have occurred at Callaway Plant. There were three previous occurrences of reactor trips that occurred in 2020 (listed below), but there is no commonality in the causes of those reactor trips in comparison to the cause of the reactor trip described in this LER.

1. LER 2020-002, "Reactor Trip and AFW Actuation Following Spurious MFRV Closure," submitted via Ameren Missouri letter ULNRC-06585, dated June 3, 2020 (Accession Nos. ML20155K872, ML20155K873)

2. LER 2020-006, "Reactor Trip due to Main Generator Ground Fault, submitted via Ameren Missouri letter ULNRC-06620, dated November 25, 2020 (Accession Nos. ML20330A266, ML20330A267)

3. LER 2020-008, "Reactor Trip due to Main Generator Ground Fault," submitted via Ameren Missouri letter ULNRC-06638, dated February 18, 2021 (Accession No. ML21049A109)