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Paul Wood
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10 CFR 50.73

W3F1-2020-0071

December 30, 2020

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

Subject: Licensee Event Report (LER) 2020-003-00
LER 2020-003-00 Procedure Deficiency for MG Set Voltage Regulator Installation Results in a Reactor Trip

Waterford Steam Electric Station, Unit 3 (Waterford 3)
NRC Docket No. 50-382
Renewed Facility Operating License No. NPF-38

The enclosed report is being sent pursuant to 10 CFR 50.73.

This letter contains no new regulatory commitments.

Should you have any questions or require additional information, please contact Paul Wood, Regulatory Assurance Manager, at 504-464-3786.

Respectfully,

Paul

Digitally signed by Paul Wood
Date: 2020.12.30 13:50:58 -06'00'

Regulatory Assurance Manager

PIW/jkb

Enclosure: Waterford 3 Licensee Event Report 2020-003-00

cc: NRC Region IV Regional Administrator
NRC Senior Resident Inspector – Waterford 3
NRC Project Manager – Waterford 3

Enclosure

W3F1-2020-0071

Waterford 3 Licensee Event Report 2020-003-00

NRC FORM 366 (08-2020) | U.S. NUCLEAR REGULATORY COMMISSION | APPROVED BY OMB: NO. 3150-0104 | EXPIRES: 08/31/2023

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
Waterford Steam Electric Station, Unit 3	05000382	1 OF 3

4. Title

Procedure Deficiency for MG Set Voltage Regulator Installation Results in a Reactor Trip

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
										05000
11	02	2020	2020	003	00	12	30	2020	Facility Name	Docket Number
										05000

9. Operating Mode	10. Power Level
1	42

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)
Paul Wood - Manager, Regulatory Assurance	(504) 464-3786

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	AA	RG	G080 General Electric	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)

In preparation for the return to service from an outage, operators were unable to achieve the desired voltage while attempting to place Control Element Drive Mechanism (CEDM) motor generator set B in service. A faulty voltage regulator was removed from the system, repaired onsite, and reinstalled.

On November 2, while paralleling MG set B with MG set A, an automatic reactor trip occurred due to a ground on the voltage regulator card's neutral circuit. All control rods inserted and there were no complications. The plant was stabilized in Mode 3. The direct cause of the ground on MG Set B was incorrectly installed voltage regulator insulator stand-offs allowing a short to ground to occur when the system was put into service. The voltage regulator was repaired, tested, and installed. Procedural changes to prevent repetition are being made.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Waterford Steam Electric Station, Unit 3	05000-382	2020	003	00

NARRATIVE

Plant Conditions:

At the time of this event Waterford 3 was operating at 42% reactor power (Mode 1). There were no other structures, systems or components out of service that contributed to this event.

Event Description:

10/28/2020: While attempting to place CEDM motor generator set B [AA, MG] in service, Operators were unable to achieve the desired voltage. With the generator up to rated speed, voltage was not able to be set at the required steady state value. CEDM MG Set B was shutdown. A Failure Modes Analysis (FMA) was completed and the probable cause was determined to be a faulty voltage regulator card.

10/28/2020: An emergent issue team (EIT) attempted to place the B motor generator set for the Control Element Drive Mechanism in service as part of return to power from refuel outage completion. On first attempt, the B MG set would not achieve rated voltage. The EIT determined the voltage regulator [AA, RG] for the MG set to be the probable failure mode.

10/29/2020 – 11/01/2020: A work order was planned to refurbish/rework voltage regulator for CEDM MG set B. Multiple attempts were made to procure a spare, repair, and replace the voltage regulator. The card had been rebuilt in the electronic card repair shop onsite due to a prior failed attempt to start up the MG set due to a faulty voltage regulator. The attempts to make repairs to the voltage regulator were conducted over several shifts involving technicians and engineers.

10/31/2020 at 2125: Reactor was taken critical.

11/1/2020: Voltage regulator was repaired, and the voltage regulator card was reassembled incorrectly (with the lower insulating stand-offs incorrectly located) and installed. MG set B was started up to burn in the repaired card and verify proper operation.

11/2/2020 0415: MG set B was being paralleled with MG set A [AA, MG]. When the generator neutral circuit was closed, a reactor trip occurred due to a ground on the neutral circuit. The ground caused excessive current draw such that current was lost to the control element assemblies (CEA) being held in position by the A MG Set. Rods dropped into the core causing an automatic scram.

All control rods inserted, all equipment required for shutdown functioned as designed and there were no complications. The plant was stabilized in Mode 3. The cause of the ground on MG Set B was that the recently rebuilt voltage regulator card insulators were not configured in a position to prevent a short to ground when the voltage regulator was reinstalled in the cabinet.

The event was reported under 10 CFR 50.72(b)(2)(iv)(B) as an event or condition that results in actuation of the reactor protection system (RPS) when the reactor is critical (EN 54978).

This report is being made pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in automatic actuation of the RPS including a reactor trip.

Safety Assessment:

The documented condition has no impact on the safety related function of the CEAs to insert into the Reactor core on a Reactor trip. This function relies on the Reactor Trip Breakers to open and the CEDM coils to de-energize which occurred.

The actual consequence was an automatic reactor trip from 42% power during startup after Refueling Outage 23. There were no other actual consequences to general safety of the public, nuclear safety, industrial safety, and radiological safety for this event. The impact to nuclear safety was minimal.

Event Cause(s):

The Root Cause of this event was that the procedural guidance used for Motor Generator set B voltage regulator repairs did not contain the level of detail needed to ensure that the lower insulating stand-offs were correctly located when the card was reassembled before burn-in.

Contributing Cause 1 of this event was that a qualified and knowledgeable I&C tech working from memory reassembled the chassis of the Motor Generator Set B voltage regulator card with the lower insulating stand-offs (spacers) incorrectly located.

Corrective Actions:

1) The voltage regulator was replaced, tested, and installed.

2) The corrective action to preclude repetition is to include the following formal practices in card repair procedure MI-004-300: (1) Maintenance Configuration Control practices during disassembly/reassembly of equipment components in for card repair (before and after pictures, drawings, like-for-like comparisons) and (2) Verify items leaving Card Repair for installation in plant [peer check or supervisor]. This will be a documented verification step with sign-off and date. This action is planned to be implemented.

3) Develop and complete a “Read and Sign” covering this incident for all Instrumentation and Control personnel. This action is planned to be implemented.

Previous Similar Events:

A voltage regulator failure was experienced in January of 2019 during RF22, and the condition was resolved by replacement of the voltage regulator card. On March 10, 2019, while attempting to start up CEDM MG Set B, Waterford personnel were unable to achieve Local Generator voltage of 240 VAC. MG set B output voltage was unable to set at the required level. This failure was attributed to infant mortality of a replaced subcomponent or aged subcomponents not addressed in refurbishment.