Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

May 8, 2019

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Unit 3
Renewed Facility Operating License No. DPR-68
NRC Docket No. 50-296

Subject: **Licensee Event Report 50-296/2019-001-00**

The enclosed Licensee Event Report provides details of an automatic reactor scram due to a turbine load reject. The Tennessee Valley Authority is submitting this report in accordance with Title 10 of the Code of Federal Regulations 50.73(a)(2)(iv)(A), as any event or condition that resulted in a manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B).

There will be a supplement to this Licensee Event Report due to an ongoing evaluation.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact J. L. Paul, Nuclear Site Licensing Manager, at (256) 729-2636.

Respectfully,

D. L. Hughes
Site Vice President

Enclosure: Licensee Event Report 50-296/2019-001-00 – Automatic Reactor Scram Due to a Turbine Load Reject

cc (w/ Enclosure):

NRC Regional Administrator - Region II NRC Senior Resident Inspector - Browns Ferry Nuclear Plant
NRC Project Manager - Browns Ferry Nuclear Plant

NRC FORM 366 (04-2018) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001,or by e-mail to Infocollects. Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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4. Title

Automatic Reactor Scram Due to Turbine Load Reject

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
03	09	2019	2019	001	00	05	08	2019	N/A	N/A
									Facility Name: N/A	Docket Number: N/A

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)
100	☐ 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)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 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)
Mimi King-Patterson, Licensing Engineer	256-614-7225

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☒ Yes (If yes, complete 15. Expected Submission Date) ☐ No		07	07	2019

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

On March 9, 2019, at approximately 2259 Central Daylight Time (CDT), Browns Ferry Unit 3 received an automatic Reactor SCRAM from 100 percent power as a result of a Turbine Load Reject. Browns Ferry Unit 3 declared a Notification of Unusual Event due to loss of all offsite AC power. The automatic SCRAM occurred as a Licensed Reactor Operator (LRO) made adjustments to lower incoming reactive power on Unit 3 at the request of the Balancing Authority. Without the presence of time or situational pressure, the LRO incorrectly operated a hand switch and changed the automatic voltage regulator (AVR) from auto to manual and adjusted Mega Volt Amps Reactive (MVAR) beyond the Under Excitation Limiter protection setting. As a result, the generator circuit breaker tripped causing a Turbine Load reject and automatic SCRAM. All safety systems actuated as designed.

A supplement to this Licensee Event Report will be provided due to an ongoing evaluation.

As an interim action, a plastic cover was placed over the manual/auto select voltage regulator hand switch on all three Units to mitigate unintentional operation of the AVR from automatic to manual control. The Operating Instruction procedure for the Turbine Generator System was revised to prompt Operations personnel to validate the initial status of the AVR prior to adjusting MVAR.

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Browns Ferry Nuclear Plant, Unit 3	05000296	2019	- 001	- 00

NARRATIVE

I. Plant Operating Conditions Before the Event

At the time of discovery, Browns Ferry Nuclear Plant (BFN), Unit 3, was in Mode 1 at approximately 100 percent power.

II. Description of Event

A. Event Summary

On March 9, 2019, at approximately 2259 Central Daylight Time (CDT), Browns Ferry Unit 3 received an automatic Reactor SCRAM from 100 percent power as a result of a Turbine [TRB] Load Reject. The automatic SCRAM occurred as a Licensed Reactor Operator (LRO) made adjustments to lower incoming reactive power on Unit 3 at the request of the Balancing Authority (BA). The request was made by the BA to address a high voltage condition on the 500 kV transmission system.

During the adjustment, a LRO incorrectly operated a hand switch [HS], placing the Automatic Voltage Regulator [RG] (AVR) in manual control, and adjusted Mega Volt Amps Reactive (MVAR) beyond the Under Excitation [EXC] Limiter (UEL) protection setting. After two seconds, the generator excitation remained below the protection setting, which initiated a loss of excitation trip resulting in loss of the generator exciter field. Incoming MVAR and current increased on all three generator phases resulting in actuation of generator overcurrent protective relays [RLY] and opening of the Unit 3 high-side breakers [BKR]. The generator circuit breaker tripped causing a Turbine Load Reject and automatic SCRAM.

Systems that actuated as a result of the automatic SCRAM include those listed in Title 10 of the Code of Federal Regulations (CFR) 50.73(a)(2)(iv)(B). Primary Containment Isolation Systems [JE] (PCIS) Groups 1, 2, 3, 6, and 8 isolation signals were received. High Pressure Coolant Injection [BG] (HPCI) and Reactor Core Isolation Cooling [BN] (RCIC) initiated on low reactor water level. All four Unit 3 Diesel Generators [EK][DG] (DGs) started and loaded as expected and supplied AC power to their respective 4kV Shutdown Boards as designed.

Browns Ferry Unit 3 declared a Notification of Unusual Event (NOUE) due to loss of all offsite AC power.

The Tennessee Valley Authority (TVA) is submitting this report in accordance with Title 10 CFR 50.73(a)(2)(iv)(A), as any event or condition that resulted in a manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B).

B. Status of structures, components, or systems that were inoperable at the start of the event and that contributed to the event

There were no structures, systems, or components (SSCs) whose inoperability contributed to this event.

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C. Dates and approximate times of occurrences

Dates	Time (CDT)	Occurrence
March 9, 2019	2259	Browns Ferry Unit 3 received an automatic Reactor SCRAM from 100 percent power.
March 9, 2019	2312	Operations declared a Notification of Unusual Event, EN 53922.
March 10, 2019	0338	Operations personnel performed 4 and 8 hour notifications to NRC Headquarters for EN 53923.
March 10, 2019	1310	Operations Shift Manager exited the Notification of Unusual Event.

D. Manufacturer and model number of each component that failed during the event
No components failed during this event.

E. Other systems or secondary functions affected
No other systems or secondary functions were affected by this event.

F. Method of discovery of each component or system failure or procedural error
Based on Operations personnel statements, the LRO initially used a series of bumps to try to make the adjustment. When the indications did not show any change, the LRO held the switch for two to three seconds and then the SCRAM occurred.

G. The failure mode, mechanism, and effect of each failed component
No components failed during this event.

H. Operator actions
Appropriate operator actions were taken in response to the SCRAM and recovery from the SCRAM.

I. Automatically and manually initiated safety system responses
Automatic actuation of safety systems include those listed in 10 CFR 50.73(a)(2)(iv)(B).

III. Cause of the event

A. Cause of each component or system failure or personnel error
The direct cause of this event was determined to be that an LRO incorrectly operated a hand switch and changed the voltage regulator from auto to manual.

B. Cause(s) and circumstances for each human performance related root cause
There will be a supplement to this Licensee Event Report due to an ongoing evaluation.

IV. Analysis of the event

The voltage regulator manual/ auto select hand switch was operated incorrectly, thereby swapping the AVR from automatic to manual control mode. In this mode of operation, the dynamic

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limiter is removed, which allows Operations personnel to adjust MVAR below the UEL. The dynamic protection setpoint (10 percent protection limit) remains active when in manual mode. After reaching the setpoint of the 10 percent protection limit, the AVR swapped active channels. Seconds later, with MVAR still below the limit, the AVR tripped the exciter circuit breaker. As excitation lowered, the generator began to reverse power, resulting in the Turbine trip and automatic reactor SCRAM.

V. Assessment of Safety Consequences

This event resulted in the automatic actuation of safety systems. This event did not result in the inoperability or unavailability of any system to provide their required safety functions. Therefore, this condition was of low safety significance and had negligible impact on the health and safety of the public.

A. Availability of systems or components that could have performed the same function as the components and systems that failed during the event

No systems or components failed during this event.

B. For events that occurred when the reactor was shut down, availability of systems or components needed to shutdown the reactor and maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident

This event did not occur when the reactor was shutdown.

C. For failure that rendered a train of a safety system inoperable, estimate of the elapsed time from discovery of the failure until the train was returned to service

Safety system availability was not impacted by this event.

VI. Corrective Actions

Corrective Actions are being managed by TVA's Corrective Action Program (CAP) under Condition Report 1497448 .

A. Immediate Corrective Actions

- A plastic cover was installed over the manual/auto select voltage regulator hand switch [HS] on Units 1, 2, and 3 to mitigate unintentional operation of the AVR from automatic to manual control.
- Units 1, 2, and 3 Operating Instruction procedure for the Turbine Generator System, was revised to prompt Operators to validate the initial status of the AVR prior to adjusting MVAR.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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B. Corrective Actions to Prevent Recurrence or to reduce the probability of similar events occurring in the future

There will be a supplement to this Licensee Event Report due to an ongoing evaluation to determine corrective actions to prevent recurrence or to reduce the probability of similar events occurring in the future.

VII. Previous Similar Events at the Same Site

A review of the BFN CAP and Licensee Event Reports for Units 1, 2, and 3 found no instances of reactor SCRAMs similar to this event within the past five years.

VIII. Additional Information

There is no additional information.

IX. Commitments

There are no new commitments.