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

February 12, 2021

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Units 1, 2, and 3
Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68
NRC Docket Nos. 50-259, 50-260, and 50-296

Subject: **Licensee Event Report 50-259/2020-002-01**

Reference: Letter from TVA to NRC, "Licensee Event Report 50-259/2020-002-00," dated December 14, 2020 (ML20349A310).

The enclosed Licensee Event Report (LER) provides details of the Standby Gas Treatment System Train B being inoperable for longer than allowed by plant Technical Specifications. The Tennessee Valley Authority is submitting this report in accordance with Title 10 of the Code of Federal Regulations 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's Technical Specifications. The enclosed LER has been revised to update the cause of the event and the corrective actions.

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,

M. M. Rasmussen
Site Vice President

Enclosure: Licensee Event Report 50-259/2020-002-01 – Standby Gas Treatment System Train B Inoperable Longer Than Allowed by Technical Specifications

cc (w/ Enclosure):

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

ENCLOSURE

Browns Ferry Nuclear Plant
Units 1, 2, and 3

Licensee Event Report 50-259/2020-002-01

Standby Gas Treatment System Train B Inoperable Longer Than Allowed by Technical Specifications

See Enclosed

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 FOIA, Library, and Information Collections 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)

1. Facility Name	2. Docket Number	3. Page
Browns Ferry Nuclear Plant, Unit 1	05000259	1 OF 6

4. Title

Standby Gas Treatment System Train B Inoperable Longer Than Allowed by Technical Specifications

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
10	13	2020	2020	- 002 -	01	02	12	2021	Browns Ferry Nuclear Plant, Unit 2	05000260
									Facility Name	Docket Number
									Browns Ferry Nuclear Plant, Unit 3	05000296

9. Operating Mode	10. Power Level
5	0

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)
☐ 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 NRC 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Baruch Calkin, Licensing Engineer	256-614-6713

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	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
☒ No	☐ Yes (If yes, complete 15. Expected Submission Date		N/A	N/A	N/A

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 13, 2020, at approximately 1200 Central Daylight Time (CDT), Standby Gas Treatment System (SGT) train B was declared inoperable upon discovery that the Relative Humidity (RH) Heater breaker was tripped. The breaker was reset, and SGT B was declared operable at 1955 CDT after a successful confidence run. On October 19, 2020, at approximately 2340 CDT, SGT train B was declared inoperable upon discovery that the RH heater breaker had tripped a second time. On October 30, 2020, a Past Operability Evaluation determined that SGT Train B was inoperable for longer than the Unit 1, 2, and 3 Technical Specifications Limiting Condition of Operation 3.6.4.3 seven day allowed outage time for a single inoperable SGT subsystem.

This event most likely resulted from a loose wire and lug, on the rear of the breaker, which was unlikely to have been visible during installation. The apparent cause of this event was lack of specific guidance on when to remove molded case breakers for inspection for maintenance workers when performing troubleshooting on such breakers. The CA to prevent or preclude recurrence is to revise site procedures to provide a specific troubleshooting checklist, and instruction on when to remove molded case breakers for inspection. An information sharing on this event and on troubleshooting requirements located within site procedures will be provided to all Senior Reactor Operators.

NARRATIVE

I. Plant Operating Conditions Before the Event

At the time of discovery, Browns Ferry Nuclear Plant (BFN), Unit 1, was in Mode 5 at 0 percent power. BFN Unit 2 was in Mode 1 at approximately 100 percent power and Unit 3 was in Mode 1 at approximately 100 percent power.

II. Description of Event

A. Event Summary

On October 13, 2020, at approximately 1200 Central Daylight Time (CDT), Standby Gas Treatment System (SGT) [BH] train B was declared inoperable upon discovery that the Relative Humidity (RH) Heater breaker [BKR] was tripped. Troubleshooting was performed, and no equipment fault was found. The breaker was reset, and SGT B was declared operable at 1955 CDT after a successful confidence run.

On October 19, 2020, at approximately 2340 CDT, SGT train B was declared inoperable upon discovery that the RH heater breaker had tripped a second time. On October 20, 2020, the breaker was replaced, a loose terminal wire was repaired, and SGT B was declared operable at 1330 CDT after a successful confidence run.

On October 30, 2020, a Past Operability Evaluation determined that SGT Train B was inoperable for longer than the Unit 1, 2, and 3 Technical Specifications (TS) Limiting Condition of Operation (LCO) 3.6.4.3 seven day allowed outage time for a single inoperable SGT subsystem.

The Tennessee Valley Authority (TVA) is submitting this report in accordance with Title 10 of the Code of Federal Regulations 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's TS.

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

C. Dates and approximate times of occurrences

Dates and Approximate Times (CDT)	Occurrence
October 13, 2020, 1200	SGT B RH Heater breaker discovered tripped. SGT B declared inoperable.
October 13, 2020, 1400	SGT B placed in service for maintenance.
October 13, 2020, 1955	SGT B declared operable
October 19, 2020, 2340	SGT B RH Heater breaker discovered tripped. SGT B declared inoperable.
October 20, 2020, 1130	SGT B placed in service for data collection.
October 20, 2020, 1330	SGT B declared operable.

D. Manufacturer and model number of each component that failed during the event

There were no components that failed during this event.

E. Other systems or secondary functions affected

No other systems or secondary functions were affected.

F. Method of discovery of each component or system failure or procedural error

The RH heater breaker was found to be tripped during a walkdown of the associated electrical panel [BD].

G. The failure mode, mechanism, and effect of each failed component

There were no components that failed during this event.

H. Operator actions

None

I. Automatically and manually initiated safety system responses

No automatic or manual safety systems were initiated as a result of this event.

III. Cause of the event

The direct cause of this event was a loose wire and lug, on the rear of the breaker, which was unlikely to have been visible during installation.

A. Cause of each component or system failure or personnel error

The apparent cause of this event was lack of specific guidance on when to remove molded case breakers for inspection for maintenance workers when performing troubleshooting on such breakers.

B. Cause(s) and circumstances for each human performance related root cause

A contributing cause for this event was non-conservative decision making and procedural non-compliance in declaring the "B" SBGT operable, after troubleshooting did not produce an actual cause for the trip of the breaker.

IV. Analysis of the event

The safety objective of the SGT System is to provide a means for minimizing the release of radioactive material from the containment to the environment by filtering and exhausting the air from any or all zones of the Reactor Building and maintaining the building at a negative pressure (such that air leakage is into, not out of, the building) during containment isolation conditions. Elevated release is assured by exhausting to the plant stack. The three redundant fifty percent capacity SGT trains share a common suction manifold. In this way, each of the three trains is connected to all three reactor zones and the refueling zone. Upon an accident signal, all three SGTS units will start.

Troubleshooting revealed that the breaker had a loose lead wire at the lug termination. It is unlikely that the SGT B RH heater would have functioned properly during a seismic event. Therefore, SGT B was considered inoperable. TS LCO 3.6.4.3 requires that three SGT subsystems shall be operable in Modes 1, 2, and 3, and/or during operations with a potential for draining the reactor vessel. TS LCO 3.6.4.3 Condition A requires that, with one SGT subsystem inoperable, the subsystem must be restored to operable status within seven days.

NARRATIVE

A Past Operability Evaluation determined that SGT B was inoperable from October 13, 2020 at 1200 CDT, to October 20, 2020 at 1330 CDT when SGT B was declared operable following repairs. The allowed outage time for a SGT train was seven days from the time the train was declared inoperable, and therefore expired at 1200 on October 20, 2020. From this time until the time when SGT B was declared operable at 1330 the same day, the Required Actions of TS LCO 3.6.4.3 Condition A was not completed. Therefore, BFN was in violation of its TS during this time.

V. Assessment of Safety Consequences

SGT is not credited in the Internal Events PRA model of record for BFN. It is also not credited in the Fire PRA model of record, for BFN, to prevent core damage or large early release. Additionally, SGT A and C remained operable, and SGT B remained available, throughout this event. Therefore, failure of the SGT B RH heater breaker is considered to be of very low safety significance.

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

SGT trains A and C remained operable during the 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 involve or result in the unavailability of any required systems or components needed to shutdown the reactor and maintain safe shut down conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident. SGT A and C remained operable.

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

The SGT B subsystem was determined to have been inoperable for approximately seven days, from 1200 CDT on October 13, 2020, to 1330 on October 20, 2020.

VI. Corrective Actions

Corrective Actions (CAs) for this event are being managed under Condition Reports 1644285, 1645805, and 1649674.

NARRATIVE

A. Immediate Corrective Actions

The following immediate CAs were taken following the second trip on October 19, 2020:

- The breaker was replaced.
- A loose wire on the load side of the terminal was tightened.

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

Revise procedures to create a specific troubleshooting checklist for molded case breakers, to add instruction on when to remove molded case breakers for inspection, and to refer the user to NPG-SPP-06.14, section 3.4 for direction when the cause of a trip is not identified through troubleshooting.

As an additional CA, an information sharing on this event and on troubleshooting requirements located within site procedures will be provided to all Senior Reactor Operators.

VII. Previous Similar Events at the Same Site

A search of BFN LERs and CAP found two previous examples within the last ten years of SGT trains which were rendered inoperable due to failed electrical components:

- Licensee Event Report 50-259/2018-006-00, 'Standby Gas Treatment System Train C Inoperable Longer Than Allowed by Technical Specifications', reported a SGT train which was found to be inoperable due to a failed handswitch [HS].
- Licensee Event Report 50-259/2012-008-01, Standby Gas Treatment System Train C Inoperable Longer Than Allowed by Technical Specifications', reported a SGT train which was found to be inoperable due to a missing bottom retaining device in the breaker bucket of the 2A Motor Control Center, which resulted in inadequate engagement of the breaker stab to the C phase of the electrical supply bus.

VIII. Additional Information

There is no additional information.

IX. Commitments

There are no new commitments.