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

December 6, 2018

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 50-259/2018-006-00**

The enclosed Licensee Event Report provides details of the Standby Gas Treatment System Train C 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.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact M.W. Oliver, Acting Nuclear Site Licensing Manager, at (256) 729-7874.

Respectfully,

D. L. Hughes
Site Vice President

Enclosure: Licensee Event Report 50-259/2018-006-00 – Standby Gas Treatment System Train C Inoperable Longer Than Allowed by Technical Specifications

cc (w/ Enclosure):

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

ENCLOSURE

Browns Ferry Nuclear Plant
Units 1, 2, and 3

Licensee Event Report 50-259/2018-006-00

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

See Enclosed

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

LICENSEE EVENT REPORT (LER)

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

1. Facility Name	2. Docket Number	3. Page
Browns Ferry Nuclear Plant, Unit 1	05000259	1 OF 5

4. Title

Standby Gas Treatment System Train C 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	Rev No.	Month	Day	Year	Facility Name	Docket Number
10	06	2018	2018	- 006	- 00	12	06	2018	BFN, Unit 2	05000260
									Facility Name: BFN, Unit 3	Docket Number: 05000296

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)
80	☐ 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)
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 ICES	Cause	System	Component	Manufacturer	Reportable to ICES
B	BH	HS	G080	Y	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		N/A	N/A	N/A

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

On October 6, 2018, at approximately 0001 Central Standard Time (CST), Standby Gas Treatment (SGT) System train C failed to automatically start in response to a Primary Containment Isolation signal which was received after Unit 3 was manually scrammed in support of the Unit 3 Cycle 6 forced outage. SGT train C was manually started. SGT trains A and B started automatically as expected.

On October 18, 2018, a Past Operability Evaluation determined that SGT Train C 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 apparent cause of this event was the failure of a handswitch contact to close because of a loose cracked phenolic barrier plate inside the switch which impeded switch rotation. This crack was most likely the result of external forces on the switch and existed prior to the failure.

Corrective actions for this condition are to replace the failed handswitch, to replace all other handswitches affected by this condition, and to add a log note to the switch's catalog ID to inspect new switches for barrier plate damage prior to installation.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 1	05000259	2018	- 006	- 00

NARRATIVE

I. Plant Operating Conditions Before the Event

At the time of discovery, Browns Ferry Nuclear Plant (BFN), Unit 1, was in Mode 1 at approximately 80 percent power. BFN Unit 2 was in Mode 1 at 100 percent power and Unit 3 was in Mode 3 at approximately 0 percent power for the Unit 3 Cycle 6 forced outage.

II. Description of Event

A. Event Summary

On October 6, 2018, at approximately 0001 Central Standard Time (CST), Standby Gas Treatment (SGT) System train C failed to automatically start in response to a Primary Containment Isolation signal which was received after Unit 3 was manually scrammed in support of the Unit 3 Cycle 6 forced outage. SGT train C was manually started. SGT trains A and B started automatically as expected.

On October 18, 2018, a Past Operability Evaluation determined that SGT Train C 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 structures, systems, or components (SSCs) whose inoperability contributed to this event.

C. Dates and approximate times of occurrences

Dates & Approximate Times	Occurrence
September 27, 2018 2345 CDT	Last known successful use of hand switch [HS] HS-66-69A/2.
October 06, 2018 0002 CDT	SGT C started manually after failing to start automatically. SGT C declared inoperable.
October 8, 2018 0954 CDT	SGT C declared operable.

NARRATIVE

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

The failed component during this event was the SGT train C hand switch 0-HS-065-069A/2. The model number for the hand switch is SB-10, and it is manufactured by the General Electric Company.

E. Other systems or secondary functions affected

There were no other systems or secondary functions affected by this event.

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

On October 6, 2018, SGT System train C fan motor failed to start automatically after Unit 3 was manually scrammed in support of the Unit 3 Cycle 6 forced outage. The SGT System train C had to be manually started from panel 2-9-25.

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

The switch contact failed to close because of a loose cracked phenolic barrier plate inside the switch which impeded switch rotation. This crack most likely existed prior to the failure and was most likely the result of external forces on the switch.

H. Operator actions

SGT train C was manually started from panel 2-9-25.

I. Automatically and manually initiated safety system responses

No safety system responses resulted from this event.

III. Cause of the event

SGT C failed to start because of the failure of the hand switch contact to close.

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

The most likely cause of the hand switch failure was a crack in a phenolic barrier plate inside the switch due to external forces during handling or maintenance.

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

There was no human performance related root cause.

NARRATIVE

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 50-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.

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. Condition B requires, with the required action of Condition A not met in Modes 1, 2, or 3, that the applicable Unit be in Mode 3 within twelve hours and Mode 4 within thirty-six hours.

A Past Operability Evaluation determined that SGT C was inoperable from September 27, 2018 when the switch was last manipulated successfully, to October 8, 2018 when SGT C was declared operable following maintenance. During this time the Required Actions of TS LCO 3.6.4.3 Conditions A and B were not completed. Therefore, BFN was in violation of its TS during this time.

V. Assessment of Safety Consequences

A qualitative Probabilistic Risk Assessment (PRA) was performed and concluded that automatic start of SGT is not credited in the Internal Events PRA Model of Record Revision 8. It is also not credited in the Fire PRA model of record to prevent core damage or large early release. Therefore, failure of SGT train C to automatically start is considered to be of 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 B remained available to automatically start during the time SGT train C failed to automatically start.

NARRATIVE

B. For events that occurred when the reactor was shut down, availability of systems or components needed to shut down 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 shut down 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 B remained operable. Operations personnel were able to manually start SGT C.

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

This event resulted in inoperability of the SGT Train C for a time longer than allowed by TS from the last time the SGT train C hand switch was operated on September 27, 2018, until the SGT train C was declared inoperable on October 6, 2018. The switch was replaced and SGT C was returned to service on October 8, 2018.

VI. Corrective Actions

Corrective actions for this event are being managed under Condition Report 1454001.

A. Immediate Corrective Actions

The SGT train C hand switch was replaced.

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

1. All other switches affected by this condition will be replaced.
2. A log note will be added to the switch's catalog ID to inspect new switches for barrier plate damage prior to installation.

VII. Previous Similar Events at the Same Site

A search of LERs and the BFN Corrective Action Program found no instances within the past five years of SGT inoperability resulting from a failed switch.

VIII. Additional Information

There is no additional information.

IX. Commitments

There are no new commitments.