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

September 6, 2019

10 CFR 50.73

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

Browns Ferry Nuclear Plant, Unit 1
Renewed Facility Operating License No. DPR-33
NRC Docket No. 50-259

Subject: **Licensee Event Report 50-259/2019-001-00**

The enclosed Licensee Event Report provides details of the High Pressure Coolant Injection System Declared Inoperable due to Steam Supply Isolation. The Tennessee Valley Authority is submitting this report in accordance with Title 10 of the Code of Federal Regulations 50.73(a)(2)(v)(D).

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, Site Licensing Manager, at (256) 729-7874.

Respectfully,

S. M. Bono
Site Vice President

Enclosure: Licensee Event Report 50-259/2019-001-00 – High Pressure Coolant Injection System Declared Inoperable due to Steam Supply Isolation

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)

1. Facility Name	2. Docket Number	3. Page
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4. Title

High Pressure Coolant Injection System Declared Inoperable due to Steam Supply Isolation

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
									N/A	N/A
07	12	2019	2019	- 001 -	00	09	06	2019	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)
Denzel Housley, Licensing Engineer	256-729-7643

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		11	12	2019

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

On July 12, 2019, at approximately 1640 Central Daylight Time (CDT), the Unit 1 High Pressure Coolant Injection (HPCI) system unexpectedly received a Group 4 Primary Containment Isolation System (PCIS) signal which closed the HPCI inboard and outboard steam supply valves. Operations personnel declared HPCI inoperable and entered Technical Specification (TS) 3.5.1, "Emergency Core Cooling System (ECCS) - Operating," Condition C.

The direct cause of this event was that Electrical Maintenance personnel tested incorrect electrical termination points during the performance of procedure EPI-0-075-RLY001, "Functional Test of Pressure Suppression Chamber Head Tank Pump Suction Valve Interlock Relays," which resulted in an unexpected Group 4 PCIS actuation. HPCI was returned to standby readiness and declared operable on July 12, 2019 at 2110 CDT, thus exiting TS 3.5.1 Condition C.

The immediate corrective action for this event was to remove the involved workers from the field with the workers disqualified and remediated prior to being returned to work.

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

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		YEAR	SEQUENTIAL NUMBER	REV NO.
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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 100 percent power.

II. Description of Event

A. Event Summary

On July 12, 2019, at approximately 1640 Central Daylight Time (CDT), the High Pressure Coolant Injection (HPCI) system [EIIS:BJ] unexpectedly received a Group 4 Primary Containment Isolation System (PCIS) [EIIS:JM] signal which closed the HPCI inboard and outboard steam supply valves (1-FCV-73-0002 and 1-FCV-73-0003) [EIIS:ISV]. Operations personnel declared HPCI inoperable and entered Technical Specification (TS) 3.5.1, "Emergency Core Cooling System (ECCS) - Operating," Condition C and verified that Reactor Core Isolation Cooling (RCIC) [EIIS:BN] was operable as required. In response to the isolation, Abnormal Operating Instruction 1-AOI-64-2b, "Group 4 High Pressure Coolant Injection Isolation," was entered.

Investigation of this event discovered that Electrical Maintenance personnel were performing procedure EPI-0-075-RLY001, "Functional Test of Pressure Suppression Chamber Head Tank Pump Suction Valve Interlock Relays," at the time of this event and had tested terminal points in the incorrect panel [EIIS:PL]. This resulted in completing the circuitry for the Group 4 PCIS actuation. HPCI was returned to standby readiness and declared operable on July 12, 2019 at 2110 CDT, thus exiting TS 3.5.1 Condition C.

The Tennessee Valley Authority (TVA) is submitting this report in accordance with Title 10 of the Code of Federal Regulations (10 CFR) 50.73(a)(2)(v)(D), as any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

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.

NARRATIVE

C. Dates and approximate times of occurrences

Dates and Approximate Times	Occurrence
July 12, 2019, 1640 CDT	HPCI isolation occurs. HPCI declared inoperable.
July 12, 2019, 2110 CDT	HPCI returned to operational status. Total time HPCI was inoperable was 4 hours 30 minutes.

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

There was no failure of a component for 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

The event was self revealing when a Group 4 PCIS signal was received.

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

There was no failure of a component for this event.

H. Operator actions

Operations personnel declared the HPCI system inoperable, entered 1-A0I-64-2b, entered TS 3.5.1, Condition C, and verified that the RCIC system was operable.

I. Automatically and manually initiated safety system responses

During this event, an inadvertent Group 4 PCIS isolation of the HPCI system occurred. A Group 4 PCIS isolation closes the steam supply valves to HPCI in the event of high steamline space temperature, high steam flow, low steamline pressure, or high pressure between diaphragm rupture discs on the HPCI turbine exhaust. These signals are indicative of a line break in the HPCI system steamline to the turbine or high pressure in the turbine steam supply line. At the time of the event, these conditions did not exist.

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NARRATIVE

III. Cause of the event

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

The direct cause of this event was that Electrical Maintenance personnel tested incorrect electrical termination points during the performance of EPI-0-075-RLY001 which resulted in an unexpected Group 4 PCIS actuation.

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

Workers were performing a functional test of the Pressure Suppression Chamber Head Tank pump suction valve interlock relays [EIIS:RLY] per EPI-0-075-RLY0011. Workers failed to recognize that the terminal connections for the tested relays were in two different panels (Panel 1-9-32 and Panel 1-9-33). Both panels have the same terminal nomenclature, so the terminal points in Panel 1-9-32 were incorrectly tested instead of the terminal points in Panel 1-9-33.

The HPCI system is provided to assure that the reactor is adequately cooled to limit fuel cladding temperature in the event of a small break in the nuclear system and loss of coolant which does not result in rapid depressurization of the reactor vessel. The HPCI system permits the nuclear plant to be shut down, while maintaining sufficient reactor vessel water inventory until the reactor vessel is depressurized. The HPCI system continues to operate until the reactor vessel pressure is below the pressure at which Low Pressure Coolant Injection [EIIS:BO] operation or Core Spray system [EIIS:BM] operation maintains core cooling. In this event, HPCI would have been unable to perform its safety function while the steam supply isolation valves were closed due to the Group 4 PCIS isolation.

V. Assessment of Safety Consequences

This event resulted in inoperability of the single train of the HPCI system resulting in the inability of the HPCI system to fulfill its safety functions to remove residual heat and mitigate the consequences of an accident. During this event, the RCIC system remained operable and the ADS system was operable to facilitate core cooling by low pressure ECCS systems if needed. The cause of the Group 4 PCIS isolation was determined and HPCI was returned to service in a short time (4.5 hours) and within the allowed outage time of TS 3.5.1. During the time period that the HPCI system was inoperable, sufficient systems were available to provide the required safety functions to protect the health and safety of the public. Based on the above, the TVA has concluded that sufficient systems were available to provide the required safety functions needed to protect the health and safety of the public.

NARRATIVE

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

During this event, RCIC was verified as operable by Operations personnel and all other ECCS and ADS systems remained operable.

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

HPCI was inoperable from the time of the Group 4 PCIS actuation on July 12, 2019 at 1640 CDT until it was returned to service on July 12, 2019 at 2110 CDT. The lapsed time for inoperability of the HPCI system was 4.5 hours.

VI. Corrective Actions

Corrective Actions are being managed by the TVA's corrective action program under Condition Report (CR) 1532170.

A. Immediate Corrective Actions

1. The involved workers were immediately removed from the field with the workers disqualified and remediated prior to being returned to work.

2. All work performed from the time of the event was risk reviewed by shop superintendents and approved by maintenance director until the issue could be defined and communicated.

3. The Maintenance department implemented a "Stop Work" on Monday July 15, 2019 to inform workers of this event.

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.

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NARRATIVE

VII. Previous Similar Events at the Same Site

A search of BFN Licensee Event Reports (LERs) for Units 1, 2, and 3 within the last three years identified one previous event involving a HPCI isolation that caused HPCI to be inoperable.

LER 259/2018-004-01 reported a HPCI isolation that occurred on July 9, 2018. During performance of surveillance procedure 1-SR-3.3.6.1.2(3B), High Pressure Coolant Injection System Steam Supply Low Pressure Functional Test, an unexpected HPCI isolation occurred. The most likely cause of the unexpected Unit 1 HPCI isolation was operation of a pressure switch near the manufacturer's electrical contact current ratings. No personnel error was involved in this event.

VIII. Additional Information

There is no additional information.

IX. Commitments

There are no new commitments.