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

August 5, 2016

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 50-296/2016-006-00**

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), as an event or condition that could have prevented the fulfillment of the safety function of structures or systems which are needed to mitigate the consequences of an accident.

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,

S. M. Bono
Site Vice President

Enclosure: Licensee Event Report 50-296/2016-006-00 – High Pressure Coolant Injection System Found to be Inoperable During Testing.

cc (w/ Enclosure):

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

ENCLOSURE

Browns Ferry Nuclear Plant
Unit 3

Licensee Event Report 50-296/2016-006-00

High Pressure Coolant Injection System Found to be Inoperable During Testing

See Enclosed

NRC FORM 366 (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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
Browns Ferry Nuclear Plant, Unit 3	05000296	1 OF 8

4. TITLE

High Pressure Coolant Injection System Found to be Inoperable During Testing

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
06	08	2016	2016	- 006 -	00	08	05	2016	FACILITY NAME	DOCKET NUMBER
									N/A	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)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
100	☐ 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)*
Ryan Coons, Licensing Engineer	256-729-2070

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	BJ	XCV	T147	Y					

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 15 single-spaced typewritten lines)*

During a surveillance test on June 8, 2016, the BFN, Unit 3, High Pressure Coolant Injection (HPCI) Turbine Stop Valve Mechanical Trip Valve behaved erratically upon turbine start. Troubleshooting and maintenance on the valve led to discovery of a condition that could have resulted in the HPCI system being unable to perform its required safety function in a Mode where HPCI Operability was required.

The inoperability was caused by the HPCI Turbine Stop Valve Mechanical Trip Valve's Reset Spring, which was deformed and weakened from years of continuous compression. The spring was replaced and the system was returned to service on June 10, 2016.

Corrective actions to prevent recurrence include revising preventive maintenance procedures to specify replacement of the Trip Tappet, Piston, and Reset Spring on a defined periodicity. Additionally, procedures will be revised to require testing the as-left breakaway force a minimum of three times to ensure repeatability. Preventative maintenance procedures will also be revised to clarify that lift force checks after spring compression adjustments shall be conducted with the auxiliary oil pump running.

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 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 100 percent power.

II. Description of Events

A. Event:

On June 8, 2016 at 1037 Central Daylight Time (CDT), the BFN, Unit 3, High Pressure Coolant Injection (HPCI) system [BJ] was manually tripped following erratic operation upon turbine [TRB] start during a surveillance. In accordance with the surveillance procedures, the turbine steam supply valve (3-FCV-73-16) [FCV] was opened to supply steam to the turbine. Both the HPCI stop valve (3-FCV-73-18) [FCV] and control valve (3-FCV-73-19) [FCV] operated slowly and erratically.

The HPCI turbine steam supply valve open signal, which also starts the auxiliary HPCI oil pump [P], was given at 1026 CDT. The expected system response was that the HPCI turbine stop valve would begin to open approximately 10 to 13 seconds later. However, the stop valve did not begin moving until 63 seconds after the start signal was given. The stop valve stayed open for 14 seconds before spuriously closing. The stop valve then remained closed for 8 seconds, then reopened, and the system appeared to operate normally.

Troubleshooting identified that the HPCI Turbine Stop Valve Mechanical Trip Valve (i.e. "HPCI mechanical trip valve," 3-XCV-73-18) [XCV] was operating erratically. The HPCI mechanical trip valve must remain in its normal "stand-by" position during HPCI operation to allow the HPCI stop valve to remain open. If the HPCI mechanical trip valve is re-positioned, either by manually lifting its reset knob, or by the overspeed (OS) trip weight striking the bottom of the tappet assembly, then the control oil to the HPCI stop valve is dumped, closing the HPCI stop valve under spring pressure. The failure of this reset spring resulted in erratic HPCI stop valve operation during the system start on June 8, 2016. Because of this degradation in system reliability, Operations declared the HPCI system inoperable.

The Unit 3 HPCI system had been declared inoperable prior to the event, on June 8, 2016 at 0925, to perform a routine surveillance. Operability was restored on June 10, 2016 at 0555 CDT, following a HPCI oil system check. The maintenance associated with the HPCI mechanical trip valve was not part of pre-planned maintenance activities. This event was determined to be reportable as a safety system functional failure in accordance with NUREG-1022, because the HPCI system, a single-train safety system, could have been prevented from performing its safety function in a Mode where HPCI Operability is required.

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 00

NARRATIVE

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 and Approximate Times	Occurrence
June 8, 2016 at 0925 CDT	Unit 3 HPCI was declared inoperable for a planned surveillance test.
June 8, 2016 at 1013 CDT	Pre-startup trip tests were completed.
June 8, 2016 at 1026 CDT	Unit 3 HPCI turbine was given an initiation signal in accordance with the surveillance procedure, but the system failed to start properly.
June 8, 2016 at 1037 CDT	HPCI turbine was manually tripped and returned to standby readiness following erratic operation upon turbine start.
June 8, 2016 at 1500 CDT	HPCI surveillance test completed with an unsatisfactory (UNSAT) result.
June 9, 2016 at 0130 CDT	Mechanical Maintenance Group performed a HPCI oil system check as a part of troubleshooting activities, which revealed that the failure of the Mechanical Trip Valve reset spring caused the event, and not air in the oil system.
June 10, 2016 at 0555 CDT	Unit 3 HPCI system is declared Operable.

D. Manufacturer and model number (or other identification) of each component that failed during the event:

The inoperable valve was a Terry Steam Turbine Company mechanical trip valve, model CCS.

E. Other systems or secondary functions affected:

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

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 00

NARRATIVE

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

Valve inoperability was discovered during the scheduled performance of 3-SR-3.5.1.7, HPCI Main and Booster Pump Set Developed Head and Flow Rate Test at Rated Reactor Pressure, when the turbine steam supply valve was opened to supply steam to the turbine. The control room observed erratic turbine operation, and the turbine was manually tripped shortly thereafter.

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

The HPCI mechanical trip valve failed due to insufficient Reset Spring force, caused by end-of-life failure. The spring was permanently deformed by continual compression, and it was 3/16 inches shorter than its replacement. The failed spring also lacked resiliency when compressed; the specification for the trip force is 2-5 pounds (lbs), but post-event maintenance found that the trip force was less than 1 lb. There is no documented history of this spring having ever been replaced on Unit 3 HPCI; although the tappet had been damaged and replaced, the old spring was reinstalled.

H. Operator actions:

The event began when the Unit 3 HPCI system was manually tripped following erratic operation upon turbine start. In accordance with the surveillance procedure, the turbine steam supply valve was opened to supply steam to the turbine. Operators in the Unit 3 Control Room noted that the turbine showed no immediate response followed by a turbine tripped alarm, and that both the HPCI stop valve and the HPCI control valve operated slowly and erratically.

I. Automatically and manually initiated safety system responses:

There were no automatic or manual safety system responses associated with this event.

III. Cause of the event

A. The cause of each component or system failure or personnel error, if known:

The HPCI mechanical trip valve failed due to insufficient Reset Spring force, caused by end-of-life failure. The spring was permanently deformed by continual compression.

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

The preventive maintenance (PM) that implements procedure MCI-0-073-TRB001, HPCI Turbine - Terry Turbine CCS - Disassembly, Inspection, Rework and Reassembly, did not contain a requirement to specify that the trip tappet, spring, and piston require replacement as part of the valve's 10 year overhaul.

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 00

NARRATIVE

IV. Analysis of the event:

The Tennessee Valley Authority (TVA) is submitting this report in accordance with Title 10 of the Code of Federal Regulations 50.73(a)(2)(v)(D), as an 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. It was determined that the HPCI mechanical trip valve was inoperable due to the end-of-life failure of the valve's reset spring, which caused it to generate insufficient force. The condition was discovered on June 8, 2016, during a planned surveillance. While the HPCI system was already declared inoperable to perform the surveillance, the discovery of a condition that could have led to the system being declared inoperable in a Mode where Operability is required is considered a reportable event, in accordance with NUREG-1022.

System availability was impacted by this event, since HPCI is a single-train system. The HPCI Turbine Stop Valve Mechanical Trip Valve (i.e. "HPCI mechanical trip valve") functions as part of the HPCI OS trip sequence, to trip the turbine and allow it to automatically re-start. Final Safety Analysis Report (FSAR) Section 7.4, Emergency Core Cooling Control, states that the only protection devices that can act to interrupt planned Emergency Core Cooling System (ECCS) operation are those which must act to prevent complete component or system failure; the HPCI turbine OS trip is one such protection device. The HPCI mechanical trip valve may also be used locally to trip the turbine. Turbine OS protection and local manual trip capability are not specified safety functions of the HPCI system, since these functions do not contribute to the system's core cooling function. However, the HPCI mechanical trip valve must remain in its normal "stand-by" position during HPCI operation to allow the HPCI stop valve to remain open. If the HPCI mechanical trip valve is re-positioned, either by manually lifting its reset knob, or by the OS trip weight striking the bottom of the tappet assembly, then the control oil to the HPCI stop valve is dumped, closing the HPCI stop valve under spring pressure. The reset spring failure resulted in erratic HPCI stop valve operation during the system start on June 8, 2016. Because of this degradation in system reliability, Operations declared the HPCI system inoperable.

V. Assessment of Safety Consequences

This event resulted in inoperability of the single train of the BFN, Unit 3, HPCI system, resulting in the inability of the HPCI system to perform its required safety function to mitigate the consequences of an accident.

Several alternate methods were available to Operations personnel in the event of an emergency to provide core cooling, safe and sustainable shutdown of the reactor, residual heat removal, and mitigation of accident consequences. For Design Basis Accidents, adequate core cooling was ensured by the operability of the other low pressure ECCS injection/spray subsystems in conjunction with the Automatic Depressurization System (ADS). All ADS valves were operable during the time period and ADS initiation capability was maintained during this time period. Additionally, two Core Spray [BM] subsystems and two Low Pressure Coolant Injection [BO] subsystems, all low pressure ECCS subsystems, and their initiation capability, remained operable. While this even caused a

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 00

NARRATIVE

Reactor Core Isolation Cooling (RCIC) suction pressure alarm, this transient was very brief and RCIC remained operable and able to perform its required function as an alternate high pressure injection system through the duration of this event.

This event was resolved within the 14 day completion time required by TS LCO 3.5.1, Condition C. Therefore, BFN Unit 3 remained in an analyzed safe condition throughout this event.

The initial system response on June 8, 2016, during the HPCI pre-startup trip checks, was that the HPCI stop valve operated normally. Therefore, it is reasonable to conclude that if a valid HPCI initiation signal was given prior to the performance of the HPCI pre-startup check, that the HPCI system would have started normally and provided the design flow rate to the reactor vessel. This operation would not have been challenged by the insufficient force on the Reset Spring unless the HPCI system was tripped by overspeed, by locally by manual operation of the HPCI stop valve. However, overspeed trip and manual trip functionality are not specified safety functions of the HPCI system.

Based on the above, during the time period that the HPCI system was inoperable, TVA has concluded that sufficient systems were available to provide the required safety functions needed to protect 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:

While this event caused the RCIC Turbine Suction Pressure Low alarm to annunciate, RCIC was verified to be operable by Operations personnel. During this event, all other Emergency Core Cooling Systems, including the Automatic Depressurization System, were available to mitigate abnormal and accident conditions.

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 occur when the reactor was shutdown.

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

Approximately two days elapsed between the time of discovery and returning the train to service.

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 00

NARRATIVE

VI. Corrective Actions:

Corrective Actions are being managed by TVA's corrective action program under Condition Report (CR) 1179483.

A. Immediate Corrective Actions

A troubleshooting work order was initiated, which found the HPCI Turbine Step Valve Mechanical Trip Valve Reset Spring was deformed and weakened from years of continuous compression. The spring was replaced and HPCI was returned to service.

B. Corrective Actions to Prevent Recurrence

Corrective actions to prevent recurrence include revising procedures to:

- Specify replacement of the Trip Tappet, Piston, and Reset Spring on a defined periodicity.
- Require recording the as-left breakaway force a minimum of three times, and selecting the lowest value as the most accurate. To ensure repeatability, additional tests shall be performed if the lowest two recorded values are not within 0.5 lb of each other.
- Clarify that the performance of the lift force check after adjusting the spring compression shall be conducted with the aux oil pump running.

VII. Additional Information:

A. Previous Similar Events:

A similar event occurred on February 11, 2012, when the HPCI Stop Valve failed to open following a simulated HPCI Turbine Overspeed (OS) Trip. During a BFN, Unit 3, HPCI System quarterly surveillance, personnel verified the proper operation of the HPCI Turbine Mechanical trip valve. During the event in question, when personnel lifted the trip tappet, it never fell to reset the system; the stop valve remained closed instead of opening again. During troubleshooting personnel mechanically agitated the trip tappet by stroking it up and down while rotating the assembly, with the auxiliary oil pump running, until the tappet began operating correctly. The tappet was then rotated to various positions and repeatedly pulled to verify its repeatability over all angles. The trip tappet was able to fall, reset, and fulfill surveillance conditions. Later investigations found metal shavings the area, and the event was attributed to debris blocking the piston port. The mechanical agitation removed the debris, correcting the problem. The duplex oil filters should prevent debris from traveling from the tank to the piston. Additionally, the oil tank was drained and cleaned.

These conditions will also be addressed by the corrective actions (CAs) for the event described in this report, by making changes to the PM and the maintenance procedures to clean the HPCI

NRC FORM 366A (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet 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) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Browns Ferry Nuclear Plant, Unit 3	05000296	2016	- 006	- 00

NARRATIVE

Turbine Overspeed OS Trip valve internals every 10 years, as part of periodic tappet, piston, and spring replacement.

B. Additional Information:

There is no additional information.

C. Safety System Functional Failure Consideration:

In accordance with NUREG-1022, this event is considered a safety system functional failure. HPCI pre-startup trip checks on June 8, 2016 verified normal operation of the HPCI stop valve trip function. These checks included a manual trip of the HPCI stop valve, which demonstrated proper operation of the Reset Spring, at 0954 CDT. Operators declared HPCI inoperable due to erratic indications during surveillance testing at 1026 CDT. Valve troubleshooting and the replacement of the Reset Spring were not part of pre-planned maintenance, causing a period of unplanned operability which lasted until June 10, 2016 at 0555 CDT. HPCI was then inoperable for an unexpected condition that could have prevented HPCI from performing its safety function for approximately two days, while in a Mode where HPCI Operability was required.

D. Scram with Complications Consideration:

This event did not result in a reactor scram.

VIII. COMMITMENTS

There are no new commitments.