



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

April 25, 2016

10 CFR 50.73

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

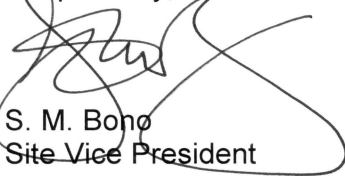
Browns Ferry Nuclear Plant, Unit 3
Renewed Facility Operating License No. DPR-68
NRC Docket No. 50-296

Subject: **Licensee Event Report 50-296/2016-003-00**

The enclosed Licensee Event Report provides details of the main steam isolation valve leaking in excess of Technical Specification requirements. The Tennessee Valley Authority is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation or condition prohibited by Technical Specifications.

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 50-296/2016-003-00 – Main Steam Isolation Valve
Leaking in Excess of Technical Specification Requirements

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 50-296/2016-003-00

Main Steam Isolation Valve Leaking in Excess of Technical Specification Requirements



LICENSEE EVENT REPORT (LER)

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.

1. FACILITY NAME

Browns Ferry Nuclear Plant (BFN), Unit 3

2. DOCKET NUMBER

05000296

3. PAGE

1 OF 6

4. TITLE

Main Steam Isolation Valve Leaking in Excess of Technical Specification Requirements

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
02	23	2016	2016	- 003	- 00	04	25	2016	N/A	N/A
									N/A	N/A

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
5	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL 000	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

Justin Garner, Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

256-729-7955

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
E	SB	FCV	A585	Y	N/A	N/A	N/A	N/A	N/A

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR
N/A	N/A	N/A

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On February 23, 2016, at approximately 0405 Central Standard Time, during performance of Primary Containment Local Leak Rate Testing (LLRT) of the Main Steam lines, the 3B Outboard Main Steam Isolation Valve (MSIV) failed its as-found LLRT. Because the MSIV failed to meet the leak rate limit, Browns Ferry Nuclear Plant, Unit 3, operated longer than allowed by Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.1.3. In addition, TS LCO 3.0.4 was not met for each applicable Mode change since the last recorded as-found MSIV leak rate test on March 16, 2014, when the leak rates were below the leak rate limit.

The cause of the event was wear on the seating surface of the pilot poppet seat. Corrective action included replacing the valve stem containing a new pilot poppet, resurfacing the seat and restoration of the valve actuator.

The safety significance of this condition was minimal since the 3B Inboard MSIV was available to perform the safety function.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Browns Ferry Nuclear Plant, Unit 3	05000296	YEAR	SEQUENTIAL NUMBER	REV NO.
		2016	- 003	- 00

NARRATIVE

I. PLANT OPERATING CONDITIONS BEFORE THE EVENT

At the time of the event, Browns Ferry Nuclear Plant (BFN), Unit 3, was at zero percent power in Mode 5 during a planned shutdown for a refueling outage.

II. DESCRIPTION OF EVENT

A. Event

On February 23, 2016, at approximately 0405 Central Standard Time (CST), during the performance of surveillance procedure 3-SR-3.6.1.3.10 (B-OUTBD), Primary Containment Local Leak Rate Test Main Steam Line B Outboard: Penetration X-7B, the Main Steam Line B Outboard Isolation Valve (BFN-3-FCV-001-0027)[FCV], exceeded Technical Specification (TS) allowable leakage rate. The as-found leakage rate for valve BFN-3-FCV-001-0027 was 79.493 standard cubic feet per hour (scfh), which is greater than the allowable administrative limit of 60 scfh. The administrative limits were previously established to address the non-conservative TS referenced in Updated Reply to Notice of Violation; EA-11-252; and follow-up to 10 CFR 50.9, "Completeness and accuracy of information". As a compensatory action, the administrative limit for each Main Steam Isolation Valve (MSIV) is less than 60 scfh and the combined leakage rate limit for all four main steam lines is less than 85 scfh when tested at a minimum of 25 pounds per square inch gauge (psig). The administrative limits are more restrictive than what is currently stated in Technical Specifications. These limits have been adopted as the acceptance criteria in the Primary Containment Total Leak Rate station procedures.

BFN, Unit 3, TS Limiting Condition for Operation (LCO) 3.6.1.3 requires each primary containment isolation valve, except reactor building-to-suppression chamber vacuum breakers, to be operable in reactor Modes 1, 2, and 3 and when associated instrumentation is required to be operable per LCO 3.3.6.1, "Primary Containment Isolation Instrumentation." With one or more penetration flow paths with MSIV leakage not within limits, Required Action D.1 requires leakage rate to be restored to within limit in 4 hours, Required Actions E.1 and E.2 require the unit to be placed in Mode 3 in 12 hours and in Mode 4 in 36 hours. Also, TS LCO 3.0.4 prohibits Mode changes when a LCO is not met except under certain conditions that were not applicable to this event.

Since the MSIV failed to meet the leak rate limit and no specific time of failure could be determined, BFN Unit 3, operated longer than allowed by TS 3.6.1.3 with an inoperable MSIV. In addition, TS LCO 3.0.4 was not met for each applicable Mode change since the last recorded as-found MSIV leak rate test on March 16, 2014, when the leak rate was below the limit.

B. Inoperable Structures, Components, or Systems that Contributed to the Event

The 3B Outboard MSIV failed its as-found local leak rate test (LLRT). There were no other structures, components, or systems that were inoperable at the start of this event that contributed to the event.

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C. Dates and Approximate Times of Occurrences

3/16/14	The 3B Outboard MSIV as-found and as-left leak rate were recorded as 39.7227 scfh. This leak rate was within allowable limit (60 scfh).
2/23/16	The 3B Outboard MSIV as-found leak rate was recorded as 79.493 scfh. This leak rate was NOT within allowable limit (60 scfh).
3/24/16	The 3B Outboard MSIV as-left leak rate was recorded as 9.554 scfh. This leak rate was within allowable limit (60 scfh).

D. Manufacturer and Model Number of Components that Failed

The failed component was the Main Steam Line B Outboard Isolation Valve (BFN-3-FCV-001-0027). This component was manufactured by Atwood & Morrill Company, Incorporated, with a manufacturer model number of 20851-H-26.

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

The condition was discovered during the performance of surveillance procedure 3-SR-3.6.1.3.10(B-OUTBD) for the 3B Outboard MSIV.

G. Failure Mode and Effect of Each Failed Component

The 3B Outboard MSIV experienced leakage through the pilot poppet to disk interface at full closure which resulted in a leakage rate in excess of the administrative limits.

H. Operator Actions

There were no Operator actions for this identified condition.

I. Automatically and Manually Initiated Safety System Responses

There were no safety system responses for this identified condition.

III. CAUSE OF THE EVENT

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

The cause for the 3B Outboard MSIV (3-FCV-001-0027) leakage exceeding the administrative limit was leakage through the pilot poppet to disk interface at full closure, due to seating surface wear.

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

There was not a human performance related cause.

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NARRATIVE

IV. ANALYSIS OF THE EVENT

The Tennessee Valley Authority (TVA) is submitting this report in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation or condition prohibited by TS.

On February 23, 2016, at approximately 0405 hours CST, during the performance of surveillance procedure 3-SR-3.6.1.3.10(B-OUTBD) valve 3-FCV-001-0027 failed to meet the administrative leak rate limit of 60 scfh.

After a visual examination of both the pilot poppet seat of the main disk and the pilot poppet, the main disk was positioned with poppet nose down and the valve stem, which houses the pilot poppet, was positioned upright in its seat. The main disk, which will now hold water with the pilot poppet in place, was filled with water and watched for a period of time. Any water that made its way through the seat between the pilot poppet and the main disk would be considered leakage and indicates a deteriorated joint.

The result of this test was leakage and also visible detection of some seat degradation. The seat degradation was believed to be the cause of repeated seating of the valve coupled with some possible side loading detected by the evidence of minor rubbing between the pilot poppet and the spring retainer inner diameter. The evidence shown may also have been made worse by steam cutting after the valve had been closed prior to startup and just after shut down.

V. ASSESSMENT OF SAFETY CONSEQUENCES

The as-found leak rate for the 3B Outboard MSIV was 79.493 scfh. The 3B Outboard MSIV was noted to have pilot poppet wear on the seating surface that was determined to be the cause of the leakage. This as-found leak rate exceeds the limit of 60 scfh. The combined leakage rate (CLR) was 102.299 scfh. This was also above the limit of 85 scfh for CLR.

Local Leak Rate Testing of the B Main Steam Line isolation valves was performed by testing the Outboard MSIV (Individual test) in accordance with 3-SR-3.6.1.3.10(B-OUTBD) on February 23, 2016 followed by a simultaneous test in accordance with 3-SR-3.6.1.3.10(B) on February 24, 2016. The resulting leak rates for the individual and simultaneous as-found tests indicated that the Outboard MSIV was the source of the measured leakage greater than 60 scfh. Therefore, the 3B Inboard MSIV was operable and remained available to perform the safety function of controlling the release of radioactive material and mitigating the consequences of an accident.

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

The 3B Inboard MSIV (3-FCV-001-0026) was available to perform the same function as the 3B Outboard MSIV (3-FCV-001-0027).

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

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The reactor was shutdown in Mode 5 at the time the condition was identified. The 3B Inboard MSIV was available to control the release of radioactive material or mitigate the consequences of an accident.

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

This event did not result in the inoperability of a safety system.

VI. CORRECTIVE ACTIONS

Corrective Actions are being managed by TVA's corrective action program under Condition Reports (CRs) 1141864 and 1140946.

A. Corrective Actions

The immediate corrective action replaced the entire valve stem, which contains the new pilot poppet, resurfacing the seat of the pilot poppet on the main disk, skim cutting main disk and main seat, and full restoration of the valve actuator. The valve LLRT as-left performance was 9.554 scfh.

The administrative limits established to address the non-conservative TS, referenced in Updated Reply to Notice of Violation; EA-11-252; and follow-up to 10 CFR 50.9, "Completeness and accuracy of information" are more restrictive than the current TS limits. The final corrective actions will require modifications to the facility which are scheduled to be complete during the Unit 1 Refueling Outage (U1R12) in November 2018, but no later than the following Unit 2 Refueling Outage (U2R20) scheduled for March 2019. These modifications will allow restoration of the original TS limits which will increase the margin to the limit and would have precluded exceeding the leak rate limit as described in this LER.

VII. ADDITIONAL INFORMATION

A. Previous similar events at the same plant

Previous BFN LERs 50-296/2012-002-00 and 50-259/2014-004-00 documented similar events involving MSIV leakage exceeding TS limits. The causes of these events were related to valve packing, and corrective actions would not have prevented the event documented in this LER.

B. Additional Information

There is no additional information.

C. Safety System Functional Failure Consideration

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In accordance with NUREG-1022, this event is not considered a safety system functional failure because redundant TS components (MSIV Inboard Valves) were operable and could have performed the required safety function.

D. Scrams with Complications Consideration

This condition did not include a reactor scram.

VIII. COMMITMENTS

There are no commitments.