



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

June 6, 2012

10 CFR 50.73

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

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

Subject: **Licensee Event Report 50-296/2012-002-00**

The enclosed Licensee Event Report provides details of a 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. E. Emens, Jr., Nuclear Site Licensing Manager, at (256) 729-2636.

Respectfully,

K. J. Polson  
Vice President

Enclosure: Licensee Event Report 50-296/2012-002-00 - Main Steam Isolation Valve Leakage in Excess of Technical Specification Requirements

cc (w/ Enclosure):

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

*JE22*  
*NR*

**ENCLOSURE**

**Browns Ferry Nuclear Plant  
Unit 3**

**Licensee Event Report 50-296/2012-002-00**

**Main Steam Isolation Valve Leakage in Excess of Technical Specification  
Requirements**

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**See Attached**

**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 FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocollects.resource@nrc.gov](mailto: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.

<b>1. FACILITY NAME</b> Browns Ferry Nuclear Plant, Unit 3	<b>2. DOCKET NUMBER</b> 05000296	<b>3. PAGE</b> 1 of 5
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**4. TITLE:** Main Steam Isolation Valve Leakage 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
04	07	2012	2012	002	00	06	06	2012	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

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

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME Eric Bates, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 256-614-7180
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**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					

<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	<b>15. EXPECTED SUBMISSION DATE</b>	MONTH N/A	DAY N/A	YEAR N/A
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**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On April 8, 2012, at approximately 1415 hours Central Daylight Time (CDT), 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 3B Outboard Main Steam Isolation Valve (MSIV) (3-FCV-001-0027) failed to meet the Technical Specification (TS) leak rate limit of 100 standard cubic feet per hour (scfh). On April 7, 2012, at approximately 0233 hours CDT, during an inspection walkdown, steam was found blowing from MSIV 3-FCV-001-0027; therefore, April 7, 2012, is considered the event date for this LER. MSIV 3-FCV-001-0027 was considered to be inoperable for an indeterminate period of time.

Since MSIV 3-FCV-001-0027 failed to meet the leak rate limit, it is probable that Browns Ferry Nuclear Plant, Unit 3, operated longer than allowed by the TS. In addition, due to MSIV 3-FCV-001-0027 failing to meet the leak rate limit, it is probable TS Limiting Condition for Operation 3.0.4 was not met for each applicable Mode change since the last recorded as-found MSIV leak rate test on March 28, 2010, when the leak rate was below 100 scfh.

The cause of the event was an inadequate packing program.

The corrective action for this cause is to implement a new valve packing program.

**LICENSEE EVENT REPORT (LER)**  
CONTINUATION SHEET

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Browns Ferry Nuclear Plant Unit 3	05000296	2012	-- 002	-- 00	2 of 5

**NARRATIVE**

**I. PLANT CONDITION(S)**

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

**II. DESCRIPTION OF EVENT**

**A. Event**

On April 8, 2012, at approximately 1415 hours Central Daylight Time (CDT), 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 3B Outboard Main Steam Isolation Valve (MSIV) [SB] (3-FCV-001-0027) failed to meet the Technical Specification (TS) leak rate limit of 100 standard cubic feet per hour (scfh). On April 7, 2012, at approximately 0233 hours CDT, during an inspection walkdown, steam was found blowing from the packing on MSIV 3-FCV-001-0027; therefore, April 7, 2012, is considered the event date for this LER. MSIV 3-FCV-001-0027 was considered to be inoperable for an indeterminate period of time. 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. If the leakage rate cannot 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 MSIV 3-FCV-001-0027 failed to meet the TS leak rate limit and no specific time of failure was determined, it is probable that BFN, Unit 3, operated longer with an inoperable MSIV than allowed by the TS. In addition, due to MSIV 3-FCV-001-0027 failing to meet the leak rate limit and that no specific time of failure was determined, it is probable TS LCO 3.0.4 was not met for each applicable Mode change since the last recorded as-found MSIV 3-FCV-001-0027 leak rate test on March 28, 2010, when the leak rate was below 100 scfh.

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

MSIV 3-FCV-001-0027 failed the as-found local leak rate test (LLRT).

**C. Dates and Approximate Times of Major Occurrences**

- |                   |                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------|
| November 29, 1995 | Packing was installed on MSIV 3-FCV-001-0027.                                                        |
| March 20, 2006    | A steam leak on MSIV 3-FCV-001-0027 was repaired by a re-torque without replacing any packing rings. |

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**NARRATIVE**

<p>March 28, 2010</p> <p>April 7, 2012, at 0233 hours CDT</p> <p>April 8, 2012, at 1415 hours CDT</p> <p>April 29, 2012</p>	<p>Recorded MSIV 3-FCV-001-0027 as-found leak rate of 0.0 scfh which was below the required TS limit of 100 scfh.</p> <p>During an inspection walkdown, steam was found blowing from the packing on MSIV 3-FCV-001-0027.</p> <p>During the performance of surveillance procedure 3-SR-3.6.1.3.10 (B-OUTBD), recorded MSIV 3-FCV-001-0027 as-found leak rate of 781.09 which was above the required TS limit of 100 scfh.</p> <p>MSIV 3-FCV-001-0027 was repacked and leak rate tested satisfactorily. Recorded as-left combined leak rate for "B" MSIVs was 11.4377 scfh.</p>
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**D. Other Systems or Secondary Functions Affected**

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

**E. Method of Discovery**

This event was discovered during an inspection walkdown. It was determined that the resulting MSIV leak rate exceeded the required TS limits during the performance of surveillance procedure 3-SR-3.6.1.3.10 (B-OUTBD).

**F. Operator Actions**

There were no operator actions for this event.

**G. Safety System Responses**

There were no safety system responses for this event.

**III. CAUSE OF THE EVENT**

**A. Immediate Cause**

The immediate cause of the event was inadequate packing on MSIV 3-FCV-001-0027.

**B. Root Cause**

The cause of the event was an inadequate packing program at BFN. The current BFN implementing procedures are insufficient for maintaining valve packing to prevent packing failure.

**C. Contributing Factors**

There were no contributing factors for this event.

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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 Technical Specifications.

On April 7, 2012, at approximately 0233 hours CDT, during an inspection walkdown, steam was found blowing from the packing on MSIV 3-FCV-001-0027.

On April 8, 2012, at approximately 1415 hours CDT, during the performance of surveillance procedure 3-SR-3.6.1.3.10 (B-OUTBD), MSIV 3-FCV-001-0027 failed to meet the TS leak rate limit of 100 scfh representing a non-conformance with the valve's containment isolation function. The as-found leak rate was 781.09 scfh. MSIV 3-FCV-001-0027 did not have recent maintenance performed that could have contributed to the packing leak. It was determined, over time, that the packing preload is lost due to packing relaxation and that the current valve packing program does not give adequate guidance on when to reconsolidate and re-torque the valve packing or when to repack the valve. Therefore, the valve packing program was determined to be inadequate.

Extent of Condition

The extent of condition applies to any valve that could result in a steam leak due to a degraded packing. The extent of condition will be addressed by identifying this population of valves and incorporating them into a new BFN valve packing program.

**V. ASSESSMENT OF SAFETY CONSEQUENCES**

The as-found leak rate for the MSIV 3-FCV-001-0027 was 781.09 scfh measured with 14 psig in the test volume and a water block on the inboard valve. The leak rate at the required full test pressure of 26 psig would have been higher. The leakage was noted as coming out of the packing of the MSIV 3-FCV-001-0027. The packing was re-torqued and the LLRT re-performed with the steam lines flooded. As a result, the leak rate was reduced to 241.8895 scfh with full test pressure in the test volume. When the steam lines were drained, the combined leakage for the "B" MSIVs (3-FCV-001-0026 and 3-FCV-001-0027) was 247.7594 scfh. Thus, the calculated leak rate for the 3-FCV-001-0026, "B" inboard MSIV, was determined to be 5.8699 scfh.

The minimum pathway leakage from the "B" main steam line was equal to 5.8699 scfh with the total MSIV minimum pathway leakage determined to be 11.1406 scfh, which is well within the design basis leakage of 150 scfh for all MSIVs (assumed in accident analysis). With one MSIV inoperable in a main steam line (i.e., 3-FCV-001-0027), the remaining operable MSIV in the main steam line (i.e., 3-FCV-001-0026) is capable of performing the main steam line isolation safety function. A review of operations logs for the time period between March 28, 2010, and April 7, 2012 (i.e., the date of entry into Mode 4 at the start of the BFN, Unit 3, refueling outage 15) indicated that the "B" inboard MSIV was operable and capable of maintaining MSIV leakage within limits whenever BFN, Unit 3, was in Mode 1, 2, or 3, during this time period. As a result, there was no loss of the main steam line isolation safety function during this time period.

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**NARRATIVE**

Therefore, TVA concluded that there was no significant reduction to the health and safety of the public for this event.

**VI. CORRECTIVE ACTIONS** - The corrective actions are being managed by TVA's corrective action program.

**A. Immediate Corrective Actions**

MSIV 3-FCV-001-0027 was repacked and applicable leak rate testing was performed satisfactorily.

**B. Corrective Actions**

Implement a new valve packing program at BFN.

**VII. ADDITIONAL INFORMATION**

**A. Failed Components**

The failed component was MSIV 3-FCV-001-0027. This component was manufactured by Atwood & Morrill Co., Inc. with a manufacturer model number of 20851-H-26.

**B. Previous Similar Events**

On December 9, 2011, during an initial drywell entry, BFN Unit 1 Recirculation Pump "B" Discharge Flow Control Valve, 1-FCV-068-0079, was discovered to have a packing leak. This event was identified in problem evaluation report (PER) 473637. The cause of this leak was determined to be an inadequate packing program at BFN.

**C. Additional Information**

The corrective action document for this report is PER 533052.

**D. Safety System Functional Failure Consideration**

In accordance with NEI 99-02, this condition is not considered a safety system functional failure.

**E. Scram With Complications Consideration**

This condition did not include a scram.

**VIII. COMMITMENTS**

There are no commitments.