NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Browns Ferry Nuclear Plant (BFN) Unit 2	05000260	1 OF 9

TITLE (4) Containment penetration and main steam isolation valve leak rates exceeded Technical Specification limits.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME NA	DOCKET NUMBER
10	02	94	94	008	01	02	27	95	FACILITY NAME NA	DOCKET NUMBER

OPERATING MODE (9): N

POWER LEVEL (10): 000

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
	20.405(a)(1)(iii)		50.73(a)(2)(i)(B)		50.73(a)(2)(viii)(A)		(Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iv)	X	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
	20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
James E. Wallace, Compliance Licensing Engineer	(205)729-7874

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	BF	FCV	F049	y					
B	SB	FCV	A585	y					

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 2, 1994, local leak rate testing was being performed during the BFN Unit 2 refueling outage. At 1240 hours, primary containment ventilation penetrations X-25 and 205 (2809.2329 SCFH) exceeded the Technical Specification (TS) limit of 655.9 SCFH. Subsequently, at 2000 hours, the outboard 'D' main steam isolation valve (MSIV) had leakage (60.5745 SCFH) which exceeded the TS limit of 11.5 SCFH. Therefore, these events are reportable in accordance with 10 CFR 50.73 (a)(2)(ii). The cause of X-25 and 205 penetration leakages resulted from a lack of adequate procedural guidance as to the proper shimming of seismic mounting brackets. The cause of the outboard 'D' MSIV leakage was abnormal rib guide wear. Corrective actions taken for the X-25 and 205 penetration leakages were to properly shim seismic mounting brackets and to successfully retest the penetrations. A maintenance instruction will be written for these and similar type of valves to address the proper shimming requirements. Corrective actions taken to address the excessive leakage for outboard 'D' MSIV were to repair and successfully retest the MSIV.

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I. PLANT CONDITIONS

At the time, this event was initiated Unit 2 was shutdown for the scheduled Unit 2, Cycle 7 refueling outage. Units 1 and 3 were shutdown and defueled.

II. DESCRIPTION OF EVENT

A. Event:

On October 2, 1994, during performance of local leak rate testing (LLRT), two events were identified involving primary containment leakage in excess of allowed limits. The excessive leakages were measured by testing between the inboard and outboard isolation valves. Further details of these events are provided below:

Drywell Penetrations X-25 and 205

At 1240 hours during the performance of a Surveillance Instruction (SI) (2-SI-4.7.A.2.g-3/64a), attempts to achieve the required pressurization (51.0 psid) and stabilization were unsuccessful due to gross leakage. The components affected were flow control valves [ISV](2-FCV-64-17, 18, 19 and 2-FCV-76-24). A leak rate calculation for the penetration [PEN] was performed and documented to be 2809.2329 SCFH. However, the allowable total leak rate for primary containment penetrations [BF] was 655.9 SCFH. Additional LLRT performed during the Unit 2, Cycle 7 refueling outage determined that valves 2-FCV-64-18 and 19 were the major contributors for the 2809.2329 SCFH leakage.

Outboard 'D' Main Steam Isolation Valve

At 2000 hours on October 2, 1994, during the performance of an SI (2-SI-4.7.A.2.i-3/1d) the leak rate between the 'D' main steam [SB] isolation valves (MSIVs) [ISV] was calculated to be 60.5745 SCFH. This calculated value exceeded the Technical Specification (TS) limit of 11.5 SCFH. The outboard valve was initially investigated and preliminary troubleshooting procedures commenced. After manipulating only the outboard valve, a significantly lower leak rate was observed. Therefore, it was concluded that the excessive leakage was through the outboard valve since the position of the inboard valve was not altered.

These events are reportable in accordance with 10 CFR 50.73 (a)(2)(ii) as a condition in a nuclear plant, including its principal safety barriers, being seriously degraded.

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

None.

C. Dates and Approximate Times of Major Occurrences:

October 2, 1994 at 0430 CST	Penetrations (2-X-25 and 205) SI began after the Unit 2 shutdown for a scheduled refueling outage.
at 1240 CST	The leakage for these penetrations was determined to have exceeded the acceptance criteria.
at 1408 CST	TVA made a four-hour notification to the NRC pursuant to 10 CFR 50.72(b)(2)(i).
at 1612 CST	'D' Main steam isolation valves SI began.
at 2000 CST	It was determined that the leak rate was excessive.
at 2115 CST	TVA made a four-hour notification to the NRC pursuant to 10 CFR 50.72(b)(2)(i).
October 25, 1994	SI for Penetrations X-25 and 205 was completed and was successfully retested.
November 2, 1994	SI for outboard 'D' MSIV was successfully retested.
November 21, 1994 at 0429	Reactor mode switch was positioned to startup
November 28, 1994	During an investigation for the recycling of the drywell differential pressure air compressor, valves 2-64-FCV-18 and 19 were identified to be

leaking after being exercised to support Unit 2, Cycle 7 startup.

November 30, 1994 — The valves were repaired, and an SI for penetrations X-25 and 205 was satisfactorily performed.

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

The leakages were determined to be unacceptable for both conditions by the performance of each SI in accordance with the BFN LLRT program.

F. Operator Actions:

None.

G. Safety System Responses:

None.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate causes of these events were:

Drywell Penetrations X-25 and 205

Gross leakage from the components for primary containment ventilation penetrations 2-X-25 and 205 was due to improper shimming of the seismic mounting brackets.

Outboard 'D' Main Steam Isolation Valve

Excessive leakage from the outboard 'D' MSIV was due to abnormal rib guide wear.

B. <u>Root Cause</u>:

The root cause of these events were:

<u>Drywell Penetrations X-25 and 205</u>

X-25 and 205 penetration leakages resulted primarily from a lack of adequate procedural guidance as to the proper shimming of seismic mounting brackets.

<u>Outboard 'D' Main Steam Isolation Valve</u>

The reason for abnormal rib guide wear is unknown.

IV. ANALYSIS OF THE EVENT

At the time of discovery of the two leak paths, Unit 2 was shutdown and was in a scheduled refueling outage. Primary containment was not required to be maintained. While the X-25 and 205 penetrations and the outboard 'D' MSIV leakages did not comply with design requirements, they were tested to accident pressure during the LLRT prior to Unit 2 restart on May 25, 1993.

<u>Drywell Penetrations X-25 and 205</u>

The components that were responsible for the excessive leakage for these penetrations have been determined. An investigation of the X-25 and 205 penetrations determined that these penetrations did not pose a significant safety impact during Unit 2, Cycle 7 because the upstream valve (2-FCV-64-17) did not leak. The valves involved in the identified leakage were the 2-FCV-64-18 and -19 (see figure 1). These valves, as configured, result in a primary containment to primary containment leakage (drywell to torus). Therefore, based on the plant conditions and the plant configuration of the involved valves, plant safety was not adversely affected. Additionally, the safety of plant personnel and the public was not compromised.

<u>Outboard 'D' main steam isolation valve</u>

Each main steam line has two isolation valves, one inside and one outside primary containment. The isolation prevents radiation release in excess of 10 CFR 100 guidelines during a steam-line break outside primary containment. The valves also limit inventory losses during a loss of coolant accident. TS require the MSIVs be tested during each refueling outage. If the leakage rate for any one MSIV exceeds 11.5 SCFH, TS require that the valve be repaired and retested.

Furthermore, if the "as found" maximum path leak rate is greater than allowed, TS require that repairs are completed and that local leakage meets acceptance criteria as proved by testing.

Preliminary investigation after the initiating event identified that the maximum leak path was from the outboard 'D' MSIV. During this investigation, it also was determined that leakage from the 'D' inboard MSIV was within the TS limit. Consequently, it was concluded that plant safety was not adversely affected, and that the safety of plant personnel and the public was not compromised.

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

The leaking valves were investigated and were scheduled to be repaired and retested.

Drywell Penetrations X-25 and 205

For the two valves (2-FCV-64-18 and 19), corrosion product interferences were removed from the valve seat and the associated system piping. New butterfly valve seats were installed in the valves. Additionally, it was determined that the stem adaptor key for 2-FCV-64-19 was longer than the manufacturer's recommendation and was subsequently machined to the manufacturer's recommendation. Both valves were reassembled and a successful LLRT test was performed prior to the Unit 2 startup.

During the Unit 2, Cycle 7 refueling outage startup, excessive run times (cycling) were experienced on the drywell differential pressure air compressor. An investigation followed, and valves 2-FCV-64-18 and 19 were again identified as leaking. The valves were disassembled, and it was determined that the shims between the valve flanges and the actuator mounting brackets were missing. These shims are required to ensure a level actuator and to eliminate a misalignment between the valve and actuator. This type of misalignment could intermittently bind the valve and prevent a seal. The two valves were shimmed, exercised several times, and retested. Both valves passed their LLRT testing with a total as-left maximum path leakage of 4.7960 SCFH.

The missing shims are believed to be the primary cause of the excessive leakages that was observed before and after Unit 2 startup.

Outboard 'D' main steam isolation valve

The outboard 'D' MSIV was initially investigated and preliminary troubleshooting procedures commenced. After manipulating only the 'D' outboard MSIV, the boundary was retested, and a significantly lower leak rate was observed. Therefore, it was concluded that the excessive leakage in the "as found" condition was through the outboard valve since the position of the inboard valve was not altered.

B. Corrective Actions to Prevent Recurrence:

Drywell Penetrations X-25 and 205

A maintenance instruction will be written for these and similar type of valves to address the proper shimming requirements.

Outboard 'D' main steam isolation valve

During the initial disassembling of the outboard MSIV, the sealing surface of the valve was cleaned and the MSIV was reassembled and tested. However, the valve did not pass the LLRT test. Consequently, the valve rib guide was grounded and the edge was tapered to blend with the cast steel part of the poppet ring. The valve was reassembled and passed its LLRT testing with a total as-left maximum path leakage of 1.6253 SCFH.

VI. ADDITIONAL INFORMATION

A. Failed Components:

The 2-FCV-64-18 is a 18-inch flow control valve manufactured by Flowseal, Model 18-1WA-121LGB-BXG. The 2-FCV-64-19 is a 20-inch flow control valve manufactured by Flowseal, Model 20-1WA-121LGB-BXG.

The outboard 'D' MSIV is manufactured by Atwood and Morrill, Model 20851-H-26.

B. **Previous LERs on Similar Events:**

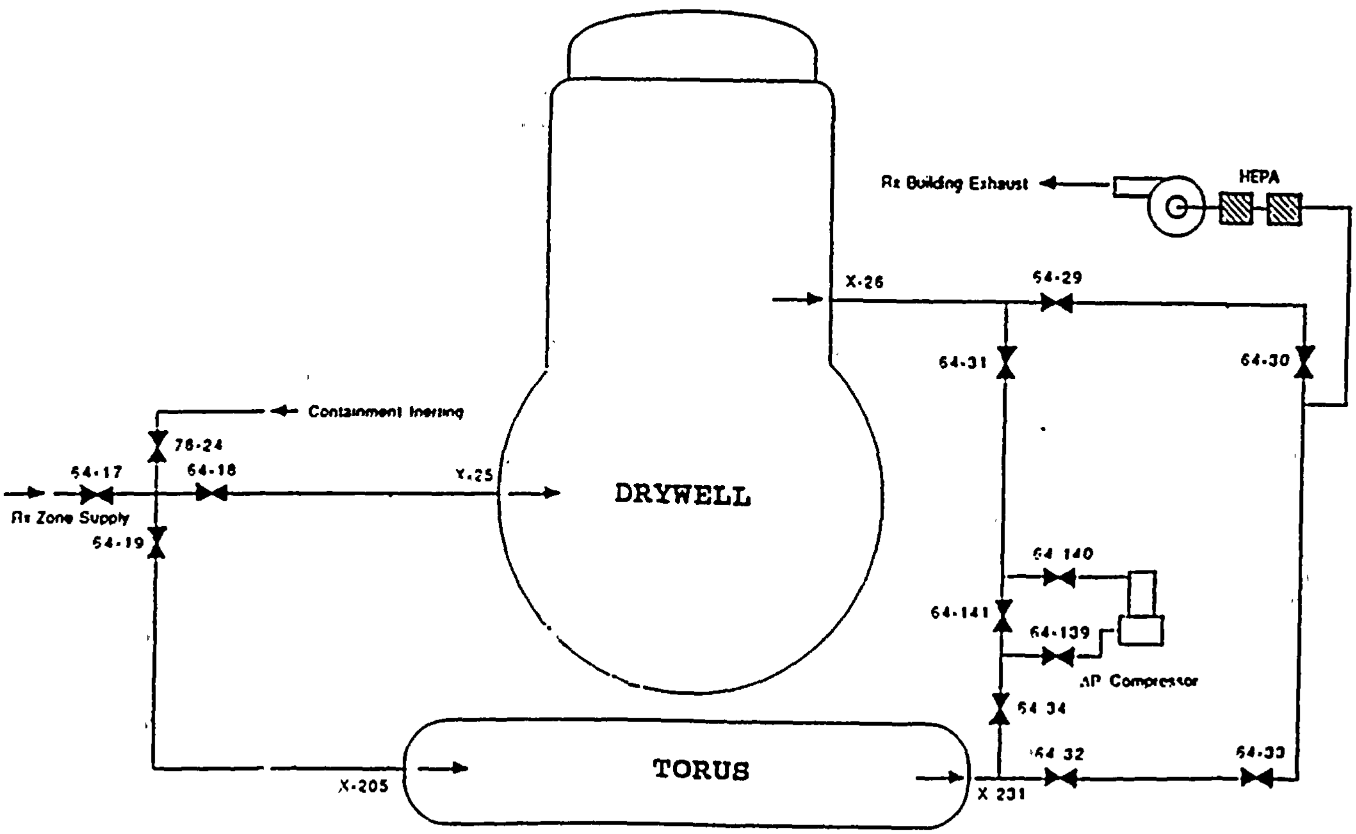
Previous Licensee Event Reports were reviewed for exceeding local leak rate limits. LER 50-260/93002 described the event in which the 'C' main steam line inboard isolation valve exceeded its leak rate limit. However, the repair on the 'C' inboard valve would not have precluded the event in this LER (260/94008). The conclusion in this LER (260/94008) was that the inboard valve minimally contributed to the noted 'D' MSIV leakage. Additionally, LER 296/84011 addressed the failure of a leak rate test for the residual heat removal testable check valves. However, the repairs on these valves would also not have precluded the event in this LER (260/94008). Finally, LERs 259/85039 and 296/84007 were identified. These LERs occurred before the implementation of the TVA MSIV upgrade program. Prior to implementing the TVA MSIV upgrade program, MSIV leakages would have revealed that the inboard and outboard valves both had excessive leakages. TVA believes that adequate previous corrective actions have been taken to reduce the number of failures.

VII. Commitment

A maintenance instruction will be written for these and similar type of valves to address the proper shimming requirements. This instruction will be written by June 30, 1995.

Energy Industry Identification System (EIIS) system and component codes are identified in the text with brackets (e.g., [XX]).

FIGURE 1


Rx Building Exhaust
HEPA
X-26
64-29
64-31
64-30
Containment Inerting
78-24
64-17
64-18
X-25
Rx Zone Supply
64-19
DRYWELL
64 140
64-141
64-139
AP Compressor
64 34
TORUS
X-205
64 32
64-33
X 231