

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555. AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) MONTICELLO NUCLEAR GENERATING PLANT										DOCKET NUMBER (2) 0 5 0 0 0 2 6 3				PAGE (3) 1 OF 0 6		
TITLE (4) MAIN STEAM ISOLATION VALVE LOCAL LEAK RATE EXCEEDED																
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 NAMES				DOCKET NUMBER(S)			
01	31	93	93	003		01	03	93					0 5 0 0 0			
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)														
N		20.402(b)				20.405(e)				50.73(a)(2)(iv)				73.71(b)		
POWER (10)		20.405(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)		
U U U		20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text NRC Form 366A)		
		20.405(a)(1)(iii)				XX 50.73(a)(2)(ii)				50.73(a)(2)(vii)(A)						
		20.405(a)(1)(iv)				50.73(a)(2)(iii)				50.73(a)(2)(vii)(B)						
		20.405(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)						
LICENSEE CONTACT FOR THIS LER (12)																
NAME DAVE PENNINGTON, SYSTEM ENGINEER										TELEPHONE NUMBER AREA CODE 6 1 2 2 9 5 - 1 4 4 9						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC						
B	S	B	I	S	V	A	5	B	5	YES						
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)												XX NO				

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

Main Steam Line Isolation Valve leak rate tests conducted during a refueling outage determined that the Technical Specification leakage limit for individual valves was exceeded. The causes included changes in test methodology, wear, thermal creep and aging, seat pitting from original manufacturing, and friction effects related to valve design and orientation. Another possible contributing cause was a thin film of unknown composition on the valve seats. All failed valves were machined/lapped and repaired as needed. The valves were re-tested with satisfactory results. Long-term modifications and repairs are being evaluated to address issues related to design and original manufacture.

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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

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		93	- 003	- 01	

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Description

On January 31, 1993, with the plant in a refueling outage, it was determined that Technical Specification 3.7.A.2.b.3 leak rate criteria for Main Steam Isolation Valves (MSIVs) had been exceeded. The Technical Specification states, "When Primary Containment Integrity is required, leakage rates shall be limited to...Less than or equal to 11.5 scf per hour for any one main steam isolation valve when tested at 25 psig". When tested, 7 of the 8 MSIVs (E1IS Component: ISV) demonstrated leakage in excess of the limit specified.

Table 1 below is a summary of "as-found" MSIV leakages (without air pressure on the valve actuator) when tested at 25 psi:

Table 1
(Test Results Without Air Pressure on Actuator)

MAIN STEAM LINE	INBOARD ISOLATION VALVE LEAKAGE	OUTBOARD ISOLATION VALVE LEAKAGE
A	50.1 scfh	6388 scfh
B	32.7 scfh	202,3 scfh
C	3.3 scfh	12.5 scfh
D	24 scfh	146 scfh

This event is a condition prohibited by Technical Specification and is reportable per 10 CFR 50.73.

Cause

A plant engineer, an engineering representative from the valve manufacturer and a maintenance supervisor inspected the valves. The following causes were determined:

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The "A" Outboard MSIV (AO-2-86A) leakage was caused by a failure of the poppet to seat properly. This can occur when the turning moment on the poppet due to the closing stem force and the initial seating friction causes the poppet to tip slightly. This is a design characteristic of the valve. However, in an accident condition the flow induced forces would be expected to assist in centering the poppet and preventing this condition.

The "B" Outboard MSIV (AO-2-86B) had pitting in the seat. The pitting is a condition of original manufacture. Normal variability in poppet position and wear can accentuate leakage due to pitting.

The "C" Outboard MSIV (AO-2-86C) had some small scratches on the seat and a packing leak. However, the probable cause of this failure was the change in test methodology. The test methodology has changed since the valves were last tested. The valves were tested without air pressure on the actuators after the piping and valves had cooled down. In the past, the valves have been tested hot and with air pressure on the valve actuators.

To determine the effect of testing without air pressure on the valve actuator, three of the inboard MSIVs were re-tested with air pressure applied. Table 2 below is a summary of "as-found" leakage when tested at 25 psig. In all three cases the leakage rate was reduced when tested in this manner:

Table 2
(Test Results With Air Pressure on Actuator)

MAIN STEAM LINE	INBOARD ISOLATION VALVE LEAKAGE
A	8.9 scfh
B	28 scfh
D	13.5 scfh

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TEXT (If more space is required, use additional copies of NRC Form 365A) (17)

The "D" Outboard MSIV (AO-2-86D) leakage was caused by a failure of the poppet to seat properly. This was due to a loose stem collar which caused the force transfer from the stem to poppet to be off center.

The "A" Inboard MSIV (AO-2-80A) failure was caused by the change in test methodology, as described above.

The "B" Inboard MSIV (AO-2-80B) leakage was caused by a failure of the poppet to seat properly. This was due to a bowed stem caused by thermal creep and aging.

The "D" Inboard MSIV (AO-2-80D) was originally installed such that the valve operator cam rollers were not in a vertical plane. This increases the closing friction since the cam rollers do not provide full support during closing. There were some small pits in the seating area from original manufacturing.

All of the MSIVs had a thin film of unknown composition on the valve seat. The appearance of this film was different than the normally observed oxide layer. This may have added friction to valve operation and may be a factor contributing to the test failures.

Analysis

The minimum pathway leakage without air pressure on the MSIV actuators was 168 scfh corrected for 42 psig containment pressure. With air on the actuators, the minimum pathway leakage was 81.8 scfh corrected for 42 psig containment pressure. During design basis loss of coolant accident conditions the air supplied to the MSIV accumulators is assumed to be lost. However, the accumulators would still be available to close the valves and to maintain them closed for a period of at least 10 minutes. During the loss of coolant accident event containment pressure peaks at 42 psig for two seconds and then begins to rapidly decay. Therefore, during peak containment pressure, air pressure would be available from the accumulators to assist in valve closure and seating.

An Engineering review of the minimum pathway leakage and current assumptions for the Control Room Dose Analysis concluded that the additional MSIV leakage would not have caused the allowable dose limit of GDC-19 to be exceeded.

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 30.0 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.

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The preliminary as-found leakage determined by the Integrated Primary Containment Leak Rate Test performed this outage, including the MSIVs as-found leakage, was approximately 0.83 Weight Percent Per Day. This is below the 1.2 Weight Percent Per Day leak rate used in the plant safety analysis. Therefore, there were no consequences to the health and safety of the public.

Required surveillance testing and monitoring maintains a high degree of valve closure reliability. The repairs and improvements made to the valves during this outage should result in improved overall leakage performance. Therefore, continued safe operation of the plant is assured.

Corrective Actions

The following actions have been completed:

1. All seven failed MSIVs were machined and/or lapped and re-tested satisfactorily.
2. The bonnet on "D" Inboard MSIV was rotated so that the valve operator cam rollers operate in a vertical plane.
3. The bowed stem on "B" Inboard MSIV was straightened.
4. The stem on "D" Outboard MSIV was replaced.

The following actions will be completed:

1. A sample of the film on the MSIV seats was removed and sent for analysis. The results should be received in about two months.
2. Long-term modifications and repairs are being evaluated to address issues related to MSIV design and original manufacture.

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Failed Component Identification

Main Steam Isolation Valves (7)

Manufacturer: A585, Atwood and Morrill Company Incorporated
Type: 18" Y Globe Valve

Previous Similar Events

Licensee Event Report 91-005 reported the failure of three MSIVs to pass the local leak rate test. The cause of the failure was an oxide film on the valve seats and normal wear. At that time it was concluded that the oxide film was a normal build up and that further corrective actions were not needed. The valves were repaired and tested satisfactorily.