

December 29, 2004

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: McGuire Nuclear Station, Unit 1  
Docket No. 50-369  
Licensee Event Report 369/2004-02, Revision 0

Pursuant to 10 CFR 50.73, Sections (a)(1) and (d), attached is Licensee Event Report (LER) 369/2004-02, Revision 0.

On November 4, 2004, McGuire Nuclear Station identified past instances where a Unit 1 Main Steam Isolation Valve (MSIV), 1SM-3, was inoperable for a period longer than permitted by plant Technical Specifications. These instances represented an operation prohibited by Technical Specifications and are reportable as per the requirements of 10 CFR 50.73 (a)(2)(i)(B). In addition, there was a period when 1SM-3 and another MSIV, 1SM-1, were simultaneously inoperable. Therefore, this event is also being reported as a condition which could have prevented fulfillment of a safety function in accordance with the requirements of 10CFR50.73(a)(2)(v)(D).

Probabilistic risk assessment has determined this event to be of no significance to the health and safety of the public. There are no regulatory commitments contained in this LER.



G. R. Peterson

Attachment

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**LICENSEE EVENT REPORT (LER)**

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

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects@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 McGuire Nuclear Station, Unit 1	2. DOCKET NUMBER 05000 369	3. PAGE 1 OF 6
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4. TITLE  
Main Steam Isolation Valve Inoperable.

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
10	07	2002	2004	- 002 -	00	12	29	2004	FACILITY NAME	DOCKET NUMBER

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

12. LICENSEE CONTACT FOR THIS LER

NAME Julius W Bryant, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) 704-875-4162
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
D	SB	ISV	A585	YES					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR
YES (If yes, complete 15.EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/>	NO	<input type="checkbox"/>					

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

Unit Status: At the start of the event, Unit 1 was in MODE 3 (Hot Standby)

Event Description: In 2002, during maintenance, 1SM-3 ("C" Steam Generator Main Steam Isolation Valve) was re-assembled incorrectly which rendered it incapable of closing to isolate a steam line break from the other Unit 1 Steam Generators when required. In consequence, 1SM-3 was inoperable for periods in excess of Technical Specification requirements. In addition, there was a period when 1SM-3 and 1SM-1 ("D" Steam Generator Main Steam Isolation Valve) were simultaneously inoperable. This constituted a safety system functional failure. Probabilistic risk assessment has determined this event to be of no significance to the health and safety of the public.

Event Cause: 1SM-3 was assembled incorrectly and accepted due to deficiencies in the procedure used to maintain, re-assemble, and test Main Steam Isolation Valves.

Corrective Action: An extent of condition review determined that the 1SM-3 failure mode was not transportable to any other Unit 1 and Unit 2 Main Steam Isolation Valves. The procedure used to maintain, re-assemble, and test Main Steam Isolation Valves has been placed on hold pending revision. 1SM-3 was repaired.

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

BACKGROUND

Main Steam Isolation Valves [ISV] (MSIV):

The Unit 1 Main Steam System [SB] (SM) contains four Main Steam Isolation Valves manufactured by Atwood and Morrill Co (Model MSI-001). Each valve is located downstream of its respective Steam Generator [SG] (SG) and remains open during normal power operation. The MSIVs are designed to automatically close upon receipt of a Main Steam Line Isolation Signal (Engineered Safety Feature). The safety functions performed by these valves include the following:

- Close to isolate all four SGs to ensure that no more than one SG blows down in the event of a steam line break. This minimizes the positive reactivity effects of the break by ensuring that the Reactor Coolant System [AB] (NC) does not experience excessive cooldown as a result of the increased steam flow.
- Close to isolate all four SGs to ensure that no more than one SG blows down in the event of a steam line break inside containment. This minimizes the containment temperature and pressure increase.

McGuire Technical Specification (TS) 3.7.2 - Main Steam Isolation Valves:

The above MSIV safety functions are ensured by compliance with the requirements of TS 3.7.2. The TS 3.7.2 LCO specifies that four MSIVs shall be operable in Mode 1. This LCO also states that they shall be operable in MODES 2 and 3, except when the MSIVs are closed and de-activated. TS Surveillance Requirement (TSSR) 3.7.2.1 and the TS 3.7.2 BASES indicate that an MSIV is operable when it is capable of closing in less than or equal to 8 seconds upon receipt of an isolation signal. Compliance with this operability criteria can be verified by the performance of hot stroke testing. As per TS 3.7.2, Condition A, if one MSIV is inoperable in MODE 1, the affected MSIV shall be restored to operable status within 8 hours. If the required action and associated completion time of Condition A are not met, then TS 3.7.2, Condition B, states that the respective Unit must be in MODE 2 within 6 hours. As per TS 3.7.2, Condition C, if one or more MSIVs are inoperable in MODE 2 or 3, the affected MSIV shall be closed within 8 hours and verified closed once per 7 days. If the required action and associated completion time of Condition C are not met, then TS 3.7.2, Condition D, states that the respective Unit must be in MODE 3 within 6 hours and in MODE 4 within 12 hours.

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EVENT DESCRIPTION

Note: All events are shown in the approximate sequence in which they occurred. All times are approximate.

September/October 2002:

- Scheduled maintenance was performed on 1SM-3 during the Unit 1 EOC15 refueling outage. Although not known at the time, 1SM-3 was re-assembled incorrectly during maintenance such that it was incapable of closing to isolate a postulated steam line break between the "C" SG and 1SM-3 when required.
- Unit 1 was restarted, entering Mode 3 (Hot Standby) at 0638 on October 7, 2002. Since, upon entry into MODE 3, 1SM-3 was unknowingly inoperable due to incorrect re-assembly, this resulted in a TS prohibited condition.
- 1SM-3 was stroke tested at 2226 on October 7, 2002. Upon review of the test data, it was identified that the measured stroke length of 1SM-3 did not meet the overall travel acceptance criteria. Subsequent evaluation concluded that 1SM-3 was operable.

March 2004:

- At 1015 on March 6, 2004, Unit 1 entered MODE 4 (Hot Shutdown) in preparation for the Unit 1 EOC16 refueling outage.

April 2004:

- At 1655 on April 3, 2004, during startup from the Unit 1 EOC16 refueling outage, Unit 1 entered MODE 3.
- At 1340 on April 4, 2004, during the Unit 1 EOC16 refueling outage and with Unit 1 in MODE 3, 1SM-3 was hot stroke tested. 1SM-1 was hot stroke tested at 1507 on the same day. No abnormalities were identified in either test.
- On April 6, 2004 at 1216, Unit 1 entered MODE 4.
- Unit 1 entered MODE 3 at 1156 on April 10, 2004.

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October 2004:

- On October 18, 2004, Unit 1 entered MODE 3 for planned repair of a leak on an instrument line associated with the "B" SG. During hot stroke testing of 1SM-1 at 1028, the valve would not fully close. 1SM-1 was subsequently declared inoperable. Unit 1 entered MODE 4 at 2153 in preparation for repairing 1SM-1.

November 2004:

- On November 3, 2004 at 1650, upon completion of repairs on 1SM-1, Unit 1 entered MODE 3.
- On November 4, 2004, 1SM-1 was hot stroke tested with acceptable results. 1SM-3 was hot stroke tested at 1308. During this test of 1SM-3, station personnel observed the absence of a distinct sound associated with the valve's pilot poppet hitting its seat. As a result, applicable test data was reviewed. This review indicated the pilot poppet stroke length for 1SM-3 was shorter than expected. Subsequent evaluation of the condition identified that, in the absence of a steam line break between the "C" SG and 1SM-3, this valve remained capable of closing within the required time to isolate forward steam flow upon receipt of an isolation signal. However, in the presence of a steam line break between the "C" SG and 1SM-3, the subject condition would have prevented 1SM-3 from remaining closed and isolating reverse steam flow. Therefore, assuming a single failure of another Unit 1 MSIV concurrent with a steam line break, more than one SG would have blown down. This condition rendered 1SM-3 inoperable with respect to TS 3.7.2.
- In preparation for repairing 1SM-3, Unit 1 entered MODE 4 at 0934 on November 5, 2004.
- Following repair of 1SM-3, Unit 1 entered MODE 3 at 0331 on November 10, 2004. 1SM-3 was hot stroke tested at 1247 with acceptable results.

Based upon cause analysis, it is assumed that 1SM-3 had been incapable of closing to isolate a postulated steam line break between the "C" SG and 1SM-3 since the maintenance performed on the valve during the Unit 1 EOC15 refueling outage in 2002. Given this assumption, 1SM-3 would have been inoperable while Unit 1 was in a TS 3.7.2 MODE of applicability during the following periods:

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- From when Unit 1 entered MODE 3 at 0638 on October 7, 2002 until when Unit 1 entered MODE 4 at 1015 on March 6, 2004.
- From when Unit 1 entered MODE 3 at 1655 on April 3, 2004 until when Unit 1 entered MODE 4 at 2153 on October 18, 2004.
- From when Unit 1 entered MODE 3 at 1650 on November 3, 2004 until when Unit 1 entered MODE 4 at 0934 on November 5, 2004.

During the above periods, 1SM-3 was inoperable longer than permitted by plant Technical Specifications. These instances represented an operation prohibited by Technical Specifications and are reportable as per the requirements of 10 CFR 50.73 (a) (2) (i) (B).

In addition to the above reportable conditions, 1SM-3 was simultaneously inoperable with 1SM-1 during the following period:

- From when 1SM-1 failed its hot stroke test at 1028 on October 18, 2004 until when Unit 1 entered MODE 4 at 2153 on October 18, 2004.

During the above period when 1SM-3 and 1SM-1 were simultaneously inoperable, the MSIV safety function of preventing blowdown from more than one S/G following a steam line break could not have been performed. This represented a condition which could have prevented fulfillment of a safety function. This condition is reportable as per 10CFR50.73(a)(2)(v)(D).

CAUSAL FACTORS

Although the associated root cause evaluation is not complete, the failure of 1SM-3 is being attributed to improper re-assembly of the valve during maintenance performed in the Unit 1 EOC15 refueling outage in 2002. This improper re-assembly was caused by deficiencies in the instructions provided in the procedure used to maintain, re-assemble, and test the MSIVs. The failure to recognize that the abnormal stroke length identified during the October 7, 2002 stroke test rendered 1SM-3 inoperable is being attributed to inadequate stroke length acceptance criteria in the procedure used to maintain, re-assemble, and test the MSIVs. If further cause analysis identifies information significant to the understanding of this event or it results in substantial changes to the corrective action plan, a revised LER will be submitted providing this information. Note that an extent of condition review determined that the failure mode of 1SM-3 was not transportable to the remaining three Unit 1 MSIVs or the four Unit 2 MSIVs.

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**CORRECTIVE ACTIONS**

- 1) An extent of condition review was performed and determined that the failure modes of 1SM-3 were not transportable to the remaining three Unit 1 MSIVs or the four Unit 2 MSIVs.
- 2) The procedure containing the instructions for maintaining, re-assembling, and testing the MSIVs has been placed on hold pending revisions to ensure adequate assembly instructions and acceptance criteria are provided to prevent re-occurrence of a failure similar to that experienced on 1SM-3.
- 3) 1SM-3 was repaired to correct the deficiencies identified in November of 2004.

**SAFETY ANALYSIS**

A probabilistic risk assessment of this event determined that the increase in the estimated core damage frequency (CDF) or large early release frequency (LERF) was insignificant. Therefore, the event described in this LER was not significant with respect to the health and safety of the public.

The safety significance of the event described in the LER are also being evaluated with respect to Pressurized Thermal Shock (PTS) and any resulting impact on the integrity of the Unit 1 reactor vessel. The preliminary results indicate that there are no PTS related reactor vessel integrity concerns resulting from this event. If further evaluation results in conclusions contrary to this, a revision to this LER will be submitted providing this information.

**ADDITIONAL INFORMATION**

A review of the McGuire corrective action database did not identify any previous occurrences of a similar event.

Applicable Energy Industry Identification (EIIS) system and component codes are enclosed within brackets. McGuire unique system and component identifiers are contained within parentheses.