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May 19, 2008

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

Attention: Document Control Desk

Subject: McGuire Nuclear Station, Units 1 and 2  
Docket No. 50-369, 50-370  
Licensee Event Report 369/2008-01, Revision 0  
Problem Investigation Process (PIP) M-08-01541

Pursuant to 10 CFR 50.73, Sections (a)(1) and (d), attached is Licensee Event Report (LER) 369/2008-01, Revision 0 concerning the potential failure of McGuire's Unit 1 & 2 Containment Isolation Valves (CIV) 2NC-56B, 1/2KC-320A, 1/2KC-332B, 1/2KC-333A, 1/2RV-79A, 1/2RV-80B, and 1/2RV-101A to remain fully closed under certain conditions.

The report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B), an operation prohibited by Technical Specifications, and 10CFR 50.73 (a)(2)(v)(C), a condition that could have prevented fulfillment of a safety function needed to control the release of radioactive material.

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



B. Hamilton

Attachment

cc: L.A. Reyes  
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**LICENSEE EVENT REPORT (LER)**

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

<b>1. FACILITY NAME</b> McGuire Nuclear Station, Unit 1	<b>2. DOCKET NUMBER</b> 05000- 369	<b>3. PAGE</b> 1 OF 6
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**4. TITLE**  
Potential Failure of Containment Isolation Valves (CIV) to Remain Fully Closed and Inoperable longer than allowed by Technical Specification 3.6.3.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
3	20	2008	2008	001	00	5	19	2008	McGuire Unit 2	05000 370
									FACILITY NAME	DOCKET NUMBER

<b>9. OPERATING MODE</b> 1	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)									
<b>10. POWER LEVEL</b> 100	<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 checked="" 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)	<input type="checkbox"/>	Specify in Abstract below or in NRC Form 366A			

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME D. Alexander-Blake, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) (704) 875-4228
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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
B1	AB	ISV	I207	YES	B1	CC	ISV	I207	YES
B1	BI	ISV	I207	YES					

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

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

On March 20, 2008; Air Operated diaphragm Containment Isolation Valves (CIVs) were declared inoperable when it was discovered inadequate bleed paths during thermal pressurization could cause actuator closing margins to be exceeded. Exceeding actuator closing margins could cause a CIV to open during an event requiring containment isolation.

This condition existed during a mode of applicability specified in the plant's Technical Specifications (TS) and is reportable as an operation or condition which was prohibited by the plant's TS in accordance with 10CFR 50.73(a)(2)(i)(B). In addition, since the CIV could have opened when required to be closed, this condition could have prevented fulfillment of the safety function and is reported in accordance with 10CFR 50.73(a)(2)(v)(C). The Safety Analysis for this event has concluded that this condition was not significant with respect to the health and safety of the public.

Upon discovery, the applicable CIVs were declared inoperable and immediate corrective action was taken to restore CIV operability on the operating unit. Corrective actions to restore operability included modifications and procedural alignment changes necessary to restore adequate closing margins. The root cause for this event was a lack of formal expectations or guidelines relative to timely completion of corrective actions having significant regulatory impact. A previous corrective action to review calculations for air operated diaphragm valves susceptible to the thermal pressurization was not completed in a timely manner and resulted in station operation with inoperable CIVs. Corrective actions have been initiated to ensure timely completion of corrective actions having significant regulatory impact.

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

EVALUATION:

BACKGROUND

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

The Containment Isolation System [ISV] provides the means of isolating fluid systems that pass through Containment penetrations to confine any radioactivity that may be released following a design basis event. The Containment Isolation System is required to function following a design basis event to isolate non-essential systems penetrating the Containment.

Reactor Coolant System [AB] (NC) Containment Isolation Valve (CIV) 2NC-56B is an air operated valve located on the reactor make-up water spray supply header line to the Pressurizer Relief Tank. This valve fails closed upon receipt of a signal for containment isolation. The valve is required to be operable in Modes 1-4. The applicable Technical Specification is 3.6.3 Containment Isolation Valves.

Component Cooling System [CC] (KC) CIVs 1/2KC-320A are air operated, normally open valves on the auxiliary building side of the KC supply lines to the NCDT (Reactor Coolant Drain Tank) Heat Exchangers. Component Cooling System CIVs 1/2KC-332B and 333A are air operated; normally open valves on the KC return lines from the NCDT Heat Exchangers. The valves fail closed upon receipt of a signal for containment isolation. The valves are required to be operable in Modes 1-4. The applicable Technical Specification is 3.6.3, Containment Isolation Valves.

Containment Ventilation Cooling Water System [BI] (RV) CIVs 1/2RV-79A, 80B and 101A are air operated, normally open valves located on the supply and discharge headers for the Upper Containment Ventilation Units. These valves fail closed upon receipt of a signal for containment isolation. The valves are required to be operable in Modes 1-4. The applicable Technical Specification is 3.6.3 Containment Isolation Valves.

The condition could have prevented the containment isolation valves from remaining closed and prevented the valves from performing their safety functions (reportable per 50.73 (a)(2)(v)(C)).

McGuire Technical Specification (TS) 3.6.3 - Containment Isolation Valves: TS 3.6.3 specifies that each containment isolation valve (CIV) [ISV] shall be operable in Modes 1, 2, 3, and 4.

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TS 3.6.3, Condition A requires, in part, that in the event one CIV in one or more penetration flow paths is inoperable, the affected penetration flow path must be isolated within 4 hours.

TS 3.6.3, Condition B requires that in the event two containment isolation valves in a flow path are inoperable, the affected penetration flow path shall be isolated within 1 hour.

If the required actions and associated completion time of Condition A or B are not met, then TS 3.6.3, Condition F states that the respective Unit must be placed in Mode 3 in 6 hours and in Mode 5 in 36 hours.

Containment isolation valves 2NC-56B, 1/2KC-320A, 1/2KC-332B, 1/2KC-333A, 1/2RV-80B & 1/2RV-101A were inoperable in excess of the TS allowed time. Therefore, the requirements of TS 3.6.3 were not met (reportable per 50.73 (a) (2) (i) (B)).

At the time of discovery, Unit 1 was in Mode 1, operating at 100% power with no safety systems or components out of service that would have contributed to this event. Unit 2 was in No Mode at 0 percent power and no other structures, systems or components contributed to this event.

EVENT DESCRIPTION

In June 16, 2006, McGuire Nuclear Station discovered that actuator closing margins for the (NF) [BC] Containment Isolation Valves, 1NF-234A and 2NF-234A could be exceeded due to an inadequate bleed path to control the effects of thermal pressurization. This condition could have prevented CIVs 1NF-234A and 2NF-234A from remaining closed following a containment isolation signal.

August 16, 2006, LER 369/2006-01 documented this condition affecting containment isolation valves, 1NF-234A and 2NF-234A, which could have potentially allowed them to open after their closure on a containment isolation signal.

On March 20, 2008, during the course of an operability evaluation, it was determined that some of the CIVs were inoperable. Specifically, 1RV-80B, 1RV-101A were determined to be inoperable on 3/20/08, 1KC-320A, 1KC-332B, 1KC333A were determined to be inoperable on 3/31/08, and 1RV-79A was concluded to be operable but degraded/non-conforming due to an inadequate bleed path in-the-event of thermal pressurization. It is further noted that

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the Unit 2 CIVs were not declared inoperable, because the Unit was not in a MODE OF APPLICABILITY at the time of discovery.

## CAUSAL FACTORS

The cause for air operated containment isolation valves not being able to remain closed after a containment isolation signal was attributed to an original design oversight, which failed to ensure an adequate bleed path when considering the effects of captive fluid thermal expansion for ITT Grinnell diaphragm valves.

The above causal factor is similar to the causal factor identified in a previous LER (369/2006-01), in which, one of the corrective actions was to perform an extent of condition to identify other valves of concern. However, the extent of condition was not completed prior to this event.

The reason the "extent of condition" was not completed prior to the event was that there were no formal expectations or guidelines relative to timely completion of corrective actions having significant regulatory impact. The "extent of condition" has now been completed.

## CORRECTIVE ACTIONS

Immediate

Containment Isolation Valves 1KC-320A, 1KC-332B, 1KC-333A, 1RV-80B, and 1RV-101A were declared inoperable.

Procedure changes were implemented to specify valve alignments to limit system pressure increase and to restore valves 1KC-320A, 1KC-332B, and 1KC-333A to operable status.

A Relief Valve was installed to provide a relief path to limit system pressure increase and to restore valves 1RV-80B and 1RV-101A to operable status.

Procedure changes were implemented to specify valve alignments to limit 2NC-56B system pressure increase to ensure operability upon entry into a mode of applicability.

Relief valve 2KC-330 was disconnected from the KC drain header to limit pressure increase for 2KC-320A, 2KC-332B, and 2KC-333A thereby ensuring operability upon entry into a mode of applicability.

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A bleed path was established for CIV 1/2RV-79A to limit system pressure increase during a beyond design basis event.

A Relief Valve was installed to provide a relief path to limit system pressure increase and ensure operability of 2RV-80B and 2RV-101A upon entry into a mode of applicability.

Subsequent

Engineering reviewed information contained in the valve calculations to ensure proper system conditions have been applied and an extent of condition examination was completed for all Air Operated Containment Isolation (ITT Grinnell diaphragm) Valves.

A Root Cause Evaluation was completed to determine the causal factors and to identify corrective actions to prevent the recurrence of this event.

Planned

The following Planned Corrective Actions have been incorporated into McGuire Nuclear Station's Corrective Action Program.

1. Implement design enhancements for the following ITT Grinnell diaphragm containment isolation valves:

- Component Cooling [CC] (KC) 1/2KC-320A, 332B, 333A
- Nuclear Service Water [BI] (RN) 1/2RN-252B, 277B
- Containment Ventilation Cooling Water [BI] (RV)  
1/2RV-79A, 80B, 101A, 102B
- Ice Condenser Refrigeration [BC] (NF) 1/2NF-228A, 233B, 234A
- Fire Protection [KP] (RF) 1RF-821A, 832A
- Reactor Coolant [AB] (NC) 2NC-56B

2. Incorporate a timeliness expectation for completing corrective actions with significant regulatory impact into station programs, procedures and processes.

## SAFETY ANALYSIS

Duke Energy used a risk-informed approach to determine the risk significance associated with the inoperable containment isolation valves. Since this condition does not increase the frequency of an initiating event or impact core damage mitigation capability, there is no Conditional Core Damage Probability (CCDP) associated with this event.

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Flow paths through the Unit 1 penetrations are considered in the McGuire Containment Isolation analysis. Those results are deemed applicable to Unit 2 due to plant symmetry. For the present analysis, one of the CIVs (2NC-56B) could open due to expansion of the fluid trapped between the containment isolation valves. If this were to occur, it would relieve pressure and the redundant inboard passive check containment isolation valve would remain closed. In order for a release of airborne fission products through this pathway to occur, a significant breach in the piping would need to occur after resetting the safety signal. Thus a release through this pathway is concluded to be probabilistically insignificant.

The remaining valves were screened out as insignificant contributors to LERF (Large Early Release Frequency) on the basis that they connect to closed piping within containment and do not constitute a probabilistically significant pathway for the release of airborne fission products. Even if redundant CIVs were to open, a significant breach in the piping would need to occur. Thus a release through these pathways is also concluded to be probabilistically insignificant.

Since the penetrations involve closed piping within containment, they do not constitute a probabilistically significant pathway for the release of airborne fission products. Even if inboard and outboard CIVs were to open, a significant breach in the piping would need to occur to provide a viable release pathway. Thus the Conditional Large Early Release Probability (CLERP) associated with this event is evaluated to be  $< 1E-7$ .

Given the above, this event is considered to be of no significance with respect to the health and safety of the public.

**ADDITIONAL INFORMATION**

The Ice Condenser Refrigeration [BC] (NF) Containment Isolation Valves 1NF-234A & 2NF-234A had a similar failure in June 2006. This failure is classified as a Recurring Event (LER 369/2006-01).