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May 17, 2012

10 CFR 50.73

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

Subject: Duke Energy Carolinas, LLC  
McGuire Nuclear Station, Units 1 and 2  
Docket No. 50-369, 50-370  
Licensee Event Report 369/2012-01, Revision 0  
Problem Investigation Process Number M-12-02194

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report (LER) 369/2012-01, Revision 0, regarding 10 CFR 50 Appendix R non-compliances which had the potential to adversely affect the ability to achieve a cold shutdown of McGuire Nuclear Station Units 1 and 2.

This report is being submitted in accordance with 10 CFR 50.73 (a) (2) (ii) (B), an unanalyzed condition that significantly degraded plant safety. This event is considered to be of no significance with respect to the health and safety of the public. There are no regulatory commitments contained in this LER.

If questions arise regarding this LER, contact Kenneth L Ashe at 980-875-4535.

Sincerely,

Regis T. Repko

Attachment

JE22  
NLR

U.S. Nuclear Regulatory Commission  
May 17, 2012  
Page 2

cc: V. M. McCree  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
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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 the 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, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-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.

**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- 0369	<b>3. PAGE</b> 1 OF 6
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**4. TITLE**  
Appendix R Non-Compliance Could Have Potentially Affected Cold Shutdown

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
03	22	2012	2012	-001-	00	5	17	2012	McGuire Unit 2	05000 370
									FACILITY NAME	DOCKET NUMBER
									None	05000

**9. OPERATING MODE**  
1

**10. POWER LEVEL**  
100

**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)**

<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 checked="" 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 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 Kenneth L Ashe, Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) 980-875-4535
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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
B	SA	ISV	W030	No					

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
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)

McGuire Nuclear Station (MNS) has identified 10 CFR 50 Appendix R related non-compliances which could have resulted in fire-induced multiple spurious operation of the block valves for the Unit 1 or Unit 2 Steam Generator (SG) Power Operated Relief Valves (PORVs). This spurious operation could have potentially damaged these valves and rendered them inoperable. Since these valves are unisolable, they could not have been repaired to allow the SGs to be used for Unit cool down if needed. This potential condition could have adversely affected the ability to achieve a cold shutdown of the affected Unit following an Appendix R fire event. This event was not safety significant since the Appendix R non-compliances have low risk significance with respect to cold shutdown and they are mitigated by existing compensatory measures (i.e. fire watches) which have been in place as part of the MNS NFPA 805 transition.

The cause of this event is a latent Appendix R design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves.

As part of the transition to NFPA 805, compensatory measures in the form of fire watches have been established in the Fire Areas associated with Appendix R non-compliances to mitigate the latent Appendix R design deficiency. PRA risk significance of this event determined it is not "High Risk" for purposes of ensuring NFPA 805 enforcement discretion criteria are satisfied. The MNS current licensing basis will be revised to maintain a Fire Protection Program that complies with NFPA 805 as an alternative to 10 CFR 50 Appendix R.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
McGuire Nuclear Station, Unit 1	05000 369	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 6	
		2012	- 001	- 00		

**17. NARRATIVE**

BACKGROUND

The following information is provided to assist readers in understanding the event described in this LER. Applicable Energy Industry Identification [EII] system and component codes are enclosed within brackets. McGuire Nuclear Station (MNS) unique system and component identifiers are contained within parentheses.

On February 28, 2005, Duke Energy notified the Nuclear Regulatory Commission (NRC) of MNS's intent to adopt National Fire Protection Association (NFPA) Standard 805 in accordance with 10 CFR 50.48(c). On April 18, 2006, Duke Energy notified the NRC that MNS had begun the process of transitioning to NFPA 805. For licensees transitioning to NFPA 805, assuming specific criteria are met, the NRC will exercise enforcement discretion for 1) Appendix R non-compliances identified during the licensee's transition process and for 2) existing Appendix R non-compliances that could reasonably be corrected under 10 CFR 50.48(c). NRC Inspection Manual Chapter 305 Section 11.05 – "Treatment of Items Associated With Enforcement Discretion" indicates that, for enforcement discretion to be applicable, Licensee Event Reports (LERs) should be submitted for pre-existing non-compliances and for non-compliances identified during transition to NFPA 805. In addition, NFPA 805 enforcement discretion Federal Register Notice 76 FR 40777 dated July 12, 2011 indicates that enforcement discretion does not relieve a licensee of the requirement to make a required report to the NRC.

As part of the transition to NFPA 805, MNS has identified Appendix R related non-compliances. In addition, MNS has identified Appendix R non-compliances that existed prior to starting the transition to NFPA 805. These non-compliances have been entered into the MNS corrective action program and the appropriate compensatory measures have been implemented to ensure fire safety and sufficient defense-in-depth. With respect to the non-compliances, MNS has satisfied the NRC criteria for NFPA 805 related enforcement discretion. However, as described above, enforcement discretion does not relieve MNS of the requirement to make required NRC notifications as applicable.

The Main Steam Vent to Atmosphere System (SV) [SA] is used to dissipate heat from the Reactor Coolant system (NC) [AB] following a turbine and/or reactor trip by releasing steam through the Steam Generator (SG) [SG] Power Operated Relief Valves (PORV) [RV] as needed to ensure a controlled cooldown following plant events. During an Appendix R fire event, the air operated SG PORVs are used to cooldown the affected Unit so it can achieve cold shutdown conditions. SG PORV block valves [ISV] 1/2SV25, 1/2SV26, 1/2SV27, or 1/2SV28 provide a means to isolate the respective SG PORV lines in response to an event or as otherwise needed. These block valves are motor operated valves (MOV) [20] which, if needed, can be manually operated using the affected block valve's handwheel.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
McGuire Nuclear Station, Unit 1	05000 369	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3	OF 6
		2012	- 001	- 00		

17. NARRATIVE

EVENT DESCRIPTION

In 1980, the NRC published the 10 CFR 50 Appendix R rule. Appendix R Section III.G specifies in part that fire protection features shall be capable of limiting fire damage such that systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours.

In 1981, the MNS Appendix R analysis identified that, in the event of a fire in the respective Fire Area, the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves 1/2SV25, 1/2SV26, 1/2SV27, and 1/2SV28 could fail and cause those valves to spuriously operate. As a result, local manual operation of the SG PORV block valves was credited for ensuring the SG PORVs are available to ensure compliance with the Appendix R III.G cold shutdown requirements.

In 1981, the MNS Unit 1 Facility Operating License was issued by the NRC. Compliance with the requirements of Appendix R Section III.G was now required for Unit 1.

In 1983, the MNS Unit 2 Facility Operating License was issued by the NRC. Compliance with the requirements of Appendix R Section III.G was now required for Unit 2.

In 1992, the NRC issued Information Notice (IN) 92-18 which provided industry operating experience related to MOV electrical circuit design deficiencies which could allow fire induced hot shorts, which spuriously operate a MOV, to also bypass the MOV limit/torque switches. Thus, the MOV typical signal to stop is bypassed and the MOV continues on to motor burnout, possible gear box damage, and possible internal valve damage. Subsequent MNS evaluation of IN 92-18 identified that, in the event of a fire in Unit 1 Fire Area 15-17 or Unit 2 Fire Area 16-18, a latent design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves made them susceptible to the potential for spurious operation and subsequent valve damage described in IN 92-18. Since the MNS position was to only assume fire induced single spurious operation of components, the IN 92-18 evaluation did not factor in the possible effects of multiple spurious operation of the block valves.

In 1997, the MNS Appendix R Design Basis Document (DBD) was issued indicating that, in the event of a fire, it is only necessary to assume a single spurious operation. The Appendix R DBD forms part of the MNS licensing basis since it was later incorporated by reference into the McGuire Updated Final Safety Analysis Report (UFSAR).

In 2003, an NRC Triennial Fire Protection Inspection exited with an Unresolved Item (URI) 03-07-04 related to the number of fire induced spurious operations that must be postulated for MNS. At that time, the MNS position remained that only fire induced single spurious operations needed to be assumed.

In October 2011, as part of the Appendix R reconstitution and NFPA 805 transition work, MNS began identifying Appendix R related non-compliances. Included in the list of non-compliances is the condition identified during the earlier evaluation of IN 92-18 related to the latent design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves which could make them susceptible to the spurious operation and subsequent valve damage described in IN 92-18. At that time, the MNS position remained that only fire induced single spurious operations needed to be assumed.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
McGuire Nuclear Station, Unit 1	05000 369	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 6	
		2012	- 001	- 00		

**17. NARRATIVE**

On February 5, 2012, Browns Ferry Nuclear Station notified the NRC of an event where, as part of their NFPA 805 transition review, they reported non-compliances with their 10 CFR 50 Appendix R requirements. These non-compliances represented unanalyzed conditions that significantly degraded plant safety (reference NRC Event Report #47638).

On February 13, 2012, as a result of MNS review of Brown's Ferry Nuclear Station Event Report #47638, MNS began assessing reportability of the Appendix R non-compliances identified during the station's Appendix R reconstitution and NFPA 805 transition work. As part of this, Engineering assessed potential reportability with respect to the latent design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves which could make them susceptible to the spurious operation and subsequent valve damage described in IN 92-18.

On March 19, 2012, MNS Engineering identified that, assuming multiple spurious operation, the latent design deficiency in the electrical circuits for the Unit 2 SG PORV block valves (2SV25, 2SV26, 2SV27, and 2SV28) could result in damage to all these block valves as described in IN 92-18. Specifically, a fire in the Unit 2 Electrical Penetration and Switchgear Room (Fire Area 16-18) could damage the electrical circuits for all of the Unit 2 SG PORV block valves. Assuming multiple spurious operation, this could mechanically damage all of these block valves, potentially rendering them manually and electrically inoperable. If the block valves were spuriously closed, they could not be manually opened. Since the SG PORV block valves are un-isolable, they could not have been repaired within 72 hours preventing using the Unit 2 SG PORVs to achieve an Appendix R required cold shutdown of Unit 2 if needed.

On April 19, 2012, as part of an extent of condition review, Engineering determined that a condition existed on the McGuire Unit 1 SG PORV block valves (1SV25, 1SV26, 1SV27, and 1SV28) similar to the Unit 2 condition described above. Due to the latent design deficiency in the electrical circuits for these valves, a fire in the Unit 1 Electrical Penetration and Switchgear Room (Fire Area 15-17) could damage the electrical circuits for all of the Unit 1 SG PORV block valves resulting in assumed multiple spurious operation of these valves and subsequent mechanical valve damage. Similar to Unit 2, the Unit 1 block valves could not have been repaired within 72 hours preventing using the Unit 1 SG PORVs to achieve an Appendix R required cold shutdown of Unit 1 if needed.

**REPORTABILITY DETERMINATION**

The current MNS licensing basis is to assume single spurious operation when addressing compliance with the requirements of 10 CFR 50 Appendix R. Assuming fire induced single spurious operation, the latent design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves would have the potential to mechanically damage only one SG PORV block valve on the affected Unit. The SG PORVs associated with the undamaged SG PORV block valves would remain available to allow the affected Unit to achieve an Appendix R required cold shutdown if needed. This would not represent a condition reportable to the NRC. However, a representative sample of Licensee Event Reports (LERs) related to Appendix R and/or NFPA 805 events identified examples where licensees had reported based upon the assumption of multiple fire induced spurious operations. In addition, MNS URI 03-07-04 related to the number of fire induced spurious operations that must be postulated for MNS remains open. Therefore, a conservative decision was made regarding reportability with respect to the latent design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
McGuire Nuclear Station, Unit 1	05000 369	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5 OF 6	
		2012	- 001	- 00		

**17. NARRATIVE**

This was a conservative decision and is not reflective of any change in the single spurious component of the MNS licensing basis.

Assuming fire induced multiple spurious operation, the latent design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves could result in damage to all of these block valves, potentially rendering them manually and electrically inoperable. If the block valves were spuriously closed, they could not be manually opened. Since the SG PORV block valves are un-isolable, they could not have been repaired within 72 hours preventing using the respective Units PORVs to achieve an Appendix R required cold shutdown if needed. The inability to make repairs of the Unit 1 and Unit 2 SG PORV block valves within 72 hours to allow the Units to achieve a cold shutdown condition represents a non-compliance with the requirements of Appendix R Section III.G. The inability to achieve an Appendix R required cold shutdown on Unit 1 or Unit 2 if needed are unanalyzed conditions significantly degrading plant safety reportable to the NRC per the requirements of 10 CFR 50.72(b)(3)(ii)(B) and 10 CFR 50.73(a)(2)(ii)(B). These Appendix R non-compliance related events were conservatively reported to the NRC on March 22, 2012 and April 19, 2012 for Unit 2 and Unit 1 respectively which satisfied the 10 CFR 50.72 (b)(3)(ii)(B) reporting requirement (Event Reports #47764 and #47854). Compensatory measures, in the form of fire watches, are in place to mitigate these events.

CAUSAL FACTORS

1. A latent Appendix R design deficiency in the electrical circuits for the Unit 1 and Unit 2 SG PORV block valves (1/2SV25, 1/2SV26, 1/2SV27, and 1/2SV28).

In the event of a fire, the circuit design of the Unit 1 and Unit 2 SG PORV block valves could result in hot shorts bypassing the valve limit switches causing multiple spurious operation and mechanical damage to the valves. Since these valves are unisolable, they cannot be repaired. This scenario could potentially result in no SGs available to achieve cold shutdown conditions following an Appendix R fire event. This latent Appendix R design deficiency has been present since Appendix R issuance.

CORRECTIVE ACTIONS

Interim:

1. As part of the transition to NFPA 805, compensatory measures in the form of fire watches have been established in the Fire Areas associated with Appendix R non-compliances to mitigate the latent Appendix R design deficiency.
2. PRA risk significance of this event determined it is not "High Risk" for purposes of ensuring NFPA 805 enforcement discretion criteria are satisfied.

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
McGuire Nuclear Station, Unit 1	05000 369	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6 OF 6		
		2012	- 001	- 00			

**17. NARRATIVE**

Planned:

- The MNS current licensing basis will be revised to maintain a Fire Protection Program that complies with NFPA 805 as an alternative to 10 CFR 50 Appendix R. This will be accomplished as part of existing planned actions associated with the MNS intent to transition to NFPA 805 as stated in docketed correspondence dated February 28, 2005.

NFPA 805 does not require cold shutdown but does require 'safe and stable' conditions, which for MNS is hot standby. Therefore, the design of the electrical circuits for the SG PORV block valves will not be considered deficient with regards to NFPA 805 where achieving and maintaining hot standby is the requirement.

**SAFETY ANALYSIS**

Probabilistic Risk Assessment (PRA) has determined there is low risk significance attributed to a failure to achieve cold shutdown conditions. Safety significance for both the cold shutdown and hot standby related non-compliances has been mitigated by the compensatory fire watches which have been established in the Fire Areas associated with the Appendix R non-compliances identified as part of the MNS NFPA 805 transition work. These Appendix R non-compliances will be resolved as part of the MNS intent to transition to NFPA 805 as stated in docketed correspondence dated February 28, 2005.

**ADDITIONAL INFORMATION**

To determine if this event was recurring, a search of the McGuire Problem Identification Process (PIP) database was conducted for a time period covering five years prior to the date of this event. For those applicable events with a corresponding cause code, a thorough review concluded that none were similar enough to call this event recurring.