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Serial No: MNS-16-057

July 22, 2016

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

10 CFR 50.73

Subject: Duke Energy Carolinas, LLC
McGuire Nuclear Station (MNS), Unit 1
Docket No. 50-369
Licensee Event Report 369/2016-01, Revision 1
Nuclear Condition Report (NCR) 2013556

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report (LER) 369/2016-01, Revision 1, regarding an American Society of Mechanical Engineers (ASME) rejectable flaw discovered on the MNS Unit 1 Chemical and Volume Control System (NV) charging piping.

This revision to LER 369/2016-01 supersedes the LER previously submitted on May 23, 2016. The cause analysis has been completed. Completion of the cause analysis has not affected the original reporting criteria, which was in accordance with 10 CFR 50.73(a)(2)(ii)(A), a degradation of a principal safety barrier.

Additionally, the revision did not affect the significance of the event, which was considered to be of no significance with respect to the health and safety of the public.

There are no regulatory commitments associated with this LER.

If questions arise regarding this LER, please contact George Murphy of Regulatory Affairs at 980-875-5715.

Sincerely,

Steven D. Capps for

Steven D. Capps

Attachment

IE22
NRR

cc: Catherine Haney
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U.S. Nuclear Regulatory Commission
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NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See page 2 for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
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4. TITLE

Degraded Condition due to Rejectable Flaw on U1 Charging Line

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
									None	
03	22	2016	2016	2016-01	1	07	22	2016	FACILITY NAME None	DOCKET NUMBER

9. OPERATING MODE

Mode 5

10. POWER LEVEL

000

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

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☒ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
George M. Murphy, Regulatory Affairs	980-875-5715

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
X	CB	PSP	X000	Y						

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

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

On March 22, 2016, while Unit 1 was in end of cycle (EOC) refueling outage 1EOC24 (Mode 5), a manual ultrasonic (UT) examination of the Chemical and Volume Control System (NV), Charging Line to the 1A Reactor Coolant System (NC) cold leg confirmed a previously identified circumferential indication associated with weld 1NC1F-1374. The current examination results had shown that the indication had changed since the previous examination during 1EOC23 and concluded that the indication no longer met American Society of Mechanical Engineers (ASME) Section XI Code requirements. This condition is reportable under 10CFR50.73(a)(2)(ii)(A) as a degraded condition.

A specific cause for the condition could not be determined. A metallurgical examination concluded that the cause of the UT result could have been influenced by pre-existing welds associated with a legacy modification.

The affected NV piping on Unit 1 was replaced during refueling outage 1EOC24.

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17. NARRATIVE

BACKGROUND:

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

Chemical and Volume Control System [CB] (NV):
The NV system is designed to maintain required water inventory in the Reactor Coolant [AB] (NC) system; maintain seal-water injection flow to the reactor coolant pumps; control water chemistry conditions; and provide emergency core cooling (part of the system shares piping with the Safety Injection [BQ] (NI) system).

A circumferential indication on weld 1NC1F-1374 was reported under 10 CFR 50.72 (b)(3)(ii)(A), "Any event or condition that results in the condition of the nuclear power plant, including its principal safety barriers, being seriously degraded." An Emergency Notification System report was made to the Nuclear Regulatory Commission (NRC) on March 22, 2016, at 2333 hours. A 10 CFR 50.73 (a)(2)(ii)(A) licensee event report is also required due to this degraded condition and was submitted on May 23, 2016. This report supplements the May 23, 2016, report.

Weld 1NC1F-1374 is located on the 3 inch nominal diameter NV connection to the 27.5 inch inside diameter 1A NC cold leg piping. This weld has been installed in the plant since 1983 following the removal of thermal sleeves in the reactor coolant system. The circumferential indication is located near the connection to the NC cold leg piping.

The circumferential indication was originally identified during the previous 1EOC23 refueling outage. When originally identified, the weld met the requirements of American Society of Mechanical Engineers (ASME) Section XI IWB 3514. The current 1EOC24 examination results had shown that the indication had changed since the previous 1EOC23 examination and concluded that the circumferential indication no longer met ASME Section XI Code requirements.

This weld was not originally scoped into the MRP-146, "Thermal Fatigue in Normally Stagnant Non-Isolable Reactor Coolant System Branch Lines," program due to piping orientation characteristics. It was added to the MRP-146 examination scope as an extent of condition examination based on similarities in application to a previously identified MRP-146 indication on Unit 2 piping. The Unit 2 condition is documented in LER 370/2014-01, Revision 1, dated July 24, 2014. The examination of 1NC1F-1374 completed the extent of condition examinations. Under the MRP-146 program, this weld will continue to be inspected per industry guidance.

No significant structures, systems, or components were out of service at the time of discovery such that they contributed to the event.

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17. NARRATIVE

EVENT DESCRIPTION:

On March 22, 2016, while Unit 1 was in refueling outage 1EOC24 (Mode 5), a manual ultrasonic (UT) examination of the [CB] NV branch line connected to the [AB] NC system cold leg piping confirmed a previously identified circumferential indication on weld 1NC1F-1374.

The UT techniques used during 1EOC24 on March 22, 2016, had shown that the circumferential indication had changed since the previous 1EOC23 examination and concluded that the indication no longer met American Society of Mechanical Engineers (ASME) Section XI Code requirements.

The relevant sequence of events pertaining to the indication on weld 1NC1F-1374 is as follows:

09/28/2014 A circumferential indication was identified during 1EOC23 at 1NC1F-1374 during the MRP-146 extent of condition UT examination. The circumferential indication was evaluated as acceptable per ASME Section XI code requirements.

03/22/2016 A subsequent re-examination of 1NC1F-1374 during 1EOC24 showed that the circumferential indication had changed and no longer met ASME Section XI code requirements.

04/04/2016 The affected piping associated with weld 1NC1F-1374 was replaced during the 1EOC24 refueling outage.

CAUSAL FACTORS:

A specific cause for the condition could not be determined. The section of the pipe that contained the circumferential indication identified by the UT was removed for examination in the Duke Energy Metallurgical Lab to understand the cause of the circumferential indication. The metallurgical examination concluded that the cause of the UT result could have been influenced by the presence of existing weld artifacts. Although the metallurgical examination results indicated the presence of small indications, they were well within ASME XI code criteria and were not actively growing. The indications appeared to be the result of shrinkage of the welds associated with a legacy modification.

The indications examined in the metallurgical lab were not able to be opened to determine the presence of fatigue striations; however, the report did not show evidence of rapid growth as evidenced by blunted, oxide filled crack tips.

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17. NARRATIVE

CORRECTIVE ACTIONS:

Immediate:

1. An ASME Code repair of the 1A Normal Charging Line containing the circumferential indication was completed during 1EOC24.

Planned:

1. The subject weld will be incorporated into the McGuire Augmented ISI Plan for UT inspection under the industry guidance of MRP-146.

SAFETY ANALYSIS:

The NV piping indication found on Unit 1 had no impact on public health and safety. A stress analysis concluded that despite the presence of the circumferential indication reported by the UT exam, the 3 inch nominal diameter NV piping nozzle would not have catastrophically failed if it had been exposed to design basis loadings. The analysis further concluded that the piping would not leak if it had been exposed to design basis loadings prior to replacement.

ADDITIONAL INFORMATION:

A review of the McGuire corrective action program was conducted to determine whether this was a recurring event. There have been two similar issues identified during the past five years that were associated with MRP-146 and thermal fatigue. The first issue is documented in LER 370/2014-01, dated July 24, 2014. The second one is documented in LER 369-2014-02, dated November 24, 2014.

The indication associated with weld 1NC1F-1374 on 1A Normal Charging Line that is discussed in this report was examined as part of the original Unit 2 issue extent of condition. Since this indication was examined as part of the extent of condition review stemming from the original McGuire Unit 2 piping weld issue, and since there were no failed corrective actions that could have prevented the event, the event documented in this LER is not considered recurring.