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Serial No. MNS-15-088

10 CFR 50.55a

November 9, 2015

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Carolinas, LLC (Duke Energy)
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Relief Request Serial No. 15-MN-002

Pursuant to 10 CFR 50.55a(z)(2), Duke Energy hereby submits the enclosed relief request (RR) for an alternative to defect removal prior to performing repair activities on buried Nuclear Service Water System (RN) piping.

McGuire's Buried Piping Integrity Program requires visual and ultrasonic examination of portions of buried Class 3 RN piping. This buried piping is shared between Units 1 and 2. If excessive wall thinning or through-wall leakage resulting from internal or external corrosion is detected in this buried piping, this RR provides an alternative to defect removal prior to performing repair activities. The proposed alternative will reduce the risk to system and plant operation and will help to avoid a hardship without a compensating increase in quality and safety.

Staff approval of this RR is requested within one year of the date of this submittal.

The enclosure to this letter contains the RR. If you have any questions or require additional information, please contact P.T. Vu of Regulatory Affairs at (704) 875-4302.

Sincerely,

Steven D. Capps

Enclosure

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NRR

xc:

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Enclosure

Duke Energy Carolinas, LLC

McGuire Nuclear Station, Units 1 and 2

Relief Request Serial #15-MN-002

Relief Requested in Accordance with 10 CFR 50.55a(z)(2) to use an Alternative to Defect Removal Prior to Performing Repair/Replacement Activities on Nuclear Service Water System Buried Piping

1. ASME Code Component(s) Affected

Nuclear Service Water (RN) System ASME Class 3 components listed below:

1.1. 36 inch and 42 inch diameter buried supply piping from the Low Level Intake (LLI) at Cowans Ford Dam to the Auxiliary Building. This piping contains raw water from Lake Norman.

1.2. 36 inch diameter buried supply and return piping from the Standby Nuclear Service Water Pond (SNSWP) to the Auxiliary Building. This piping contains raw water drawn from, and returned to, the SNSWP.

1.3. Design data applicable to the above piping is provided below:

Nominal Wall Thickness:	ANSI "Standard" pipe schedule to 0.5 inches
Design Pressure:	25 to 35 psig
Design Temperature:	95 to 150 degrees, F
Material Specification:	Carbon steel, consisting of one or more of the following specifications and grades:

- A-134 Gr 283C
- SA-155 Gr C55
- SA 285 Gr C
- SA-672 Gr C70, CL. 21
- SA-155 Gr KC 70, CL. 1

1.4. The above piping does not have an internal coating system, but the exterior of this piping was coated with coal tar epoxy.

1.5. The RN System piping above is shared between Units 1 and 2.

2. Applicable Code Edition and Addenda

ASME Code, Section XI, 2007 Edition with the 2008 Addenda.

The 4th Inservice Inspection Interval dates for Units 1 and 2 are as follows:

- Unit 1 4th Inservice Inspection Interval: December 1, 2011 through November 30, 2021
- Unit 2 4th Inservice Inspection Interval: July 15, 2014 through December 14, 2024

3. Applicable Requirement

3.1. IWA-4412 requires that welding, brazing, defect removal, and installation activities be performed in accordance with IWA-4420.

3.2. IWA-4420 specifies requirements for defect removal and examination.

Relief is requested from the requirement of IWA-4400 that defective portions of components be removed prior to performing a repair/replacement activity by welding.

4. Reason for Request

4.1. McGuire plans to continue to inspect portions of buried Class 3 Nuclear Service Water (RN) piping for visual and ultrasonic examination in accordance with requirements of the McGuire Buried Piping Integrity Program, prior to the end of the Unit 1 4th inservice inspection interval. This program was developed for the purpose of maintaining the safe and reliable operation of all buried piping systems within its scope, including portions of the RN System, and was developed in direct response to industry awareness of aging buried pipe issues. Subsequently, NEI and the Buried Piping Integrity Task Force developed and issued on February 4, 2010 NEI 09-14, "Guideline for the Management of Buried Piping Integrity" to facilitate the industry implementation of the Initiative. Duke Energy believes that these examinations will help to confirm the structural and leak-tight integrity of these components, providing additional assurance that this system can continue to perform its intended safety function.

4.2. If excessive wall thinning or through-wall leakage resulting from internal or external corrosion is detected in this buried piping, the defective areas would require repair in accordance with the ASME Code, Section XI, 2007 Edition with the 2008 Addenda, IWA-4000. Prior to performing repair/replacement activities by welding, the defective portions of the component must be removed. Duke Energy believes that requiring removal of defective portions of this piping prior to performing repair/replacement activities represents a hardship or unusual difficulty without a compensating increase in the level of quality and safety for reasons identified in this request.

5. Proposed Alternative and Basis for Use

5.1. For piping identified in Section 1.0 of this request that cannot be depressurized and dewatered without entering a Technical Specification LCO, or without requiring a shutdown of both Units 1 and 2, the following alternative is proposed.

5.2. In lieu of the requirement of IWA-4400 to remove the defective portion of the component prior to performing repair/replacement activities by welding, unacceptable wall thickness loss or through-wall leakage caused by localized general or pitting corrosion on the interior or exterior surface of the piping may be repaired without removing the defective portion of the component, provided the repair/replacement activity complies with the requirements of ASME Code Case N-789-1, with the following exceptions:

5.2.1. Pressure pads shall not be used.

5.2.2. The requirement of Code Case N-789-1, 1(e) shall not apply.

5.2.3. Structural pads shall be designed such that the growth of degradation is not projected to exceed the limits of dimensions "C" or "L" in Code Case N-789-1, Figure 1 for the design life of the repair/replacement activity. The growth of degradation shall be based on a corrosion rate of either 2 times the actual measured corrosion rate in that location, or 4 times the estimated maximum corrosion rate for that portion of the RN system.

5.2.4. Structural pads shall be designed such that the minimum required design thickness shall be maintained for the design life of the repair/replacement activity, based on corrosion rates used in the design.

5.2.5. Gasket or sealant material, if used between the pipe and the pad, shall be designed to allow for pressurization of the pad attachment welds to the piping during the pressure test required by Code Case N-789-1, 7. In addition, any residual moisture at welding locations shall be removed by heating, prior to welding.

5.2.6. Where a structural pad is applied over externally-corroded areas where there is potential for bulging, the corrosion cavity shall be filled with hardenable fill to minimize the gap beneath the reinforcing pad, prior to installing the pad.

5.2.7. The leak tightness of the structural pad and its attachment welds to the component pressure boundary shall be verified by performing a system leakage test and VT-2 visual examination, as required by Code Case N-789-1, 7.

5.2.8. Inservice monitoring requirements of Code Case N-789-1, 8 shall apply, except as follows:

1. In lieu of the requirement of 8(b), thickness monitoring for structural pads using ultrasonic or direct thickness measurement shall be performed to verify that minimum design thicknesses, as required by the Construction Code or Section III, are maintained. These measurements shall be performed prior to the date on which no less than 25% of the design life of the repair/replacement activity remains, based on corrosion rates used in the design of the structural pad. Subsequent measurements shall be performed prior to the date on which no less than 25% of the remaining design life of the repair/replacement activity remains, based on measured corrosion rates at the location of the structural pad.
2. The requirements of 8(d) and 8(e) shall not apply.

5.2.9. Upon completion of the repair/replacement activity, protective coatings shall be restored on exterior surfaces of the piping, including areas affected by the repair/replacement activity.

5.3. The basis for the proposed alternative is as follows:

5.3.1. For repair of through-wall defects or excessive wall thinning caused by corrosion, compliance with the requirement to remove the defect prior to performing the repair/replacement activity would require that the piping be dewatered prior to performing repairs, or that repairs be completed using a hot-tapping machine.

5.3.2. For repair of excessive wall thinning caused by external corrosion (without through-wall leakage), restoration of the required component wall thickness could be performed by weld overlay on the exterior of the pipe in accordance with applicable ASME Code requirements. However, the integrity of the pressure boundary could be jeopardized by welding directly on these areas during system operation.

5.3.3. For repair of defective areas where through-wall leakage is detected, IWA-4400 would require the defective area to be removed. The defective areas would then be replaced using new pressure retaining material, or by installing a branch connection that is designed in accordance with the requirements of the Construction Code. The RN System Low Level Intake supply piping is a single header that is shared between Units 1 and 2, and it would be difficult to isolate, depressurize, and drain the piping to permit these types of repairs within the

Technical Specification 3.7.7, Condition A Allowed Outage Time. This difficulty would also be encountered in repairing the RN supply and return piping between the SNSWP and the Auxiliary Building. As such, Duke Energy believes that the only practical repair methods would require the use of a hot-tapping machine to install a branch connection during system operation or to install a line stop (requiring removing the system from service) to dewater the pipe, remove the defective area, and perform a code-compliant repair. Use of a hot-tapping machine is not desirable for the following reasons:

1. Duke Energy believes that installation of a line stop using a hot-tapping machine (to permit dewatering of the pipe) would necessitate a plant shutdown for both units because Technical Specification 3.7.7 allows only one train of the RN System to be taken out of service for no more than 72 hours, and Duke Energy believes that it would be difficult to complete this work within this timeframe. Also, the risks associated with performing repairs using a hot-tapping machine (without dewatering the piping) can be eliminated using the proposed alternative.
2. Hot-tapping the RN pipe could result in metal shavings or a portion of the pipe wall dislodging, entering the system, and becoming debris that could hinder system operation and make it difficult to retrieve the loose material.
3. Typically, the installation of a branch connection using a hot-tapping machine results in a mechanical joint being installed on the new branch connection after the hot-tap is completed. Installation of a mechanical joint in a buried application is not desirable because it introduces a new path for potential system leakage.
4. Removal of material from the pipe wall during hot-tapping could increase the risk of system leakage in the event that difficulties are encountered during this process.

5.3.4. Structural pads designed and installed in accordance with the proposed alternative will provide sufficient margin against lateral and radial growth of the defective area due to any internal corrosion of the pipe wall. The proposed inservice monitoring requirements are based on conservative corrosion rates that provide reasonable assurance that unacceptable degradation of the pipe wall would be detected prior to challenging the structural integrity of the pipe. The proposed alternative includes requirements to ensure the leak-tightness of the structural pad, and requirements for restoration of protective coatings to minimize the risk of external corrosion.

5.4 For the reasons stated above, Duke Energy believes that compliance with the requirements of the ASME Code, Section XI, IWA-4400 to remove defective portions of buried RN System piping prior to performing a repair/replacement activity by welding would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety achieved by the proposed alternative.

6. Duration of Proposed Alternative

The proposed alternative is requested for the duration of the McGuire Unit 1 4th Inservice Inspection Interval, currently scheduled to end on November 30, 2021. Structural pads

installed in accordance with the proposed alternative may be used for the duration of their projected design life, based on measured corrosion rates at the location of the structural pads.

7. References

7.1. Letter dated March 28, 2011, providing NRC Safety Evaluation for Duke Energy Corporation Relief Request #09-MN-002 Revision 1 (ADAMS Accession #ML110800426).