Duke Energy®
Carolinas

KELVIN HENDERSON
Catawba Nuclear Station
Site Vice President

Duke Energy Carolinas, LLC
4800 Concord Rd.
York, SC 29745

803-701-4251

March 18, 2013

10 CFR 50.55a

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

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Unit 2
Docket No. 50-414
Relief Request Serial Number 13-CN-001, Relief Request to Use Alternative Depth Sizing Criteria

Pursuant to 10 CFR 50.55a(g)(5)(iii), Duke Energy hereby submits Relief Request 13-CN-001 requesting approval to use an alternative depth sizing qualification for volumetric examinations of the reactor vessel hot leg and cold leg nozzle-to-safe end dissimilar metal welds performed from the inside surface.

The basis for the proposed relief request is provided in the enclosure to this letter. Duke Energy requests approval of this request by August 31, 2013 to support examinations scheduled during the Catawba Unit 2 refueling outage in Fall 2013.

There are no regulatory commitments contained in this letter or its enclosure.

If you have any questions or require additional information, please contact L. J. Rudy at (803) 701-3084.

Very truly yours,

Kelvin Henderson

LJR/s

Enclosure

AD47
NRR

xc (with enclosure):

V.M. McCree
Regional Administrator
U.S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Ave., NE Suite 1200
Atlanta, GA 30303-1257

G.A. Hutto, III
Senior Resident Inspector
U.S. Nuclear Regulatory Commission
Catawba Nuclear Station

J.H. Thompson (addressee only)
NRC Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop O8-G9A
11555 Rockville Pike
Rockville, MD 20852-2738

Enclosure

Duke Energy Carolinas, LLC

Catawba Nuclear Station, Unit 2

Relief Request Serial No. 13-CN-001

Relief Request for Alternative Depth Sizing Criteria, Submitted Pursuant to 10 CFR 50.55a(g)(5)(iii)

1.0 ASME Code Components Affected

Class 1 Reactor Coolant System (NC) Reactor Vessel Hot Leg Nozzle-to-Safe End and Cold Leg Nozzle-to-Safe End Dissimilar Metal Welds Listed in Table 1 Below.

Table 1

Description	Size	Nozzle-to-Safe End Weld No.	Inspection Plan Summary Number	ASME Section XI Item No. or Code Case N-770-1 Item
Hot Leg Nozzle 2A to Safe End Weld	29.0" ID (Nom.)	2RPV-202-121ASE	C2.B5.10.0006	B5.10
			C2.G7.2.0001	A-2
Hot Leg Nozzle 2B to Safe End Weld	29.0" ID (Nom.)	2RPV-202-121BSE	C2.B5.10.0005	B5.10
			C2.G7.2.0002	A-2
Hot Leg Nozzle 2C to Safe End Weld	29.0" ID (Nom.)	2RPV-202-121CSE	C2.B5.10.0008	B5.10
			C2.G7.2.0003	A-2
Hot Leg Nozzle 2D to Safe End Weld	29.0" ID (Nom.)	2RPV-202-121DSE	C2.B5.10.0007	B5.10
			C2.G7.2.0004	A-2
Cold Leg Nozzle 2A to Safe End Weld	27.5" ID (Nom.)	2RPV-201-121ASE	C2.G7.3.0001	B
Cold Leg Nozzle 2B to Safe End Weld	27.5" ID (Nom.)	2RPV-201-121BSE	C2.G7.3.0002	B
Cold Leg Nozzle 2C to Safe End Weld	27.5" ID (Nom.)	2RPV-201-121CSE	C2.G7.3.0003	B
Cold Leg Nozzle 2D to Safe End Weld	27.5" ID (Nom.)	2RPV-201-121DSE	C2.G7.3.0004	B

Component materials and nozzle weld configurations are shown in Figure 1.

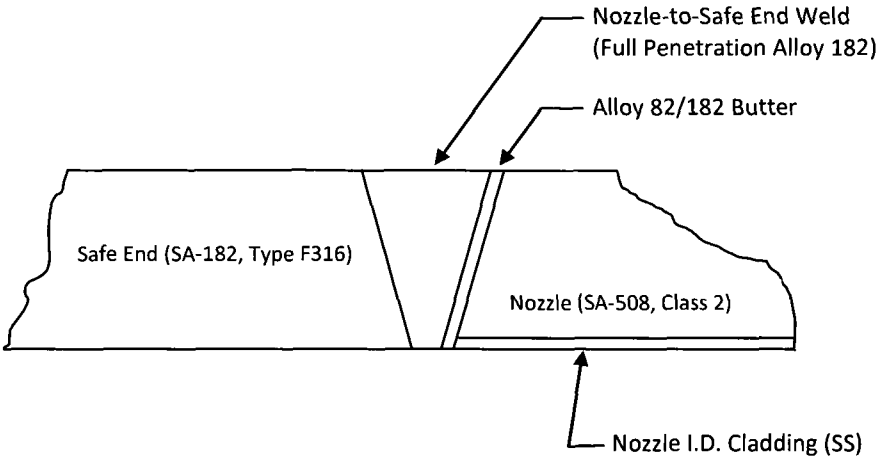

Figure 1
Hot Leg and Cold Leg Nozzle-to-Safe End Welds
(Not to Scale)

2.0 Applicable Code Edition and Addenda

2.1 ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda.

2.2 ASME Code Case N-770-1, Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1. Use of this Case is required by 10 CFR 50.55a(g)(6)(ii)(F).

2.3 The 3rd Inservice Inspection Interval Program for Unit 2 includes ASME Code Case N-695, Qualification Requirements for Dissimilar Metal Piping Welds, Section XI, Division 1, which has been approved for use in Regulatory Guide 1.147, Rev. 16, Table 1- "Acceptable Section XI Code Cases".

3.0 Applicable Code Requirements

3.1 IWA-2232 requires that ultrasonic examinations be conducted in accordance with Mandatory Appendix I. Appendix I, I-2220 requires that ultrasonic examinations be qualified by performance demonstration in accordance with Mandatory Appendix VIII. Appendix VIII, Supplement 10, "Qualification Requirements For Dissimilar Metal Piping Welds", Paragraph 3.2(b) requires that "Examination procedures, equipment, and personnel are qualified for depth sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125 in. (3.2 mm)."

Note that volumetric examinations of the Reactor Vessel nozzle-to-safe end dissimilar metal welds are also required to be performed in accordance with Section XI, Appendix VIII, as required by 10 CFR 50.55a(b)(2)(xv) and 10 CFR 50.55a(b)(2)(xvi).

3.2 Code Case N-770-1, Table 1, Footnote (4) applies to volumetric examination of Inspection Items A-2 and B, and requires that "Ultrasonic volumetric examination shall be used and shall meet the applicable requirements of Appendix VIII."

3.3 Code Case N-695 provides alternatives to the requirements of Appendix VIII, Supplement 10, but paragraph 3.3(c) of this case requires that "Examination procedures, equipment, and personnel are qualified for depth-sizing when the RMS error of the flaw depth measurements, as compared to the true flaw depths, do not exceed 0.125 in. (3 mm)." Code Case N-695 has been accepted by the NRC without condition and is listed in Table 1 of Regulatory Guide 1.147, Rev. 16.

4.0 Impracticality of Compliance

Since 2002, the nuclear power industry has attempted to qualify personnel and procedures for depth-sizing examinations performed from the inside surface of dissimilar metal and austenitic stainless steel butt welds in PWR piping. As of November 26, 2012, no domestic or international vendor has met the applicable root mean square (RMS) error requirement of ASME Section XI Appendix VIII, Supplement 10, or the alternative qualification requirements of ASME Code Case N-695, as applicable.

Vendors that Duke Energy is considering for performing these examinations have demonstrated an RMSE of no less than 0.189 inch.

5.0 Proposed Alternative and Basis for Use

Duke Energy proposes to use the following alternative for flaw depth sizing when dissimilar metal welds are examined from the inside surface:

1. Examinations shall be performed using ultrasonic (UT) techniques that are qualified for flaw detection and sizing using procedures, personnel and equipment qualified by demonstration in all aspects except depth sizing.
2. A correction factor of the RMS Error - 0.125 inches shall be added to the depths of any measured flaws. The correction factor shall be applied to the most critical location on the flaw in relation to surface proximity.
3. Eddy Current (ET) examinations shall be used to confirm whether any detected flaws are surface-breaking.
4. If any inner diameter (ID) surface-breaking flaws are detected and measured as 50% through-wall depth or greater, Duke Energy shall repair the indications or shall perform flaw evaluations and shall submit the evaluations to the NRC for review and approval prior to reactor startup.

   These flaw evaluations shall include the following:

   a. Information concerning the mechanism which caused the flaw.
   b. Information concerning the surface roughness/profile in the area of the pipe/weld required to perform the examination, and an estimate of the percentage of potential surface areas with UT probe "lift-off".

All other ASME Code, Section XI, requirements for which relief was not specifically requested apply, including the third party review by the Authorized Nuclear Inservice Inspector.

Because compliance with the applicable requirements is impractical, this request is submitted pursuant to 10 CFR 50.55a(g)(5)(iii). Duke Energy believes that the proposed alternative provides reasonable assurance that flaws detected during examination will be sufficiently sized to disposition in accordance with acceptance standards of the ASME Code, Section XI and ASME Code Case N-770-1.

6.0 Duration of Proposed Alternative

The proposed alternative to the ASME Code is applicable for the remainder of the third 10-year Inservice Inspection (ISI) Interval at Catawba Nuclear Station, Unit 2, which began on October 15, 2005 and is currently scheduled to end on August 19, 2016.

7.0 Related Industry Relief Requests

7.1 A similar request was approved for use at McGuire Nuclear Station, Unit 2 in NRC letter dated September 24, 2012 (ADAMS Accession No. ML 12258A363).

7.2 A similar request was submitted for use at McGuire Nuclear Station, Unit 1 (Relief Request 13-MN-001), dated January 31, 2013.

8.0 References

8.1 1998 Edition through 2000 Addenda, ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components."

8.2 1998 Edition through 2000 Addenda, ASME Code, Section XI, Appendix VIII, Supplement 10.

8.3 ASME Code Case N-695, Qualification Requirements for Dissimilar Metal Piping Welds, Section XI, Division 1.

8.4 ASME Code Case N-770-1, Alternative Examination Requirements and Acceptance Standards for Class 1 PWR Piping and Vessel Nozzle Butt Welds Fabricated With UNS N06082 or UNS W86182 Weld Filler Material With or Without Application of Listed Mitigation Activities, Section XI, Division 1.

8.5 EPRI Policy/Procedure Directive 03-01: Criteria for Issuing Documentation of Depth Sizing Errors That Exceed the 0.125-inch RMS Appendix VIII Criteria.

8.6 EPRI Materials Reliability Program Letter MRP 2012-046, dated November 26, 2012, Subject: Assessment of Effect of the Depth-Sizing Uncertainty for Ultrasonic Examinations from ID Surface of Large-Bore Alloy 82/182 and Austenitic Stainless Steel Butt Welds in PWR Primary System Piping, Revision 1.