UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 16, 2012

Mr. Preston Gillespie
Site Vice President
Oconee Nuclear Station
Duke Energy Carolinas, LLC
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 - REQUEST FOR ADDITIONAL INFORMATION (RAI) REGARDING FOURTH 10-YEAR INTERVAL INSERVICE INSPECTION FOR PROGRAM PLAN REQUESTS FOR RELIEF (TAC NOS. ME6181, ME6182, ME6183, ME6184, ME6185, ME6186, ME6187, ME6188, ME6189, ME6190, ME6191, ME6192, ME6193, ME6194, ME6195, ME6196, ME6197, ME6198, ME6199, ME6200, ME6201, ME6202, ME6203, ME6204, ME6205, ME6206, ME6207, ME6208, ME6209, ME6210, ME6211, ME6212, ME6213, ME6214, ME6215, ME6216, AND ME6217)

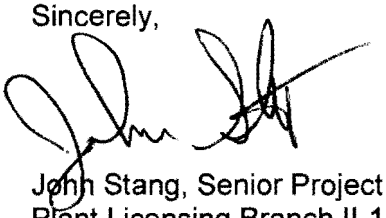
Dear Mr. Gillespie:

By letter dated April 29, 2011, Duke Energy Carolinas, LLC (the licensee), submitted requests for relief (RRs) 10-ON-002, from the requirements of the American Society of Mechanical Engineers (ASME Code), *Boiler and Pressure Vessel* (B&PV Code), Section XI, for Oconee Nuclear Station, Units 1, 2, and 3. The RRs apply to the fourth 10-year inservice inspection interval, in which the licensee adopted the 1998 Edition through the 2000 Addenda of ASME B&PV Code, Section XI, as the Code of Record.

The U.S. Nuclear Regulatory Commission (NRC) staff is in the process of reviewing the RRs and has determined that additional information is required in order to complete the review. The RAI is enclosed. The draft RAI was provided to your staff electronically, and a telephone call between your staff and the NRC staff has occurred to ensure that the right level of detail is provided in the RAI responses. Mr. Kent Alter of your staff agreed to provide responses to the RAIs by March 5, 2012.

If you have any questions, please contact me at 301-415-1345.

Sincerely,



John Stang, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosure: As Stated

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REQUEST FOR ADDITIONAL INFORMATION (RAI)

RELIEF REQUESTS (RRs) FROM

TITLE 10 OF THE *CODE OF FEDERAL REGULATIONS* (10 CFR) SECTION 50.55(a)

REGARDING THE FOURTH 10-YEAR

INTERVAL INSERVICE INSPECTION (ISI) PROGRAM PLAN

DUKE ENERGY CAROLINAS, LLC (DUKE)

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3 (ONS 1, 2, and 3)

DOCKET NOS. 50-269, 50-270, AND 50-287

1.0 SCOPE

By letter dated April 29, 2011 (Agencywide Documents Access and Management System Accession No. ML11124A131), Duke Energy Carolinas, LLC (the licensee), submitted RR 10-ON-002, from the requirements of the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel* (B&PV Code), Section XI, Rules for ISI of Nuclear Power Plant Components for ONS 1, 2, and 3. These RRs apply to the fourth 10-year ISI, in which the licensee adopted the 1998 Edition through the 2000 Addenda of ASME Code, Section XI as the Code of Record.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 55a(g)(5)(iii), the licensee has submitted the subject RR for limited examinations in multiple ASME B&PV Code Examination Categories. The ASME B&PV Code, Section XI, requires that 100 percent of the examination volumes, or surface areas, described in Tables IWB-2500 and IWC-2500 be performed during each interval. The licensee stated that it is impractical to obtain 100 percent of the ASME B&PV Code-required volumes, or surface areas, are at ONS 3.

The regulation at 10 CFR 50.55a(g)(5)(iii), states that "if the licensee has determined that conformance with ASME Code requirements is impractical at their facility; they shall submit information to support this determination. The NRC will evaluate such requests based on impracticality, and may impose alternatives, giving due consideration to public safety and the burden imposed on the licensee."

2.0 REQUEST FOR ADDITIONAL INFORMATION

2.1 Request for Relief 10-ON-002, Part A, ASME Code, Section XI, Table IWB-2500-1, Examination Category B-D, Item B3.110, Full Penetration Welded Nozzles in Vessels (Oconee, Units 2 and 3)

The licensee has provided only general, and somewhat vague, information regarding impracticality of obtaining ASME B&PV Code-required volumetric examinations. For example, the licensee's statement "limitation was caused by the design of the nozzle," is inadequate to describe the basis for not obtaining the ASME B&PV Code-required examination volumes.

Submit detailed and specific information to support the bases for limited examination in all requests for relief in ASME B&PV Code, Section XI, Table IWB-2500-1, Examination Category B-D, and therefore, demonstrate impracticality.

Include detailed descriptions (written and/or sketches, as necessary) of the interferences to applied Nondestructive (NDE) techniques.

As applicable, describe NDE equipment (ultrasonic (UT) scanning apparatus), details of the listed obstructions (size, shape, proximity to the weld, etc.) to demonstrate accessibility limitations, and discuss whether alternative methods or advanced technologies that are qualified under ASME B&PV Code, Section XI, Appendix VIII, requirements could have been employed to maximize ASME B&PV Code coverage.

It is not always clear from the information in the licensee's submittal which UT wave mode corresponds to each insonification angle. Please clarify the wave modality and insonification angles used for all UT examinations performed on the pressurizer (PZR) nozzle-to-head welds listed in ASME B&PV Code, Section XI, Table IWB-2500-1, Examination Category B-D.

For some of the ASME B&PV Code, Section XI, Table IWB-2500-1, Examination Category B-D welds there was conflicting information presented in the written descriptions and the examination data. Section X.7 (where X is a specific relief request section number) of the written description stated "acceptable results" and the examination data sheets had a check mark next to "Reject" under results, even when there was a check mark next to "No" indications found. In other cases, the examination data had a check mark next to "Yes" for indication and "Accept" under results and there was no mention in the written description of any indications being detected.

State whether any indications were discovered as a result of ASME Code-required examinations, and how these indications have been dispositioned.

For PZR lower head-to-surge nozzle Weld 3-PZR-WP-15, the licensee stated in Section 22.4 that the "scanning requirements described in ASME B&PV Code, Section V, Article 4, T-441.1.2(a), T-441.1.3, T-441.1.4, T-441.1.5, and T-441.1.6 could not be met." Besides not meeting the ASME B&PV Code, Section XI volumetric code coverage, please specifically describe which, if any, other requirements, if any, that could not be met under ASME B&PV Code, Section V, Article 4.

2.2 Request for Relief 10-ON-002, Part B, ASME Code, Section XI, Table IWB-2500-1, Examination Category B-J, Item B9.11, Pressure Retaining Welds in Piping (Oconee, Units 1, 2, and 3)

Please describe NDE equipment (UT scanning apparatus) and discuss whether alternative methods or advanced technologies that have been qualified under ASME B&PV Code, Section XI, Appendix VIII requirements could have been employed to maximize ASME B&PV Code coverage.

For some of the ASME B&PV Code, Section XI, Table IWB-2500-1, Category B-J welds there appears to be conflicting information presented in the written descriptions and the examination data. Section X.7 (where X is a specific relief request section number) of the written description stated "acceptable results" and the examination data sheets had a check mark next to "Reject" under results even when there was a check mark next to "No" indications found.

State whether any indications were discovered as a result of ASME B&PV Code-required examination, and how these indications have been dispositioned.

The licensee's submittal states that the subject weld areas were interrogated with a combination of 45-and 60-degree shear waves, and in some cases, 60- and 70-degree longitudinal waves (L-waves) were applied to detect circumferentially-oriented flaws. The licensee's submittal further states that examinations were performed in accordance with ASME B&PV Code, Section XI Appendix VIII (performance demonstration initiative (PDI)), and consisted of single-sided examinations from the pipe side of the welds. Confirm the insonification angles and wave modalities used to examine each of the subject welds.

Discussions with the industry's PDI administrator, the Electric Power Research Institute (EPRI), indicate that ASME B&PV Code, Section XI, Supplement 2 qualifications require refracted longitudinal wave methods to be applied, if possible. If only shear wave techniques were used (as in Pipe-to-Valve Weld 3HP-241-3) to examine the subject stainless steel welds, please clarify why refracted longitudinal wave techniques where not used as part of a "best effort" examination. The L-wave method has been shown capable of detecting planar inside diameter (ID) surface-breaking flaws on the far side of wrought stainless steel welds. Recent studies[1,2] recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds.

In cases where L-waves were used, it appears that the "best effort" examinations involved both 60- and 70-degree longitudinal waves. "Best effort" coverage percentages were presented for the 60-degree L-wave examinations but there was no coverage mentioned for the "best effort" examination for the 70-degree L-wave examinations. Please state if any additional "best effort" coverage that was obtained using the 70-degree L-wave examination.

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1. F. V. Ammirato, X. Edelmann, and S.M. Walker, Examination of Dissimilar Metal Welds in BWR Nozzle-to-Safe End Joints, 8th International Conference on NDE in the Nuclear Industry, ASM International, 1987.

2. P. Lemaitre, T.D. Koble, and S.R. Doctor, PISC III Capability Study on "*Wrought-to-Wrought Austenitic Steel Welds: Evaluation at the Level of Procedures and Techniques, Effectiveness of Nondestructive Examination Systems and Performance Demonstration, PVP-Volume 317, NDE-Volume 14, ASME, 1995.*"

2.3 Request for Relief 10-ON-002, Part C, ASME Code, Section XI, Table IWC-2500-1, Examination Category C-A, Item C1.20, Pressure Retaining Welds in Pressure Vessels (Oconee, Units 2 and 3)

The licensee has provided only general, and somewhat vague, information regarding impracticality of obtaining ASME B&PV Code-required volumetric examinations. The licensee's statement of "four physical scanning limitations" is inadequate to describe the bases for not obtaining the ASME B&PV Code-required examination volumes. No sketches with dimensional information showing the causes of limited accessibility have been included or descriptions of the four physical limitations.

Please submit detailed and specific information to support the bases for limited examination in all requests for relief in ASME B&PV Code, Section XI, Table IWC-2500-1, Examination Category C-A, and therefore, demonstrate impracticality.

Include detailed descriptions (written and/or sketches, as necessary) of the interferences to applied NDE techniques.

As applicable, describe NDE equipment (UT scanning apparatus), details of the listed obstructions (size, shape, proximity to the weld, etc.) to demonstrate accessibility limitations, and discuss whether alternative methods or advanced technologies that have been qualified under ASME B&PV Code, Section XI, Appendix VIII requirements could have been employed to maximize ASME B&PV Code coverage.

Clarify the wave mode(s) and insonification angles used for all UT examinations. If only shear wave techniques were used to examine the subject stainless steel welds, please explain why refracted L-wave techniques where not used. The L-wave method has been shown capable of detecting planar ID surface-breaking flaws on the far-side of wrought stainless steel welds. Recent studies recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds.

Provide cross-sectional coverage plots to describe ASME B&PV Code volumes examined.

2.4 Request for Relief 10-ON-002, Part D, ASME Code, Section XI, Table IWC-2500-1, Examination Category C-F-1, Items C5.11 and C5.21, Pressure Retaining Welds in Austenitic Stainless Steel or High Alloy Piping (Oconee, Units 1, 2, and 3)

For some of the ASME B&PV Code, Section XI, Table IWC-2500-1, Examination Category C-F-1 welds there appears to be conflicting information presented in the written descriptions and the examination data. Section X.7 (where X is a specific relief request section number) of the written description stated "acceptable results" and the examination data sheets had a check mark next to "Reject" under results even when there was a check mark next to "No" indications found. In other cases the examination data had a check mark next to "Yes" for indication and "Reject" under results and there was no mention in the written description of any indications being detected or what was done to correct for any unacceptable indications.

Clarify whether any indications were discovered as a result of ASME B&PV Code-required examination and how these indications have been dispositioned.

The licensee's submittal states that the subject weld areas were interrogated with a combination of 38-, 45-and/or 60-degree shear waves, and in some cases, 60- and 70-degree L-waves were applied to detect circumferentially-oriented flaws. The licensee's submittal further states that examinations were performed in accordance with ASME B&PV Code, Section XI, Appendix VIII, and consisted of single-sided examinations from the pipe side of the welds.

Confirm the insonification angles and wave modalities used to examine each of the subject welds. Discussions with the industry's Performance Demonstration Initiative (PDI) administrator, the EPRI, indicate that ASME B&PV Code, Supplement 2 qualifications require refracted L-wave methods to be applied, if possible. If only shear wave techniques were used to examine the subject stainless steel welds, please explain why refracted L-wave techniques where not used as part of a "best effort" examination. The L-wave method has been shown capable of detecting planar ID surface-breaking flaws on the far side of wrought stainless steel welds. Recent studies recommend the use of both shear and L-waves to obtain the best detection results, with minimum false calls, in austenitic welds. If both shear and L-waves were used please, state the "best effort" coverage achieved on the near- and far-side of the subject weld volumes.

If you have any questions, please contact me at 301-415-1345.

Sincerely,

/RA/

John Stang, Senior Project Manager
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosure: As Stated

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