April 21, 2008

Mr. Bruce H. Hamilton
Vice President, Oconee Site
Duke Energy Carolinas, LLC
7800 Rochester Highway
Seneca, SC 29672

SUBJECT: RELIEF REQUEST (RR 02-001, REV. 1) FOR INSUFFICENT COVERAGE REQUIRED BY AMERICAN SOCIETY MECHNICAL ENGINEERS (ASME) CODE FOR THE THIRD 10-YEAR INSERVICE INSPECTION INTERVAL AT OCONEE NUCLEAR STATION, UNIT 3 (TAC NO. MD7314)

Dear Mr. Hamilton:

By letter dated November 15, 2007, you submitted relief request RR-02-001, Revision 1 for the third 10-year inservice inspection interval for Oconee Nuclear Station, Unit 3 that terminated on January 2, 2005. You requested relief from the volumetric examination requirement to obtain essentially 100 percent (greater than 90 percent in accordance with Code Case N-460) of the weld volume as required by Section XI of the 1989 edition of the ASME, *Boiler and Pressure Vessel Code* with no addenda.

We have reviewed the information provided for the revised relief request. Pursuant to Title 10 of the *Code of Federal Regulations,* Part 50, Section 50.55a(g)(6)(i), we grant the requested relief due to the code-required examination being impractical, and our safety evaluation is enclosed.

This relief is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon Duke Energy Carolinas, LLC, that could result if the requirements were imposed on the facility.

Sincerely,

/RA/

Melanie C. Wong, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-287

Enclosure:
Safety Evaluation

cc w/encl: See next page

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**See previous concurrence
*transmitted by memo dated

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELIEF REQUEST RR-02-001, REVISION 1

INSUFFICIENT COVERAGE REQUIRED BY ASME CODE

FOR THE THIRD 10-YEAR INSERVICE INSPECTION (ISI) INTERVAL

DUKE ENERGY CAROLINAS, LLC

OCONEE NUCLEAR STATION, UNIT 3

DOCKET NO. 50-287

1.0 INTRODUCTION

By letter dated November 15, 2007, Duke Energy Carolinas, LLC (the licensee), for Oconee Nuclear Station, Unit 3 submitted relief request RR-02-001, Revision 1 for the third 10-year inservice inspection (ISI) interval that terminated January 2, 2005. The revised relief request, considered as Revision 1, supersedes the March 11, 2002, relief request (ML020840509). The March 11, 2002, request was submitted in a timely fashion but the cover letter that accompanied the request contained a typographical error that identified the wrong unit. The November 15, 2007, request cover letter identifies the correct unit. The request pertains to relief from the volumetric examination coverage requirement of essentially 100 percent (greater than 90 percent in accordance with Code Case N-460) of the weld volume as required by Section XI of the 1989 edition of the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code), for the Class 2 weld identified in this relief request.

2.0 REGULATORY EVALUATION

Inservice inspection (ISI) of ASME Code Class 1, 2 and 3 components shall be performed in accordance with the requirements of Section XI of the ASME Code and applicable edition and addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR), 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). Pursuant to 10 CFR 50.55a(g)(5)(iii), if the licensee determines that conformance with examination requirements of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a request made for relief from the ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55a(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest,

giving due consideration to the burden upon the licensee that could result if the requirements were imposed. Section 50.55a(a)(3) states in part that alternatives to the requirements of paragraph (g) may be used, when authorized by the Nuclear Regulatory Commission (NRC), if the licensee demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components", to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure test conducted during the first 10-year interval and subsequent intervals comply with the reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable ASME Section XI Code, for Oconee Unit 3's third 10-year ISI interval is the 1989 edition with no addenda requested. The components (including supports) may meet the requirements set forth in subsequent editions and addenda of the ASME Code incorporated by reference in 10 CFR 50.55a(b) subject to the limitations and modifications listed therein and subject to Commission approval.

3.0 TECHNICAL EVALUATION

3.1 System/Component(s) for Which Relief is Requested

Relief is requested for a pipe to valve 3PR-2 weld located in the reactor building purge system (RBPS) penetration piping. The weld identification number is ID#:3-20B-21-18-18 and in examination category C-F-2 with a weld item number of C05.051.046.

3.2 Applicable Code Edition and Addenda (as stated)

ASME Section XI Code – 1989 Edition, with no addenda

3.3 ASME Code Requirement (as stated)

IWC-2500, Table IWC-2500-1, Examination Category C-F-2, Item Number C5.51, Figure IWC-2500-7 (a), Volume Coverage of Examination Volume C-D-E-F.

3.4 ASME Code Requirement from Which Relief is Requested

Relief is requested from the ASME Code Section XI, subsection IWC-2500, Table IWC-2500-1, examination category C-F-2 (pressure retaining welds in carbon or low alloy steel piping), requirement to obtain essentially 100% surface and volumetric examination (C-D-E-F, Fig. I WC-2500-7(a)) for the specified weld (3PR-2) referenced above.

3.5 Licensee's Proposed Alternative

No alternatives were proposed by the licensee. The licensee states, "The use of radiography as an alternate volumetric examination of the weld/component referenced in this request is not a viable option. Restrictions to performing radiography are primarily due to limited access for placement of film due to the proximity of the penetration." All volumetric examinations were performed during EOC-19, the last outage in the second period of the third 10-year ISI interval. No additional examinations were planned or conducted for the third 10-year ISI interval that terminated on January 2, 2005.

3.6Licensee's Basis for Relief (As stated)

Pipe to Valve 3PR-2 weld 3-20B-21-18-18 (Item C05.051.046) is limited to 75.00% coverage of the required volume due to the proximity of a penetration. The percentage of coverage represents the aggregate coverage from all scans performed on the weld and adjacent base material. The coverage from each scan was as follows: 45° shear wave circumferential scans, both clockwise and counter-clockwise covered 56.25% of the weld and base material; 60° shear wave scan perpendicular to the weld (toward the penetration) covered 87.5% for the first leg which included 100% of the inside surface within the area of interest and 100% for the second leg of the weld and base metal in the axial direction. In order to achieve more coverage, the penetration would have to be removed or re-designed to allow scanning from both sides of the weld. That would be impractical. There was one recordable indication found that was determined to be a geometric reflector during the inspection of this weld.

The Oconee Inservice Inspection Plan allows the use of Code Case N-460, which requires greater than 90% volumetric coverage of examination volume C-D-E-F. Therefore, the available coverage will not meet the acceptance criteria of this Code Case.

3.7 Licensee's Justification for granting Relief (As stated)

The subject weld was examined to the maximum extent practical using ultrasonic techniques qualified in accordance with the requirements of ASME Section XI, Appendix VIII, Supplements 2 and 3 of the 1995 Edition with the 1996 Addenda as administered by the Performance Demonstration Initiative (PDI). An inner diameter (ID) connected circumferential flaw within the required examination volume would have been detected.

In addition to the volumetric examination with limited coverage, Duke performed a surface examination (code required) on this C5.51 item and achieved 100%coverage. The result from the surface examination was acceptable.

In addition to the C5.51 welds of this relief request, there were five additional C5.51 welds that surface and volumetric examinations were performed on during the outage. All of the surface and volumetric examinations except for one surface examination were acceptable. A surface examination on weld 3MS-20B-B found a reportable indication which was removed by grinding and reexamined and found to be acceptable. Additional surface exams were performed as required by code. 100% coverage was obtained on all five additional C5.51 surface and volumetric examinations. Three of the five additional welds were from the Low Pressure Service Water System, one of the

additional welds was from the Feedwater System, and one of the additional welds was from the Main Steam System.

IWC-2500, Table IWC-2500-1, Examination Category C-H System Leakage Tests and VT-2 visual examinations performed once each period provide adequate assurance of pressure boundary integrity. In addition to the above Code required examinations (volumetric, surface, and pressure test), there are other activities which provide a high level of confidence that, in the unlikely event that leakage did occur through this weld it would be detected and proper action taken. Specifically, Appendix J penetration leak rate testing performed during refueling outages provides additional assurance that any leakage would be detected prior to gross failure of the component.

The component weld was inspected by visual examination during construction and verified to be free from unacceptable surface fabrication defects. Based on the coverage and results of the volumetric, surface, and the pressure testing VT [visual testing]-2 examinations performed, it is Duke's position that this combination of examinations provides a reasonable assurance of quality and safety.

3.8 NRC Staff's Evaluation

The NRC staff has evaluated the information provided by the licensee in support of the request for relief from required volumetric examinations of the subject weld (3PR-2) performed during the third 10-year ISI interval for Oconee Nuclear Station, Unit 3. The subject weld consists of a pipe-to-valve full penetration weld between two similar low carbon steel materials that is located in the RBPS penetration piping. The RBPS is used only during the plant shutdown refueling event, otherwise it is isolated and not in use for any other critical functions. The subject weld is a circumferential weld in examination category C-F-2 and requires surface and volumetric examinations for essentially 100-percent coverage of the required volume. The licensee performed a volumetric examination to the maximum extent practical for the subject weld using existing ultrasonic examination techniques with 45° shear wave circumferential scans and 60° shear wave perpendicular (toward the penetration) scans. Due to the proximity of the penetration near the subject weld, the aggregate coverage for all scans performed on the subject weld and adjacent base material was limited to 75-percent coverage of the required volume.

The NRC staff has determined that the volumetric examination coverage of the subject weld was reduced by the proximity of a penetration that caused scanning restrictions. In addition to the limited volumetric examination conducted, the licensee performed the required ASME Code surface examination for the subject weld and found it to be acceptable (Code: Examination Category C-F-2, Item #C5.51). The licensee also reaffirmed volumetric examinations on five similar welds near the subject weld and found all to meet ASME Code requirements. The licensee also states that they have also performed additional Class 2, Examination Category C-H, pressure testing and VT-2 visual examinations on the subject weld to complement the limited examination coverage. The licensee also states that other activities such as those in Appendix J penetration leak rate testing performed during refueling outages will provide a high level of assurance that any leakage would be detected prior to gross failure. In order to meet ASME Code volumetric examination requirements the penetration would have to be removed, redesigned, fabricated, and installed in the system, imposing a tremendous burden to the

licensee. Therefore, the staff has determined that the licensee's limited examination coverage of the subject weld and extra examinations performed to complement the limited coverage provide reasonable assurance of structural integrity. Based on the limitations discussed above, it is impractical for the licensee to meet the ASME Code requirements.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's submittal for relief, R-02-001, Revision 1 from the ASME Code requirement for achieving 100% volumetric coverage and has concluded that compliance with this requirement is impractical due to the proximity of a penetration near the subject weld. The NRC staff also determined that if the ASME Code requirement were to be imposed on the licensee, the penetration would have to be removed or redesigned to allow coverage on both sides of the subject weld, which would impose a significant burden on the licensee. The NRC staff finds that the examination coverage of the accessible weld volume, the comparison of similar welds (Examination Category C-F-2, Item #5.51), volumetric examinations near the subject weld, along with other additional weld examinations and additional pressure testing conducted by the licensee, provide reasonable assurance of structural integrity of the subject weld. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI interval of Oconee Nuclear Station, Unit 3. This relief is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. All other ASME Code, Section XI requirements for which relief was not specifically requested and authorized herein by the NRC staff remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: J. Oxendine, DCI/CPNB

Date: April 21, 2008

Oconee Nuclear Station, Units 1, 2, and 3

cc:

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