



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

February 17, 2010

Mr. Dave Baxter  
Vice President, Oconee Site  
Duke Energy Carolinas, LLC  
7800 Rochester Highway  
Seneca, SC 29672

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3, RELIEF REQUEST  
09-GO-001, REGARDING ALTERNATIVES FROM PRESSURE TEST  
REQUIREMENTS FOR BURIED PIPING (TAC NOS. ME0962, ME0963, AND  
ME0964)

Dear Mr. Baxter:

By letter dated February 24, 2009, as supplemented by letter dated August 27, 2009, Duke Energy Carolinas, LLC (Duke, the licensee), submitted relief request (RR) 09-GO-001 for the fourth 10-year interval of Oconee Nuclear Station Units 1, 2, and 3 (Oconee 1, 2, and 3) related to the Inservice Inspection (ISI) Program pertaining to system pressure tests. The licensee requested approval of a proposed alternative to the American Society of Mechanical Engineers, *Boiler and Pressure Vessel Code* from performing required pressure tests of the buried components of the condenser circulating water system by measuring the rate of pressure loss or change in flow between the ends of the buried components. Alternatively, the licensee proposed a test that will confirm that flow during operation is not impaired.

Based on the information provided by the licensee, the Nuclear Regulatory Commission (NRC) staff has determined that the licensee's compliance to the ISI Code of Record would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, pursuant to Title 10 of the *Code of Federal Regulations*, Part 50, Section 50.55a(a)(3)(ii), the NRC authorizes the ISI program alternative proposed in RR 09-GO-001 for the fourth 10-year ISI intervals of Oconee 1, 2, and 3 which are scheduled to end on July 14, 2013, for Oconee 1, September 8, 2014, for Oconee 2 and December 15, 2014, for Oconee 3. Enclosed is the NRC's Safety Evaluation.

D. Baxter

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If you have any questions concerning this action, please contact John Stang of my staff at 301-415-1345.

Sincerely,



Gloria Kulesa, Chief  
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:  
Safety Evaluation

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR APPROVAL OF RELIEF 09-GO-001

REGARDING ALTERNATIVES FROM PRESSURE TEST REQUIREMENTS FOR

BURIED PIPING

OCONEE NUCLEAR STATION, UNITS 1, 2, AND 3

DUKE ENERGY CAROLINAS, LLC

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

1.0 INTRODUCTION

By letter dated February 24, 2009, Agencywide Documents Access and Management System (ADAMS) Accession No. ML090890782), as supplemented by letter dated August 27, 2009 (ADAMS Accession No. ML092520032), Duke Energy Carolinas, LLC (Duke, the licensee), submitted relief request (RR) 09-GO-001 for the Oconee Nuclear Station Units 1, 2 and 3 (Oconee 1, 2 and 3) for the fourth 10-year interval of Oconee 1, 2, and 3 related to the Inservice Inspection (ISI) Program pertaining to system pressure tests. The licensee requested approval of a proposed alternative to the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code) required pressure test for buried components of the condenser circulating water (CCW) system, by measuring the rate of pressure loss or change in flow between the ends of the buried components. Alternatively, the licensee proposed a test that will confirm that flow during operation is not impaired.

The integrity of the buried piping will be ensured during unimpaired flow testing of the CCW system by comparing the flow from the output of the CCW pumps against the total measured flow through various safety-related loads. All of the individual component flows are recorded and verified against the owner-established flow acceptance criteria. In addition to the unimpaired flow test, the licensee will perform a visual examination of the ground surface areas above components buried to detect evidence of through-wall leakage in buried components. The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's proposed alternative pursuant to Title 10 to *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(a)(3)(ii) on the basis that compliance to the Code requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY REQUIREMENTS

Section 50.55a(g) requires that ISI of ASME Code Class 1, 2, and 3 components be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). According to 10 CFR 50.55a(a)(3), alternatives to the requirements of paragraph 50.55a(g) may be used,

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when authorized by the NRC, if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety or if the specified requirement 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, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in ASME Code, Section XI, Rules for 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 ISI of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by 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 ISI Code of Record for the fourth 10-year inspection interval of Oconee 1, 2 and 3 is the 1998 Edition, through the 2000 Addenda of the ASME Code, Section XI.

### 3.0 TECHNICAL EVALUATION

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

ASME Code Class 3 CCW system buried piping at Oconee 1, 2, and 3.

#### ASME Code Requirements

As applicable to the Oconee 1, 2 and 3, the 1998 Edition through the 2000 Addenda of the ASME Code, Section XI, Table IWD-2500-1, Examination Category D-B, Item Number D2.10 requires a system pressure test and a VT-2 visual examination. Subsection IWA-5244(b) requires buried components that are isolable by means of valves be tested to determine the rate of pressure loss in the buried components. Alternatively, the test may determine the change in flow between the ends of the buried components. The system pressure test for nonisolable buried components shall consist of a test to confirm that flow during operation is not impaired.

#### Licensee's Request for Relief

Approval of the proposed alternative is requested from performing the system pressure test for buried portions of Class 3 piping that are isolable by means of valves by determining the rate of pressure loss or the change in flow between the ends of buried piping.

#### Licensee's Basis for Requesting Relief

The buried piping segments of the Class 3 CCW piping at Oconee 1, 2 and 3 are bounded by butterfly valves that are not designed or expected to provide an adequate leak tight boundary that is necessary for an accurate pressure decay test. To perform an accurate rate of pressure loss test, extensive system modifications would be required. Also, the buried piping is not instrumented to measure change of flow at the ends. The licensee has proposed an alternative to perform the unimpaired flow test. Neither the change in flow test [IWA-5244(b)(1)] nor the unimpaired flow test [IWA-5244(b)(2)] is sufficiently sensitive to detect small through-wall leakage in these buried components, due to relatively high system flow rates and accuracy of flow

measurement instrumentation. As such, there is no appreciable difference between the level of quality and safety achieved by performing either of these tests.

Visual examinations of ground surface areas are capable of detecting potentially small through-wall leakage in the buried components. These visual examinations and unimpaired flow tests will provide reasonable assurance of the structural and leak-tight integrity of the buried components.

For Oconee 1, 2 and 3, the unimpaired flow tests are conducted in accordance with the procedure "LPSW [Low Pressure Service Water] System Flow Data Verification" which confirms that the CCW system for Oconee 1, 2 and 3 is capable of supplying cooling water to the LPSW pumps. In accordance with Generic Letter (GL) 89-13 "Service Water System Problems Affecting Safety-Related Equipment," the flow balancing is performed as part of licensee's test program at the design basis flow rates to ensure that all components are not fouled or clogged and that they will be able to receive their design basis flow rates simultaneously. Flow rates measured during flow balance tests are verified to meet licensee's flow acceptance criteria for each cooled component. If the measured CCW system flow is less than the specified acceptance criteria, the LPSW system is declared inoperable, and the condition is entered into the licensee's corrective action program for resolution.

#### Licensee's Proposed Alternative

The licensee proposes to use as an alternative to the requirements of IWA-5244(a) or IWA-5244(b), a verification that flow during operation is not impaired in non-isolable buried piping. For each segment of the buried pipe, periodic flow testing will be performed in accordance with flow balance test procedure for the CCW system. These surveillance procedures require flow to be measured, recorded and compared to established acceptance criteria to provide assurance that flow is not impaired during operation. In addition to the unimpaired flow test, the licensee will perform a visual examination of the ground surface areas above components buried to detect evidence of through-wall leakage in buried components.

#### 4.0 NRC STAFF'S EVALUATION

The Code of Record requires a system pressure test for the buried portion of the CCW system that will determine either a rate of pressure loss or a change in flow at the ends of the buried piping. The buried CCW piping at Oconee 1, 2 and 3, uses butterfly valves at the ends which were not designed for pressure isolation and therefore, are unsuitable to determine meaningful rate of pressure loss. One end of the buried piping is not instrumented for flow measurement which does not permit measurement of change in flow at the ends of the buried pipe; therefore, the ASME Code-required test cannot be performed. In order to comply with the ASME Code requirement, extensive system modifications would be required and additional instrumentation would need to be installed in the buried piping which would result in hardship to the licensee. The ASME Code, however, allows for nonisolable buried components to confirm that flow during operation is not impaired. The NRC staff finds acceptable the licensee's unimpaired flow in the buried piping can be qualitatively assessed during the flow balance test routinely performed in accordance with GL 89-13. The procedure for the flow balance test will confirm that the CCW system is capable of supplying the design basis cooling water to various safety-related loads. During this test alignment, all of the individual component flows are recorded. The recorded test

flows are verified against the licensee's established flow acceptance criteria. The NRC staff finds that the licensee's proposed test performed in accordance with GL 89-13 will ensure unimpaired flow in the buried piping given that the specified flow from each of the pumps is available, assuming no major breach in the piping pressure boundary. The licensee has stated, however, that if during the flow balance test, the required flow could not be achieved, the LPSW system would be declared inoperable and the condition entered into the licensee's corrective action program for resolution. In addition to the test for unimpaired flow, the licensee will also perform a visual examination of the ground surface areas above buried components to detect any evidence of through-wall leakage. Therefore, the licensee's proposed alternatives in RR 09-GO-001 will provide reasonable assurance of structural and leak-tight integrity of the buried piping and components. The NRC staff has determined that compliance with the ASME Code requirement would require extensive system modifications which would cause hardship to the licensee without a compensating increase in the level of quality and safety.

## 5.0 CONCLUSION

The NRC staff concludes that for the buried portion of the CCW system at Oconee 1, 2, and 3, compliance with the ASME Code Section XI requirement to perform a system pressure test that determines the rate of pressure loss or the change in flow would result in hardship to the licensee without a compensating increase in the level of quality and safety. The licensee's proposed alternative provides reasonable assurance of structural and leak-tight integrity of the buried piping. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the proposed alternatives in RR 09-GO-001 are authorized for the fourth 10-year ISI interval for Oconee 1, 2 and 3. All other requirements of ASME Code, Section XI for which relief has not been specifically requested remain applicable, including a third-party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: P. Patnaik

Date: February 17, 2010

D. Baxter

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If you have any questions concerning this action, please contact John Stang of my staff at 301-415-1345.

Sincerely,

*/RA/*

Gloria Kulesa, Chief  
Plant Licensing Branch II-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

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

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Safety Evaluation

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