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

February 18, 2010

Mr. J. R. Morris
Site Vice President
Catawba Nuclear Station
Duke Energy Carolinas, LLC
4800 Concord Road
York, SC 29745

SUBJECT: CATAWBA NUCLEAR STATION, UNITS 1 AND 2, RELIEF REQUEST 09-GO-001, REGARDING ALTERNATIVES FROM PRESSURE TEST REQUIREMENTS FOR BURIED PIPING (TAC NOS. ME0958 AND ME0959)

Dear Mr. Morris:

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 Catawba Nuclear Station, Units 1 and 2 (Catawba 1 and 2), related to the Inservice Inspection (ISI) Program for the third 10-year interval 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) from performing required pressure tests of the buried components of the nuclear service water system. The Code requires measuring the rate of pressure loss or change in flow between the ends of the buried components. The licensee proposed an alternative test that will confirm that flow of the nuclear service water system is not impaired during normal plant operation. The Code of Record for Catawba 1 and 2 is the 1998 Edition through the 2000 Addenda of the ASME Code.

Based on the information provided by the licensee, the Nuclear Regulatory Commission (NRC) staff has determined that the licensee's compliance to the 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 proposed alternative in RR 09-GO-001 for the third 10-year ISI interval for Catawba 1 and 2, which is scheduled to end on June 8, 2015, for Catawba 1 and August 19, 2016, for Catawba 2. Enclosed is the NRC's Safety Evaluation.

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. 50-413 and 50-414

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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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

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DUKE ENERGY CAROLINAS, LLC

DOCKET NOS. 50-413 AND 50-414

1.0 INTRODUCTION

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

The integrity of the buried piping will be ensured during unimpaired flow testing for each train of nuclear service water system by balancing the flow from the output of nuclear service water pumps against the total measured flow through various nuclear 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 CFR 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, 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 the 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 third 10-year inspection interval at Catawba 1 and 2 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 nuclear service water system buried piping at Catawba 1 and 2.

ASME Code Requirements

As applicable to Catawba 1 and 2, the 1998 Edition through the 2000 Addenda of 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 a 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 nuclear service water piping at Catawba 1 and 2 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 maintenance or system modifications would be required. Also, the buried piping is not instrumented to measure change of flow at the ends. The licensee has proposed 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 component. These visual examinations and unimpaired flow tests will provide reasonable assurance of the structural and leak-tight integrity of the buried components.

For Catawba 1 and 2, the unimpaired flow tests for the buried piping identified in the relief request are conducted in accordance with "RN [Nuclear Service Water] Flow Balance" for each train of nuclear service water system. 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 testing are verified to meet licensee's flow acceptance criteria for each cooled component. If the measured nuclear service water system flow is less than the specified acceptance criteria, the nuclear service water train is declared inoperable and the appropriate Limiting Condition for Operating of the Technical Specifications is entered into. In addition, 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 each train. 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 for Catawba 1 and 2 requires a system pressure test for the buried portion of the nuclear service water piping and the condenser circulating water that will determine either a rate of pressure loss or a change in flow at the ends of the buried piping. The buried piping at the Catawba 1 and 2 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 maintenance or system modification would be required or additional instrumentation need to be installed in the buried piping which would result in hardship to the licensee. The ASME Code, however, allows for nonisolable testing for buried components to confirm that flow during operation is not impaired. The NRC staff agrees with the licensee's approach that 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 testing will confirm that the nuclear service water

system of each unit is capable of supplying the design basis cooling water to various nuclear safety-related loads. During this test alignment, all of the individual component flows are recorded, including the total system flow and the opposite unit system flow. 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 the GL 89-13 program 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 nuclear service water system train under the test would be declared inoperable and the appropriate Limiting Condition for Operating of the Technical Specifications is entered into. In addition, the condition is entered into the licensee's corrective action program for resolution. 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. The NRC staff has determined that compliance with the ASME Code requirement would require extensive maintenance and/or system modifications requiring the installation of additional flow measuring devices at the inlet and outlet ends of buried piping. This would result in 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 nuclear service water system at Catawba 1 and 2 , 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 does provide 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 third 10-year ISI interval for Catawba1 and 2. 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 18, 2010

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. 50-413 and 50-414

Enclosure:
Safety Evaluation

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