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

July 13, 2012

Mr. William R. Gideon, Vice President
Carolina Power & Light Company
H. B. Robinson Steam Electric Plant,
3581 West Entrance Road
Hartsville, South Carolina 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 – RELIEF REQUEST-3 FOR THE FIFTH 10-YEAR INTERVAL INSERVICE TESTING PROGRAM PLAN (TAC NO. ME8260)

Dear Mr. Gideon:

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated March 16, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12086A067), as supplemented by letter dated May 10, 2012, (ADAMS Accession No. ML12138A041), Carolina Power & Light Company (the licensee), doing business as Progress Energy Carolinas, Inc., submitted Relief Request-3 for the Inservice Testing (IST) Program Plan for the fifth 10-year Interval for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP).

The licensee requested approval to use an alternative test plan in lieu of certain IST requirements of the 2004 Edition through 2006 Addenda of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM) Code for the Category C check valves exercise tests or exams at HBRSEP. Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(a)(3)(i), the licensee requested to use proposed alternatives on the basis that the alternatives provide an acceptable level of quality and safety.

The fourth 10-year interval in HBRSEP began on February 19, 2002, and was scheduled to end on February 18, 2012. As allowed by ASME Section XI, IWA-2430(d)1 the licensee extended the fourth 10-year interval through July 20, 2012, to complete refueling outage-27 which was postponed to January 18, 2012. The duration of proposed alternative is for the fifth10-year IST interval that begins on July 21, 2012, and ends on February 18, 2022.

As discussed with the licensee on July 9, 2012, the NRC staff is concerned with the amount of information provided in the submittal that required revision after review by and questions from the NRC staff, and your request for multiple concurrent reviews with a short review timeframe. The uncharacteristic inattention to detail observed in the submittal resulted in the need to focus limited resources to address mostly administrative issues. Additional attention to ensure a high quality submittal would allow for a more efficient use of review resources, and better ability of the NRC staff to accommodate requests for a shortened review timeframe.

The details of the NRC staff review are included in the enclosed safety evaluation. Section 50.55a(f) of 10 CFR, "Inservice Testing Requirements," requires in part, that the IST of certain ASME OM Code Class 1, 2, and 3 components must meet the requirements of the ASME OM

Code and applicable addenda, except where alternatives have been authorized pursuant to paragraphs (a)(3)(i) or (a)(3)(ii) of 10 CFR 50.55a. The NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii) and is in compliance with the ASME Code requirements.

Therefore, the licensee's proposed alternative is authorized in accordance with 10 CFR 50.55a(a)(3)(ii) for the fifth 10-year IST interval at HBRSEP, which begins on July 21, 2012, and ends on February 18, 2022.

Sincerely,

/RA by Eva Brown for/

Douglas A. Broaddus, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure:
Safety Evaluation

cc w/encl: Distribution via Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON THE FIFTH 10-YEAR INTERVAL INSERVICE TESTING PROGRAM PLAN

RELIEF REQUEST-3

CAROLINA POWER & LIGHT COMPANY

H.B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated March 16, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12086A067), as supplemented by letter dated May 10, 2012 (ADAMS Accession No. ML12138A041), Carolina Power & Light Company (the licensee), doing business as Progress Energy Carolinas, Inc., submitted Relief Request (RR)-3 for the Inservice Testing (IST) Program Plan for the fifth 10-year Interval for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP).

The licensee requested approval to use an alternative test plan in lieu of certain IST requirements of the 2004 Edition through 2006 Addenda of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM) Code for the Category C check valves exercise tests or exams at HBRSEP. The fourth 10-year interval in HBRSEP began on February 19, 2002, and was scheduled to end on February 18, 2012.

As allowed by ASME Section XI, IWA-2430(d)1 the licensee extended the fourth 10-year interval through July 20, 2012, to complete the refueling outage-27 which was postponed to January 18, 2012. The duration of proposed alternative is for the fifth10-year IST interval that begins on July 21, 2012, and ends on February 18, 2022.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(f), "Inservice Testing Requirements," requires in part, that the IST of certain ASME Code Class 1, 2, and 3 components must meet the requirements of the ASME OM Code and applicable addenda, except where alternatives have been authorized pursuant to paragraphs (a)(3)(i) or (a)(3)(ii) of 10 CFR 50.55a.

In proposing alternatives, a licensee must demonstrate that the proposed alternatives provide an acceptable level of quality and safety. Paragraph 50.55a(a)(3) of 10 CFR states, in part, that alternatives to the requirements of 10 CFR 50.55a may be used, when authorized by the NRC, if the licensee demonstrates (i) the proposed alternatives would provide an acceptable level of quality and safety or if (ii) compliance with the specified requirements would result in hardship or

unusual difficulty without a compensating increase in the level of quality and safety. The licensee requested authorization of an alternative to the requirements of the ASME OM Code pursuant to 10 CFR 50.55a(a)(3)(i).

The NRC staff has previously approved this alternative for HBRSEP for the fourth IST 10-year interval on June 27, 2002, (ADAMS Accession No. ML040700790).

3.0 TECHNICAL EVALUATION

The NRC staff has evaluated the information provided by the licensee in support of the request for relief from, or alternative to, the ASME OM Code requirements and the bases for disposition are documented below.

3.1 ASME OM Code Requirements

ISTC-3510 "Exercising Test Frequency," states, in part, that "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months, except as provided by ISTC-3520, ISTC-3540, ISTC-3550, ISTC-3570, ISTC-5221, and ISTC-5222."

ISTC-3522 "Category C Check Valves," (a), states, in part, that "During operation at power, each check valve shall be exercised or examined in a manner that verifies obturator travel using the methods in ISTC-5221. Each check valve exercise test shall include open and close tests."

ISTC-3530 "Valve Obturator Movement," states that, "The necessary valve obturator movement shall be determined by exercising the valve while observing an appropriate indicator, such as indicating lights that signal the required changes of obturator position, or by observing other evidence, such as changes in system pressure, flow rate, level, or temperature, that reflects change of obturator position."

ISTC-5221 "Valve Obturator Movement," (a), states that, "The necessary valve obturator movement during exercise testing shall be demonstrated by performing both an open and a close test."

ISTC-5221(a)(2), states that, "Check valves that have a safety function in only the open direction shall be exercised by initiating flow and observing that the obturator has traveled either the full open position or to the position required to perform its intended function(s) (see ISTA-1100), and verify closure."

ISTC-5221(c)(2), states, in part, that, "the full stroke motion of the obturator shall be verified."

3.2 Component for which Relief is Requested

The licensee requested relief from the following Category C, Isolation Valve Seal Water (IVSW) system valves: IVSW-71, IVSW-72, IVSW-74 through IVSW-97, IVSW 100A, IVSW-100B, and IVSW-100C.

3.3 Licensee's Basis for Relief Request

The licensee stated in the March 16, 2012, submittal that the 3/8 inch penetration check valves in the IVSW system have no safety function in the closed direction and are required to open in order to provide seal water to selected containment penetrations during a design-basis accident (DBA). The IVSW system operates to limit the release of fission products if leakage occurs. The licensee indicated that no credit is taken for the operation of the IVSW system when calculating off site accident dose.

The licensee stated that the IVSW system is a qualified seal water system according to the requirements of 10 CFR Part 50 Appendix J "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors." The IVSW system is maintained at a minimum pressure of 1.1 times the peak accident pressure related to the design basis loss-of-coolant accident (LOCA). Therefore, the design and qualification of the system eliminates the need for these valves to close during a DBA in the unlikely event that closure is required.

The licensee stated that the disassembly to verify the obturator closure or modifications to facilitate IST for closure, (1) is impractical based on the large number of valves requiring verification and the insignificance associated with their failure to close and (2) may lead to maintenance induced errors associated with re-assembly. The small size and construction of IVSW valves prohibits the ability to perform partial disassembly/inspection in a manner representative of its inservice condition (e.g., valve removal and decontamination activities could alter disc position).

The ISVW system is a standby system that is typically operated during refueling outages to facilitate testing. Based on the infrequent use of the ISVW system, the licensee stated that the valve obturator exhibits minimal wear. The licensee adopted bi-directional check valve testing to counter the effects of a faulty test strategy associated with the inability to detect a detached valve disc. The licensee stated that a satisfactory forward flow check valve test could be completed when the valve disc is detached and laying in the bottom of the valve body. Based on the design and materials of construction associated with these check valves, disc failure with subsequent migration into associated systems is not likely since the size of the disc exceeds the inner diameter of the valve outlet. The licensee stated that the failure of the valve in this manner would be detected by the current test method that is performed at refueling outages in conjunction with required 10 CFR Part 50 Appendix J leak rate testing.

The licensee stated that based on the design and qualification of the ISVW system, compliance with the ASME OM Code requirements would result in an unusual hardship without a compensating increase in the level of quality and safety.

3.4 Licensee's Proposed Alternative Examination

The licensee stated that as an alternative to the ASME OM Code testing requirements, the 3/8 inch penetration check valves installed in the IVSW system will be tested in the open position at refueling intervals. The licensee also indicated that closure verification will not be performed.

3.5 NRC Staff Evaluation

Section 50.55a(f) of 10 CFR, "Inservice Testing Requirements," requires in part, that the IST of certain ASME OM Code Class 1, 2, and 3 components must meet the requirements of the ASME OM Code and applicable addenda, except where alternatives have been authorized pursuant to paragraphs (a)(3)(i) or (a)(3)(ii) of 10 CFR 50.55a. The licensee alternative request was based on applying the rule of 10 CFR 50.55a(a)(3)(i). However, the alternative method described in IST-RR-3 is more in line with 10 CFR 50.55a(a)(3)(ii). Therefore, the NRC staff reviewed IST-RR-3 on the basis that complying with the specified ASME Code requirement would result in hardship or unusual difficulty without increase in the level of quality and safety.

The IVSW system assures the effectiveness of certain containment isolation valves during any condition that requires containment isolation, by providing a water seal at the valves. These valves are located in lines that are connected to the reactor coolant system, or that could be exposed to the containment atmosphere in the event of a LOCA. The system provides a simple and reliable means for injecting seal water between the seats and stem packing of the globe and double disc types of isolation valves, and into the piping between closed diagram type isolation valves. This system operates to limit the fission product release from the containment.

The NRC staff evaluated the technical aspects of IST-RR-3 against the criteria in the ASME OM Code. ISTC-5221(a)(2) requires closure verification of check valves that only have a safety function in the open direction. ISTC-5221(c) requires a sample disassembly examination program for certain check valves that have been determined to be impractical to test. Closure verification after a successful open direction test ensures that the internals of the check valve assembly are still in place and remain intact.

The IVSW valves are in-line spring loaded ball check valves. The internal ball provides a seal against an o-ring seat to provide leak tight shutoff. The internal ball provides the valve closure and seal is secured in a leak tight body joint and seat assembly. The internal ball is physically unable to migrate away from the valve assembly and, therefore, would not adversely impact the function of the overall IVSW system.

The IVSW system, when actuated, delivers seal water through the check valves between two isolation points located outside the containment at a minimum pressure of 1.1 times the peak calculated containment accident pressure related to the design basis LOCA. The resulting water seal blocks leakage of the containment through valve seats and stem packing. The possibility of leakage from the containment past the isolation points is prevented by assuring that if leakage does exist, it will be from the seal water system into the containment.

The IVSW check valves have no safety function in the closed direction and are required to open to provide seal water to selected containment penetrations. According to the HBRSEP Updated Final Safety Analysis Report Revision No. 22, Section 6.8.2.1, "Isolation Valve Seal Water System - System Description," relief valves are provided in the system to prevent over-pressurization of the system if a pressure control valve fails or if a seal water injection line communicates with a high-pressure line due to a check valve failure in the seal water line. Disassembly to verify obturator closure or modifications to facilitate IST for closure is impractical based on the large number of valves requiring verification and the insignificance associated with their failure to close.

The NRC staff has reviewed the valve design and configuration and finds that the likely mode of failure is leakage through the valve seat. Because of the valve's unique design, failure of the ball-shaped disc would not result in subsequent migration into associated systems, and therefore would not adversely impact the safety function of the IVSW calculated containment accident pressure related to the design-basis LOCA. Therefore, containment out leakage will be prevented when the IVSW system is in operation following a LOCA. Incomplete valve closure or leakage will also be detected by pressure and water level instruments associated with the seal injection tank. As a result, closure verification by a sample disassembly program of the IVSW system valves is unnecessary and would result in hardship without a compensating increase in the level of quality and safety. Therefore, the NRC staff finds the proposal of testing the affected valves to only the open position acceptable.

4.0 CONCLUSION

The NRC staff determines that the proposed alternative, described in IST-RR-3, provides reasonable assurance that valves IVSW-71, IVSW-72, IVSW-74 through IVSW-97, IVSW-100A, IVSW-100B, and IVSW-100C are operationally ready and provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii) and is in compliance with the ASME OM Code requirements. Therefore, the NRC staff authorizes the proposed alternative in IST-RR-3 for the fifth IST interval at HBRSEP Unit No. 2 currently scheduled to begin on July 21, 2012, and ends on February 18, 2022.

All other ASME Section XI requirements for which relief was not specifically requested and authorized by the NRC staff will remain applicable including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributor: Michael Farnan

Date of issuance: July 13, 2012

Code and applicable addenda, except where alternatives have been authorized pursuant to paragraphs (a)(3)(i) or (a)(3)(ii) of 10 CFR 50.55a. The NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(ii) and is in compliance with the ASME Code requirements.

Therefore, the licensee's proposed alternative is authorized in accordance with 10 CFR 50.55a(a)(3)(ii) for the fifth 10-year IST interval at HBRSEP, which begins on July 21, 2012, and ends on February 18, 2022.

Sincerely,

/RA by Eva Brown for/

Douglas A. Broaddus, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosure:
Safety Evaluation

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