April 27, 2006

Mr. James Scarola, Vice President
Brunswick Steam Electric Plant
Carolina Power & Light Company
Post Office Box 10429
Southport, North Carolina 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 - RE: REQUEST FOR RELIEF FROM THE REQUIREMENTS OF THE ASME CODE (TAC NOS. MC7354 AND MC7355).

Dear Mr. Scarola:

By letter dated May 26, 2005, as supplemented by letters dated September 2, 2005, and January 25, 2006, Carolina Power & Light Company (the licensee), also doing business as Progress Energy Carolinas, Inc., requested U. S. Nuclear Regulatory Commission (NRC) approval for Relief Request No. VRR-15 for check valves associated with its third 10-year inservice testing (IST) program plan for pumps and valves for the Brunswick Steam Electric Power Plant (BSEP) Unit 1 and 2. BSEP's IST program plan for the third 10-year interval is based on the requirements in Section XI of the 1989 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code). For IST of valves, the ASME Code Section XI, Subsection IWV, references the 1987 Edition through the 1988 Addenda of the Operations and Maintenance (OM) Standard, Part 10 (OM-10), "Inservice Testing of Valves in Light-Water Reactor Power Plants." The licensee proposed alternatives in lieu of the requirements in Section XI of the ASME Code and applicable addenda. The proposed alternative to verify the full-stroke capability of the identified check valves on a nominal 24-month frequency, and not during refueling outages, by valve disassembly and inspection will provide an acceptable level of quality and safety.

The NRC staff has reviewed the relief request and concludes that the proposed alternative of Relief Request No. VRR-15 to verify the full-stroke capability of the identified check valves on a nominal 24-month frequency, and not during refueling outages by valve disassembly and inspection will provide an acceptable level of quality and safety. Therefore, Relief Request VRR-15 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternatives provide an acceptable level of quality and safety. The proposed alternative is approved for the remainder of the third 10-year inservice inspection interval which ends on May 10, 2008.

The results of the staff review are provided in the enclosed Safety Evaluation. If you have any questions regarding this approval, please contact the Brunswick Project Manager, Brenda Mozafari, at 301-415-2020.

Sincerely,

/RA/

Michael L. Marshall, Jr., Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosure: Safety Evaluation

cc w/encl: See next page

The results of the staff review are provided in the enclosed Safety Evaluation. If you have any questions regarding this approval, please contact the Brunswick Project Manager, Brenda Mozafari, at 301-415-2020.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM RELIEF REQUEST FOR

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NUMBERS 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated May 26, 2005, as supplemented by letters dated September 2, 2005, and January 25, 2006, Carolina Power & Light Company (the licensee), also doing business as Progress Energy Carolinas, Inc., submitted Relief Request No. VRR-15 for check valves associated with its third 10-year inservice testing (IST) program plan for pumps and valves for the Brunswick Steam Electric Power Plant (BSEP) Unit 1 and 2. In response to the NRC staff's request for additional information, the licensee submitted additional information in its letter dated September 2, 2005, and revised relief request in its letter dated January 25, 2006.

The Brunswick third 10-year IST program interval began on May 11, 1998, and will conclude on May 10, 2008.

2.0 REGULATORY EVALUATION

The *Code of Federal Regulations* (10 CFR), Section 50.55a, requires that IST of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves are performed in accordance with Section XI of the American Society of Mechanical Engineers (ASME) *Boiler and Pressure Vessel Code* (the Code) and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for its facility. Section 50.55a authorizes the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. Guidance related to the development and implementation of IST programs is given in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," issued April 3, 1989, and its Supplement 1 issued April 4, 1995. Also see NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," and NUREG/CR-6396, "Examples, Clarifications, and Guidance on Preparing Requests for Relief from Pump and Valve Inservice Testing Requirements."

The BSEP Units 1 and 2 IST program plan for the third 10-year interval is based on the requirements in Section XI of the 1989 Edition of the Code. For IST of valves, the ASME Code Section XI, Subsection IWV, references the 1987 Edition through the 1988 Addenda of the *Operations and Maintenance (OM) Standard*, Part 10 (OM-10), "Inservice Testing of Valves in Light-Water Reactor Power Plants." The licensee proposed alternatives in lieu of the requirements in Section XI of the ASME Code and applicable addenda.

The NRC's findings with respect to authorizing alternatives and granting or denying the IST program relief requests are discussed below.

3.0 TECHNICAL EVALUATION

3.1 Relief Request VRR-15

3.1.1 Code Requirements

ASME/ANSI [American National Standards Institute] OM-10, Paragraph 4.3.2.1 requires check valves to be exercised nominally every 3 months except as provided by paragraphs 4.3.22, 4.3.2.3, 4.3.2.4, and 4.3.2.5.

ASME/ANSI OM-10, Paragraph 4.3.2.2(e) states, "If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outage."

ASME/ANSI OM-10, Paragraph 4.3.2.4(c) states, "As an alternative to the testing in 4.3.2.4(a) and 4.3.2.4(b), disassembly every refueling outage to verify operability of check valve may be used."

3.1.2 Specific Relief Requested

The licensee requests relief from the Code requirements OM-10, paragraphs 4.3.2.2(e) and 4.3.2.4(c) for service water check valves 1(2)-SW-V683, 1(2)-SW-V684, 1(2)-SW-V695, and 1(2)-SW-V686.

3.1.3 Component Identification

The components affected by this relief request are check valves 1-SW-683, 1-SW-V684, 1-SW-V695, and 1-SW-V686 for Brunswick Unit 1, and check valves 2-SW-V683, 2-SW-V684, 2-SW-V695, and 2-SW-V686 for Brunswick Unit 2. These check valves are in the service water system and classified as ASME Class 3 and Category C check valves. These check valves are 6-inch Enertech model KRV, and made of Grade 400 Monel. These check valves open to provide flow paths for cooling water to the emergency diesel generators, and close to ensure service water system train isolation. The identified check valves will be assigned to eight valve groups, each group consisting of a single check valve.

3.1.4 Licensee's Basis for Relief

These service water check valves open to provide flow paths for cooling water to the emergency diesel generators, and close to ensure service water system train isolation. These are simple check valves, with no external means of exercising the valves or determining

obturator position. Due to the absence of isolation valves and vent and drain connections, there is no practical way these check valves can be back-flow (i.e., closure) tested. Therefore, the only means of determining valve operability is to observe system parameters. Since there are no position indicating devices on these check valves and no flow instrumentation installed on the emergency diesel generator service water supply headers, verification of full flow through these check valves is not possible.

These valves are located in the diesel generator building adjacent to the machinery to which they supply cooling water. Each valve is oriented horizontally. The valves operate in a saltwater environment and are only operated during the monthly diesel generator testing, quarterly partial stroke testing, and during a system hydraulic test that is performed once every other refueling outage (i.e., approximately every 4 years). The design of these check valves is very robust, and the valves are limited operation; therefore, the potential for wear is minimum. Being nozzle check valves, the piston does not oscillate during diesel generator operation, which eliminates the primary contributor to wear in check valves.

NRC GL 89-04, Position 2, "Alternative to Full Flow Testing of Check Valves," provides NRC guidelines to develop a sample disassembly and inspection program where the licensee determines that it is burdensome to disassemble and inspect all applicable valves each refueling outage. The program involves grouping similar valves, and testing at least one valve in each group during each refueling outage. A different valve of each group is required to be disassembled, inspected, and manually full-stroke exercised at each successive refueling outage, until the entire group has been tested. The identified check valves will be assigned to eight valve groups, each group consisting of a single check valve.

The valves will be disassembled and inspected on a nominal 24-month frequency. This valve grouping and inspection frequency is acceptable, as described in GL 89-04, Position 2, and is further supported by NUREG-1482, Revision 0, "Guidelines for Inservice Testing at Nuclear Power Plants," Appendix A. Following check valve disassembly and inspection, the check valve will be partial-stroke tested.

The valves have been routinely disassembled and inspected during normal at-power operation as part of the 24-month emergency diesel generator inspection. The time allotted for the diesel generator inspection is approximately 72 hours. The Technical Specification Limiting Condition for Operation (LCO) allows the emergency diesel generator to be out of service for 7 days. The 24-month diesel generator inspection consists of inspections and maintenance of diesel engine, generator, and supporting systems such as lubrication oil, fuel oil, starting air, and cooling water.

The approximate time period for the work associated with the check valve inspection is 4 to 5 hours and is usually performed in the first 24 hours of the diesel generator inspection work. Due to the physical arrangement of the valves, both check valves on a diesel generator are inspected at the same time.

Since their installation in 1994/1995, these valves have not exhibited any signs of wear or degradation. However, early signs of degradation would likely not have an impact on valve operability. This would allow ample time to obtain additional replacement parts, if needed.

The BSEP maintains one new replacement check valve in stock. In the event that a deficiency was found that warranted inspections of the other check valve groups, the additional inspections would be planned and carried out within the framework of the 12-week rolling schedule used at the BSEP.

Isolation of the affected check valves is accomplished by closing two upstream motor operated butterfly valves (i.e., one valve on each unit's service water supply line to the diesel) and manually closing a single butterfly valve on the common discharge line. The butterfly valves used to isolate the affected check valves are not leak tested, as they are Category B valves and there are no taps available to perform leak testing. Historically, the isolation valves have performed well, with only one instance of one of the isolation valves leaking to a point that inhibited inspecting the check valves.

In the event that one of the isolation valves should lose isolation capability during the inspection, it would cause a reduction in service water header pressure on the affected unit. This results in an alarm in the control room and entry into plant procedure 0AOP-18, "Nuclear Service Water System Failure." Plant procedure 0AOP-18 directs closure of manual upstream isolation valves, isolating one unit's service water header into the diesel generator building. Service water to the remaining three emergency diesel generators is provided from the other unit's nuclear service water header.

A flooding event in the out-of-service diesel generator cell will not impact the three remaining diesel generators in the adjoining cells. Level switches in the room sumps would alert the control room of a flooding condition.

The check valve disassembly and inspection does not add time to emergency diesel generator out-of-service time and can be completed well within the allowed Technical Specification LCO time of 7 days. There is no net adverse impact associated with performing the on-line IST of these check valves since the work is performed when the diesel generator is already unavailable (i.e., during on-line diesel generator maintenance and surveillance activities). Overall diesel generator maintenance activities are performed within the restrictions of the Technical Specification LCO, and the risk is managed in accordance with 10 CFR 50.65 requirements. As such, there is no increase in plant risk associated with the check valve disassembly and inspection activity during plant operation versus during refueling.

Performing this task during refueling outages will add tasks to the refueling outage and potentially extend the refueling work window.

Based on the above, the proposed alternative to verify the full-stroke capability of the identified check valves on a nominal 24-month frequency, and not during refueling outages, by valve disassembly and inspection, will provide an acceptable level of quality and safety.

3.1.5 Licensee Proposed Alternative Testing

The check valves will be full-stroke exercised every 24 months instead of every refueling outage as required by OM-10, paragraph 4.3.2.2(e). Also the check valve IST will be performed by valves disassembly and inspection in accordance with the guidelines provided in Position 2 of NRC GL 89-04, “Guidance on Developing Acceptable Inservice Testing

Programs." This check valve testing will be performed at a frequency of at least once per operating cycle (i.e., 24 months) in lieu of during each refueling outage.

3.1.6 Safety Evaluation of Relief Request VRR-15

ASME OM-10, Paragraph 4.3.2, requires check valves to be exercised to their safety position(s) quarterly, if practical, otherwise at cold shutdowns. If this, too, is not practicable, the Code allows testing to be deferred to refueling outages. The licensee proposes as an alternative to perform the inspection IST activities once every refueling cycle in lieu of during the refueling outage. Paragraphs 4.3.2.2(e) and 4.3.2.4(c) of OM-10 and GL 89-04 Position 2 limit the performance of check valve IST activities (including disassembly) to refueling outages.

The licensee states that as more system outages are performed on-line, it is evident that selected refueling outage IST activities could be performed during system outages on-line without sacrificing quality or safety. The licensee proposes, as an alternative, to perform the IST disassembly and inspection activities during normal plant operation (on-line), in conjunction with appropriate system outages, or during refueling outages. In any case, disassembly, inspection, and manual exercising will be performed at least once each operating cycle (i.e., 24-months).

All the check valves, 1-SW-V683, 1-SW-V684, 1-SW-V695, and 1-SW-V686, of BSEP Unit 1, and 2-SW-V683, 2-SW-V684, 2-SW-V695, and 2-SW-V686 of BSEP Unit 2 are in the service water system, and are classified as ASME Class 3 check valves. These check valves are 6-inch Enertech model KRV, and made of Grade 400 Monel. These check valves open to provide flow paths for cooling water to the emergency diesel generators, and close to ensure service water system train isolation. The licensee states that these check valves will be assigned to eight valve groups, each group consisting of a single check valve.

The licensee states that to perform the IST disassembly and inspection activities of these check valves during normal plant operation (on-line), isolation of these check valves is accomplished by closing two upstream motor-operated butterfly valves (i.e., one valve on each unit's service water supply line to the diesel) and manually closing a single butterfly valve on the common discharge line. Historically isolation valves have performed well, with only one instance of one of the isolation valves leaking to a point that inhibited inspection of the check valves. In the event that one of the isolation valves should lose isolation capability during the inspection, it would cause a reduction in service water header pressure on the affected unit. This results in an alarm in the control room and entry into plant procedure 0AOP-18, "Nuclear Service Water System Failure." Plant procedure 0AOP-18 directs closure of manual upstream isolation valves, isolating one unit's service water header into the diesel generator building. Service water to the remaining three emergency diesel generators is provided from the other unit's nuclear service water header.

The NRC staff finds that disassembly and inspection of service water system check valves 1-SW-V683, 1-SW-V684, 1-SW-V695, 1-SW-V686, 2-SW-V683, 2-SW-V684, 2-SW-V695, and 2-SW-V686 can be safely accomplished during system outages when the plant is on-line. The NRC staff's finding is based on the following considerations:

1. Approximately the same number of inservice tests will be performed using the proposed operating cycle test frequency as would be performed using the Code refueling outage

frequency. IST performed on a frequency (24 months) that maintains the acceptable time period between testing activities during the operating cycle (i.e., 24-months) is consistent with the intent of the OM Code and GL 89-04.

2. Over time, approximately the same number of tests will be performed using the proposed operating cycle test frequency as would be performed using the current refueling outage frequency.

3. During IST of check valves, the licensee will perform on-line testing by isolating two upstream motor-operated butterfly valves and manually closing a single butterfly valve on the common discharge line. The licensee states that historically, the isolation valves have performed well, with only one instance of the isolation valves leaking to a point that inhibited inspecting the check valves. This resulted in entry into plant procedure 0AOP-18, "Nuclear Service Water System Failure." Procedure 0AOP-18 directs closure of manual upstream isolation valves, isolating one unit's service water header into the diesel generator building. Service water to the remaining three emergency diesel generators is provided from the other unit's service water header.

4. There are no technical barriers to performing these IST activities during either the refueling outage or the operating cycle when plant is on-line.

5. The IST of check valves will be performed during normal at-power operation as part of the 24-month emergency diesel generator inspection. The time allotted for the diesel generator inspection is approximately 72 hours. The Technical Specification LCO allows the emergency diesel generator to be out of service for 7 days. The approximate time period for the work associated with the check valve inspection is 4 to 5 hours, and is usually performed in the first 24 hours of the diesel generator inspection work. Due to the physical arrangement of the valves, two check valves on a diesel generator are inspected at the same time. This provides adequate margin to complete disassembly and inspection activities in an orderly manner.

6. There is no net adverse impact associated with performing the on-line IST of these check valves since the work is performed when the diesel generator is already unavailable (i.e., during on-line diesel generator maintenance and surveillance activities).

7. The Brunswick Plant maintains one new replacement check valve in stock, in case an inspected valve is found to be defective.

8. The licensee states that “In the event that a deficiency was found that warranted inspections of the other check valve groups, the additional inspections would be planned and carried out within the framework of the 12-week rolling schedule used at the Brunswick Plant.”

On the basis of these considerations, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety.

4.0 CONCLUSION

Based on the NRC staff's review of the information provided in the relief request, the NRC staff concludes that licensee's proposed alternative will provide an acceptable level of quality and safety. Therefore, the proposed alternative for the check valves 1-SW-V683, 1-SW-V684, 1-SW-V695, 1-SW-V686, 2-SW-V683, 2-SW-V684, 2-SW-V695, and 2-SW-V686 to perform IST once per operating cycle (24-month) in lieu of once per refueling outage is authorized pursuant to 10 CFR 50.55a(a)(3)(i).

5.0 REFERENCES

5.1 *CFR*, "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," Section 50.55a, Codes and standards.

5.2 CFR, "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," Section 50.65, Requirements for monitoring the effectiveness of maintenance at nuclear power plants.

5.3 NRC, "Guidance on Developing Acceptable Inservice Testing Program," GL 89-04, through Supplement 1, April 4, 1995.

5.4 NRC, "Guidance for Inservice Testing at Nuclear Power Plants," NUREG-1482, April 1995.

5.5 Progress Energy Carolinas' letter from Edward T. O'Neil to NRC "Burnswick Steam Electric Plant, Units 1 and 2, Docket Nos. 50-325 and 50-324/License No. DPR-71 and DPR-62, Relief Request VRR-15, Emergency Diesel Generator Service Water Check Valves," dated May 26, 2005.

5.6 Progress Energy Carolinas' letter from Edward T. O'Neil to NRC "Burnswick Steam Electric Plant, Units 1 and 2, Docket Nos. 50-325 and 50-324/License No. DPR-71 and DPR-62, Response to Request for Additional Information Regarding Relief Request VRR-15, Emergency Diesel Generator Service Water Check Valves (NRC TAC Nos. MC7354 and MC7355)" dated September 02, 2005.

5.7 Progress Energy Carolinas' letter from Edward T. O'Neil to NRC "Burnswick Steam Electric Plant, Units 1 and 2, Docket Nos. 50-325 and 50-324/License No. DPR-71 and DPR-62, Response to Request for Additional Information Regarding Relief Request VRR-15, Emergency Diesel Generator Service Water Check Valves (NRC TAC Nos. MC7354 and MC7355)" dated January 25, 2006.

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