Progress Energy

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SERIAL: BSEP 08-0050

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62
Response to Request for Additional Information Regarding Fourth 10-Year Inservice Testing (IST) Program Update

Reference: Letter from Randy C. Ivey (CP&L) to U.S. Nuclear Regulatory Commission Document Control Desk, "Fourth 10-Year Interval Inservice Testing (IST) Program Update Submittal," November 13, 2007, ADAMS Accession Numbers ML073230790 and ML073240148

Ladies and Gentlemen:

By letter dated November 13, 2007, Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., submitted the Inservice Testing (IST) Program for the fourth 10-year interval at the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. On March 13, 2008, via electronic mail, the NRC requested additional information regarding several of the 10 CFR 50.55a requests that were included as part of the IST Program update. Responses to those NRC requests are enclosed.

No regulatory commitments are contained in this letter. Please refer any questions regarding this submittal to Mr. Gene Atkinson, Supervisor - Licensing/Regulatory Programs (Acting), at (910) 457-2056.

Sincerely,

Gene Atkinson FOR RANDY IVEY

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Enclosures:

1. Response to NRC Requests for Information Regarding the Fourth 10-Year Inservice Testing Program
2. 10 CF 50.55a Relief Request Number PRR-03
3. 10 CF 50.55a Relief Request Number VRR-01
4. 10 CF 50.55a Relief Request Number VRR-02

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Response to NRC Requests for Information
Regarding the Fourth 10-Year Inservice Testing Program

By letter dated November 13, 2007, Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., submitted the Inservice Testing (IST) Program for the fourth 10-year interval at the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. On March 13, 2008, via electronic mail, the NRC requested additional information regarding several of the 10 CFR 50.55a requests included as part of the IST Program update. Responses to those NRC requests are provided below.

Relief Request PRR-01

NRC Request RAI-PRR-01-01:

Section 5 of your relief request states that "Core Spray (CS) pump flow measurement for Preservice and Comprehensive pump tests will be made with the existing instrumentation with an overall accuracy of 2.016%. RHR pump flow measurement for Preservice, Group A, and Comprehensive pump tests will be made with the existing instrumentation with an overall loop accuracy of 2.016%." Please explain why relief is not being requested for Group A or Group B core spray pump tests.

CP&L Response:

CP&L has determined that Relief Request Number PRR-01 is not needed. Based on additional calculations, the Core Spray flow indicator has a loop accuracy of ± 1.52%, which meets the requirements of Table ISTB-3500-1. For the Residual Heat Removal (RHR) pump flow measurement, CP&L has determined that an existing, installed flow recorder can be used in lieu of the RHR pump flow indicator.

Relief Request PRR-02

NRC Request RAI-PRR-02-01:

Please explain why compliance with the Code requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

This explanation should include the burden associated with installation of a plant modification, installation of temporary flow instruments, and more accurate calibration of flow instrument loop components.

NRC Request RAI-PRR-02-02:

Section 4 of your relief request states that "the existing instrument loops provide more accurate flow measurement than required by the Code." Section 5 of your relief request states that "the variance in the actual test results is less than the maximum variance allowed by the Code." Please explain what these statements mean.

CP&L Response:

CP&L has determined that Relief Request Number PRR-02 is not needed. It has been determined that using the same signal that supplies the existing RHR Service Water pump flow indicator, a digital voltmeter can be used to measure a millivolt signal across a resistor within the flow loop of the flow indicator and a corresponding voltage tolerance can be established that is representative of the 4000 gpm reference value for the RHR Service Water pump. With the use of this method to measure flow, instrumentation can be used which meets the requirements of Table ISTB-3500-1.

Relief Request PRR-03

NRC Request RAI-PRR-03-01:

Please provide the ranges of the pressure gauges used to obtain differential pressure readings and the reference values when testing the core spray pumps.

NRC Request RAI-PRR-03-02:

In this relief request, the licensee did not request relief for Group A or Group B pump tests. Please verify that the relief is being requested only for preservice and comprehensive core spray pump tests.

CP&L Response:

Ranges of the pressure gauges and reference values for the Core Spray pump differential pressures are provided in the table below.

Gauge	Range	Reference Value
E21-PI-R001A,B Suction (Stopping)	30" HgVac – 30 psi	6 psi
E21-PI-R001A,B Suction (Running)	30" HgVac – 30 psi	4 psi
E21-PI-7119A,B Discharge	0 – 400 psi	290 psi

The proposed alternative is being revised to include Group B, Preservice, and Comprehensive pump testing. A copy of the revised 10 CFR 50.55a Relief Request Number PRR-03 is provided in Enclosure 2.

Relief Request VRR-01

NRC Request RAI VRR-01-01:

In the relief request section entitled "Impracticality of Compliance and Basis for Use," the licensee did not demonstrate any hardship and/or inability to meet the Code requirements. Please explain and provide details.

NRC Request RAI-VRR-01-02:

In the relief request section entitled "Impracticality of Compliance," last sentence of third paragraph states that "This position and alternate testing conforms with the recommendations presented in NUREG-1482, Revision 1, Paragraph 4.3.4." Please explain how requirements of NUREG-1482, Revision 1, Paragraph 4.3.4 are being used as an alternative to the Code requirements.

NRC Request RAI-VRR-01-03:

In the relief request section entitled "Burden Caused by Compliance," the licensee states that "Compliance with the Code requirement would require a plant modification without a compensating increase in the level of quality or safety." Please explain why compliance with the Code requirements would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety.

CP&L Response:

This relief request is being resubmitted as an "Alternative Provides Acceptable Level of Quality and Safety." The NUREG-1482 citation has been revised to cite paragraph 4.3.2.1. The revised relief request is provided in Enclosure 3.

The safety relief valves (SRVs) are sent to a vendor for as-found testing, including stroke time testing. The valves are stroke timed by the vendor using accelerometers. The acceptance criteria requires the valves to open in less than 100 milliseconds. Historical data shows the valves consistently open within 25 to 50 milliseconds. After the vendor testing, full stroke testing of the SRVs is performed at BSEP in the installed locations of the SRVs to ensure operability. This sequence of SRV testing conforms to recommendations presented by NUREG-1482, Revision 1, paragraph 4.3.2.1. To perform the stroke time testing at the plant would require installation of test equipment. Within the drywell, the installation of this test equipment would be required during plant start-up operations, involve personnel working in high radiation fields, and involve subsequent removal of this test equipment when the drywell is inaccessible.

Relief Request VRR-02

NRC Request RAI VRR-02-01:

In the relief request sections entitled "Impracticality of Compliance," the licensee did not demonstrate any hardship and/or inability to meet the Code requirements. Please explain and provide details.

CP&L Response:

This relief request is being resubmitted as an "Alternative Provides Acceptable Level of Quality and Safety" instead of an IST impracticality. The revised relief request is provided in Enclosure 4.

NUREG-1482, paragraph 4.1.6, allows extension of the test frequency for check valves to refueling outages in order to verify their closure by leak testing. RFJ-01 was submitted to extend leak rate testing to the refueling outages for these valves. This paragraph also allows the open exercise test to be performed during the refueling outage or anytime during the fuel cycle interval. ISTC-3550 of ASME OM Code, 2001 Edition with 2003 Addenda, titled "Valves in Regular Use," also provides allowances that satisfy the exercising requirements, provided that observations otherwise required for testing are made and analyzed during operation and recorded in the plant record at no greater time periods than specified within the OM Code. Current open verification of the check valves is conducted by monitoring full flow on a monthly basis, per plant procedure 0PT-01.8D, and as required by plant procedure 0PT-50.0 during the post-refueling start-up test program. Relief Request Number VRR-02 has been revised to add the additional information supporting use of monthly monitoring of the flow venturis for verifying the opening of the feedwater check valves.

For post-maintenance testing purposes, partial stroking of the valves before start-up would not be practical due to the unavailability of Reactor Core isolation Cooling (RCIC), High Pressure Coolant Injection (HPCI), and Feedwater during outages. Exercising the valve disc

to ensure mobility prior to reassembly, and a local leak rate test to ensure acceptable leakage in accordance with the acceptance criteria, will adequately satisfy post-maintenance requirements.

10 CF 50.55a Relief Request Number PRR-03

10 CFR 50.55a Relief Request Number PRR-03

Proposed Alternative In Accordance with 10 CFR 50.55a(a)(3)(i)

- Alternative Provides Acceptable Level of Quality and Safety -

1. ASME Components Affected

1-E21-C001A&B and 2-E21-C001A&B

2. Applicable Code Edition and Addenda

ASME OM Code, 2001 Edition through ASME OMb 2003 Addenda.

3. Applicable Code Requirement

ISTB-3510(b)(1) requires that the full-scale range of each analog instrument shall be not greater than three times the reference value.

4. Reason for Request

In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., is requesting a proposed alternative to the Code requirements provided above. The proposed alternative provides an acceptable level of quality and safety.

ISTB-3510(b)(1) requires that the full-scale range of each analog instrument shall be not greater than three times the reference value. The permanently installed plant instrumentation does not meet the requirements of ISTB-3510(b)(1).

The use of permanently installed plant instruments provides an acceptable level of quality and safety for the following reasons:

1. NUREG-1482, Revision 1, provides guidelines for development and implementation of programs for in-service testing of pumps and valves at nuclear power plants. Section 5.5.1, "Range and Accuracy of Analog Instruments," discusses situations where the range of permanently installed instrumentation is greater than three times the reference value but the accuracy of instrument is more conservative than the OM Code. Under such circumstances, the NUREG indicates the NRC will grant relief when the combination of range and accuracy yields a

reading at least equivalent to the reading achieved from the instruments that meet the Code requirements (i.e., up to ± 6% for Group A and B tests, and ± 1.5% for pressure and differential pressure instruments for Preservice and Comprehensive tests).

2. CS pump suction indicators are subject to temporary over-range conditions during pump operation above that of the reference value. For this reason, a temporary gauge that met the requirements of ISTB-3510(b)(1) would also be subject to over-range conditions. For Group B testing of the CS pump, the range of the plant installed analog instrumentation is greater than three times the reference values, but has an vendor accuracy of ± 0.5% and a calibrated accuracy of ± 0.8%. These percent of full scale yields readings that are within the ± 6% expected. For Preservice and Comprehensive testing, a temporary gauge would be used that would have the same range as the currently installed gauge but would have an accuracy of ± 0.1% of full scale. Again this instrument would be greater than three times the reference values, but it would yield a reading that is within the ± 1.5% expected.

5. Proposed Alternative and Basis for Use

Use permanently installed plant instrumentation to perform Group B in-service testing and temporary gauges for Preservice and Comprehensive in-service testing that will yield readings (i.e. combination of the range and accuracy) which are at least equivalent to the readings achieved from instrumentation that meet the OM Code requirements.

6. Duration of the Proposed Alternative

The proposed alternative will be used for the entire fourth 10-year interval for both BSEP units.

7. Precedents

This relief request was previously submitted as Relief Request PRR-04 for the third 10-year IST interval and was approved by NRC letter dated February 9, 1999.

8. Referencess

1. Engineering Evaluation Report 94-0243, "IST Gauge Accuracy Requirements Evaluation."

2. Letter from the Eugene V. Imbro (NRC) to W. R. Campbell (CP&L) dated May 16, 1996, "Relief from American Society of Mechanical Engineers Code Requirement for the Inservice Inspection Program Pump Differential Pressure Instrument Range for the Brunswick Steam Electric Plant, Units 1 and 2 (TAC Nos. M93256 and M93257)."

10 CF 50.55a Relief Request Number VRR-01

10 CFR 50.55a Relief Request Number VRR-01

Proposed Alternative In Accordance with 10 CFR 50.55a(a)(3)(i)

- Alternative Provides Acceptable Level of Quality and Safety -

1. ASME Components Affected

1-B21-F013A through 1-B21-F013L

2-B21-F013A through 2-B21-F013L

2. Applicable Code Edition and Addenda

ASME OM Code, 2001 Edition through ASME OMb 2003 Addenda.

3. Applicable Code Requirement

The stroke time of all valves shall be measured to at least the nearest second (ISTC-5113(c)).

4. Reason for Request

In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., is requesting a proposed alternative to the Code requirements provided above. The proposed alternative provides an acceptable level of quality and safety.

The functions of the primary steam line safety/relief valves are to: (1) open upon receipt of an Automatic Depressurization System (ADS) signal to blow down the reactor vessel (i.e. for the ADS valves only), (2) act as primary system safety valves actuating on high system pressure or by manual actuation from the Control Room, and (3) to close to maintain the primary system pressure boundary and prevent uncontrolled de-pressurization of the reactor (i.e., stuck open relief valve). The function of the solenoid valves is to energize upon receipt of a manual or ADS actuation signal and, in so doing, vent the associated poppet valve assembly causing the associated main valve to open.

The valves are sent to a vendor (i.e., Wyle Labortories) and as-found tested which includes visual inspection, leakage testing, stroke time tested and set pressure testing, as well maintenance performed. The stroke time is measured by using accelerometers. The acceptance criteria is set at < 100 milliseconds. The valves test consistently between

25 and 50 milliseconds. This verifies the valves will perform their desired function. The valves are full stroke exercised and remote position verified, in accordance with ASME OM Code ISTC-3500 and Technical Specification 3.4.3, "Safety/Relief Valves (SRVs)," at BSEP. There are no remote position indicators related to the position of these valves that signal full-open positioning of the valves. Therefore, temperature sensors and acoustic monitors downstream of the valves' discharge nozzles are used to provide a positive valve position indication.

The proposed alternate testing above, together with the extensive preventative maintenance requirements for these valves, gives adequate assurance that these valves will perform satisfactorily and reliably. This position and alternate testing conforms to the recommendations presented in NUREG-1482, Revision 1, paragraph 4.3.2.1.

5. Proposed Alternative and Basis for Use

Each of these valves will be exercised open and closed, and proper operation will be ascertained, by observing the response and changes in main steam parameters within a specified time period and observation of the outputs of the downstream temperature and acoustic sensors. Specific as-found stroke times, visual inspections, set pressure and leakage testing will be measured by the vendor.

6. Duration of the Proposed Alternative

The proposed alternative will be used for the entire fourth 10-year interval for both BSEP units.

7. Precedents

A similar relief request was previously submitted as Relief Request VRR-02 for the third 10-year IST interval and was approved by NRC letter dated February 9, 1999.

10 CF 50.55a Relief Request Number VRR-02

10 CFR 50.55a Relief Request Number VRR-02

Proposed Alternative In Accordance with 10 CFR 50.55a(a)(3)(i)

- Alternative Provides Acceptable Level of Quality and Safety -

1. ASME Components Affected

1-B21-F010A and 1-B21-F010B

2-B21-F010A and 2-B21-F010B

2. Applicable Code Edition and Addenda

ASME OM Code, 2001 Edition through ASME OMb 2003 Addenda.

3. Applicable Code Requirement

ISTC-3510 Exercising Test Frequency. 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-3560, ISTC-5221, and ISTC-5222.

ISTC-5224 Corrective Action. If a check valve fails to exhibit the required change of obturator position, it shall be declared inoperable. A retest showing acceptable performance shall be run following any required corrective action before the valve is returned to service.

4. Reason for Request

In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., is requesting a proposed alternative to the Code requirements provided above. The proposed alternative provides an acceptable level of quality and safety.

These Feedwater line to Reactor Pressure Vessel check valves open to provide flow paths for normal feedwater flow as well as high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) flow into the reactor vessel. These are simple check valves, with no external means of exercising or external determination of disk position. Thus, the only practical method of exercising these valves to their open position and confirming full open operation per the guidance of NRC Generic Letter 89-04 and NUREG-1482,

Revision 1, is with flow from the reactor feedwater system, or from the HPCI or RCIC systems themselves. The HPCI accident flow requirement is 4250 gpm, and RCIC accident flow requirement is 400 gpm. Injecting water directly from either the HPCI or RCIC systems to the reactor is impractical during plant operation due to the possibility of creating an unacceptable reactor vessel water level transient, thermal shock to reactor vessel nozzles, a reactivity excursion, or upsetting reactor water chemistry. Under normal shutdown conditions, steam is unavailable to operate the HPCI and RCIC turbines and there is a potential for over-pressurizing the reactor vessel. Thus, the only practical way of exercising these valves is with reactor feedwater flow during power operation.

During normal plant operation, the feedwater flow is approximately 12,500 gpm per loop. Normal plant operation exceeds 12,500 gpm, which is greater than the maximum accident flow of either HPCI or RCIC through these check valves. The Reactor Feedwater System arrangement is such that flow indication can be obtained for each of the individual feedwater loops. Thus, flow measurement through each check valve can be made to verify proper opening of the subject check valve. This method complies with NUREG-1482, Revision 1, paragraph 4.1.6 which allows extension of the test frequency for check valves to refueling outages to verify closed by leak testing and the performance of the open exercise test during the refueling outage or anytime during the fuel cycle interval. ISTC-3550 of ASME OM Code, 2001 Edition with 2003 Addenda, titled "Valves in Regular Use," also provides allowances that satisfy the exercising of requirements provided that observations otherwise required for testing are made and analyzed during operation and recorded in the plant record at no greater than specified within the OM Code. Monitoring of feedwater flow monthly and as required during post-refueling start-up test program, in accordance with plant procedures, complies with the above guidance.

5. Proposed Alternative and Basis for Use

Exercising of these valves open will only be performed to the extent that adequate reactor feedwater flow is available. Full accident flow through each feedwater injection leg will be confirmed by monitoring A-loop and B-loop flow through feedwater flow venturis, 1/2-C32-FE-N001A/B, during power operation. Feedwater flow is a critical input to the reactor heat balance and is monitored by Operations continuously via the plant process computer. Where maintenance or corrective action has been performed on a valve during a shutdown period, the subject valve will not be flow tested (i.e., opened) prior to being placed in service.

6. Duration of the Proposed Alternative

The proposed alternative will be used for the entire fourth 10-year interval for both BSEP units.

7. Precedents

This relief request was previously submitted as Relief Request VRR-12 for the third 10-year IST interval and was approved by NRC letter dated February 9, 1999.