



**Progress Energy**

10 CFR 50.55a(a)(3)(i)

**JAN 21 2005**

**SERIAL: BSEP 05-0013**

**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  
Redesignation of Proposed Alternative to the ASME Code, Section XI,  
Appendix VIII, Supplement 4, "Qualification Requirements for the  
Clad/Base Metal Interface of Reactor Vessel," as Relief Request RR-35  
(NRC TAC Nos. MC4386 and MC4387)**

**Ladies and Gentlemen:**

By letter dated August 6, 2004 (Serial: BSEP 04-0094), Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc. (PEC), submitted a request to adopt an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure vessel Code, Section XI, regarding the inspection of Class 1, examination Category B-A pressure retaining welds in the reactor vessel at the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The proposed alternative was designated as Relief Request RR-34. This proposed alternative has now been redesignated as Relief Request RR-35. A copy of the revised relief request is enclosed. No changes have been made to the revised relief request, other than the request number.

Please refer any questions regarding this submittal to Mr. Leonard R. Beller, Supervisor - Licensing/Regulatory Programs, at (910) 457-2073.

Sincerely,

Edward T. O'Neil  
Manager - Support Services  
Brunswick Steam Electric Plant

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WRM/wrm

Enclosure: 10 CFR 50.55a Request Number RR-35

cc (with enclosure):

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## 10 CFR 50.55a Request Number RR-35

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

Alternative Provides Acceptable Level of Quality and Safety

### 1. ASME Code Components Affected

Code Class:	Class 1
Examination Categories:	B-A, B-D
Item numbers:	B1.12 Longitudinal Shell Welds
	B1.21 Circumferential Head Welds
	B1.22 Meridional Head Welds
	B1.51 Beltline Region Repair Welds
	B3.90 Nozzle-to-Shell Welds

### 2. Applicable Code Edition and Addenda

The Code of Record for the third 10-year inservice inspection interval is the American Society of Mechanical Engineers (ASME) Section XI Boiler and Pressure Vessel Code, 1989 Edition, with no addenda.

### 3. Applicable Code Requirement

On September 22, 1999, the NRC published a final rule in the *Federal Register* (i.e., 64 FR 51378) to amend 10 CFR 50.55a(b)(2), to incorporate by reference the 1995 Edition and addenda through 1996, of Section XI of the ASME Code. The change included the provisions of subparagraph 3.2(a), 3.2(b), and 3.2(c) of Section XI of the ASME Code, 1995 Edition with the 1996 Addenda, Appendix VIII, Supplement 4. In addition, the September 22, 1999, notice amended 10 CFR 50.55a(b)(2)(xv)(C)(1). The amended 10 CFR 50.55a(b)(2)(xv)(C)(1) requires a depth sizing acceptance criterion of 0.15 inch Root Mean Square (RMS) to be used instead of the requirements of subparagraph 3.2(a) and 3.2(b) of Section XI of the ASME Code, Appendix VIII, Supplement 4. On March 26, 2001, the NRC published in the *Federal Register* a correction (i.e., 66 FR 16390) to an error in the wording of 10 CFR 50.55a(b)(2)(xv)(C)(1). The correction requires a depth sizing acceptance criterion of 0.15 inch RMS to be used instead of the requirements of subparagraph 3.2(a) and a length sizing requirement of 0.75 inch RMS to be used instead of the requirements of subparagraph 3.2(b).

Subparagraph 3.2(c) of Section XI of the ASME Code, Appendix VIII, Supplement 4, requires that the ultrasonic testing (UT) performance demonstration results be plotted on a two-dimensional plot with the measured depth plotted along the ordinate axis and the true depth

plotted along the abscissa axis. For qualification, the plot must satisfy the statistical parameters identified in subparagraph 3.2(c).

10 CFR 50.55a(g)(6)(ii)(C) imposes implementation of Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," to the 1995 Edition with 1996 Addenda of Section XI of the ASME Code.

#### **4. Reason for Request**

The United States nuclear utilities created the Performance Demonstration Initiative (PDI) to implement performance demonstration requirements contained in Appendix VIII of Section XI of the ASME Code. To this end, PDI has developed a performance demonstration program for qualifying UT equipment, procedures, and personnel. During development of the performance demonstration for Supplement 4, the PDI determined that the ASME Code criteria for flaw depth and length sizing was unworkable.

#### **5. Proposed Alternative and Basis for Use**

As an alternative to the statistical parameters of subparagraph 3.2(c) of the ASME Code, Section XI, Appendix VIII, Supplement 4, the RMS depth and length sizing values contained in 10 CFR 50.55a(b)(2)(xv)(C)(1), as revised on March 26, 2001 (i.e., 66 FR 16390), will be used. 10 CFR 50.55a(b)(2)(xv)(C)(1) modifies the depth sizing criteria contained in ASME Code, Section XI, Appendix VIII, Supplement 4, subparagraph 3.2(a) and the length sizing criteria contained in ASME Code, Section XI, Appendix VIII, Supplement 4, subparagraph 3.2(b).

The first parameter, subparagraph 3.2(c)(1), pertains to the slope of a linear regression line. The linear regression line is the difference between actual versus true values plotted along a through-wall thickness. For Supplement 4 performance demonstrations, a linear regression line of the data is not applicable because the performance demonstrations are performed on test specimens with flaws located in the inner 15 percent through-wall. The differences between actual versus true values produce a tight grouping of results which resemble a shotgun pattern. The slope of a regression line from such data is extremely sensitive to small variations, thus making the parameter of subparagraph 3.2(c)(1) an inappropriate acceptance criterion.

The second parameter, subparagraph 3.2(c)(2), pertains to the mean deviation of flaw depth. The value used in the ASME Code is too lax with respect to evaluating flaw depths within the inner 15 percent of wall thickness. Therefore, this alternative will use the more appropriate criterion of 0.15 inch RMS, from 10 CFR 50.55a(b)(2)(xv)(C)(1), which modifies subparagraph 3.2(a).

The third parameter, subparagraph 3.2(c)(3), pertains to a correlation coefficient. The value of the correlation coefficient in subparagraph 3.2(c)(3) is inappropriate for this application since it is based on the linear regression from subparagraph 3.2(c)(1).

Based on the above, the alternative to use the depth and length sizing criteria contained in 10 CFR 50.55a(b)(2)(xv)(C)(1), instead of the requirements of subparagraph 3.2(c) of the ASME Code, Section XI, Appendix VIII, Supplement 4, is more appropriate and will provide an acceptable level of quality and safety.

**6. Duration of Proposed Alternative**

Use of the alternative is proposed for the remainder of the third 10-year inservice inspection interval for BSEP, Units 1 and 2. The third 10-year inservice inspection interval began May 11, 1998, and will conclude on May 10, 2008.

**7. Precedents**

Similar requests have been granted to:

- a. Indian Point Generating Units No. 2 and No. 3, Docket Nos. 50-247 and 50-286, letter dated March 19, 2004 (ADAMS Accession Number ML040850668). This request was submitted by letter dated December 30, 2003 (ADAMS Accession Number ML040020317).
- b. Quad Cities Nuclear Power Station Units 1 and 2, Docket Nos. 50-254 and 50-265, letter dated December 6, 2001 (ADAMS Accession Number ML012690586). This request was submitted by letter dated August 16, 2001 (ADAMS Accession Number ML012330156).