



# Progress Energy

**JAN 28 2011**

SERIAL: BSEP 11-0011

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

Subject: Brunswick Steam Electric Plant, Unit No. 2  
Renewed Facility Operating License No. DPR-62  
Docket No. 50-324  
Response to Request for Additional Information – Proposed Alternatives for  
the Third 10-Year Inservice Inspection Program (NRC TAC Nos. ME4343,  
ME4344, ME4345, and ME4346)

Reference: Letter from Phyllis N. Mentel to the U.S. Nuclear Regulatory Commission,  
*Proposed Alternatives for the Third 10-Year Inservice Inspection Program*,  
dated July 23, 2010, ADAMS Accession Number ML102150345.

Ladies and Gentlemen:

By letter dated July 23, 2010, Carolina Power & Light Company (CP&L), now doing  
business as Progress Energy Carolinas, Inc., submitted four 10 CFR 50.55a requests for the  
Brunswick Steam Electric Plant, Unit No. 2. On December 9, 2010, via electronic mail,  
the NRC staff provided a request for additional information (RAI) concerning the proposed  
inservice inspection program alternatives. The response to the RAI is provided in  
Enclosure 1.

No regulatory commitments are contained in this letter. Please refer any questions  
regarding this submittal to Mr. Lee Grzeck, Acting Supervisor - Licensing/Regulatory  
Programs, at (910) 457-2487.

Sincerely,

Phyllis N. Mentel  
Manager - Support Services  
Brunswick Steam Electric Plant

A047  
NRK

Document Control Desk  
BSEP 11-0011 / Page 2

WRM/wrm

Enclosures:

1. Response to Request for Additional Information
2. Revised Table RR-47-1

cc (with enclosures):

U. S. Nuclear Regulatory Commission, Region II  
ATTN: Mr. Victor M. McCree, Regional Administrator  
245 Peachtree Center Ave, NE, Suite 1200  
Atlanta, GA 30303-1257

U. S. Nuclear Regulatory Commission  
ATTN: Mr. Philip B. O'Bryan, NRC Senior Resident Inspector  
8470 River Road  
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission **(Electronic Copy Only)**  
ATTN: Mrs. Farideh E. Saba (Mail Stop OWFN 8G9A)  
11555 Rockville Pike  
Rockville, MD 20852-2738

Chair - North Carolina Utilities Commission  
P.O. Box 29510  
Raleigh, NC 27626-0510

Mr. W. Lee Cox, III, Section Chief  
Radiation Protection Section  
North Carolina Department of Environment and Natural Resources  
1645 Mail Service Center  
Raleigh, NC 27699-1645

Mr. Jack M. Given, Jr., Bureau Chief  
North Carolina Department of Labor  
Boiler Safety Bureau  
1101 Mail Service Center  
Raleigh, NC 27699-1101

## Response to Request for Additional Information

### Background

By letter dated July 23, 2010, Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., submitted four 10 CFR 50.55a requests for the Brunswick Steam Electric Plant, Unit No. 2. On December 9, 2010, via electronic mail, the NRC staff provided a request for additional information (RAI) concerning the proposed inservice inspection program alternatives. The response to this RAI follows.

### NRC Question 1

#### RR-47

1. 10 CFR 50.55a(g)(6)(ii)(C)(1), "Implementation of Appendix VIII to Section XI," states that, "Appendix VIII and the supplements to Appendix VIII to Section XI, Division 1, 1995 Edition with the 1996 Addenda of the ASME Boiler and Pressure Vessel Code must be implemented in accordance with the following schedule: Appendix VIII and Supplements 1, 2, 3, and 8 – May 22, 2000; Supplements 4 and 6 – November 22, 2000; Supplement 11 – November 22, 2001; and Supplements 5, 7, and 10 – November 22, 2002."

10 CFR 50.55a(g)(6)(ii)(C)(2) states that, "[l]icensees implementing the 1989 Edition and earlier editions and addenda of IWA-2232 [(stating that ultrasonic examinations shall be conducted in accordance with Appendix I, 'Ultrasonic Examinations,' to Section XI of the ASME Code)] of Section XI, Division 1, of the ASME [Code] must implement the 1995 Edition with 1996 Addenda of Appendix VIII and the supplements to Appendix VIII of Section XI, Division 1, of the ASME [Code]."

Table RR-47-1 in Relief Request RR-47 includes a remark in the line entries for each of the subject nozzle-to-reactor vessel (RV) welds stating that the "[e]xamination [was] performed prior to implementation of [ASME Code, Section XI,] Appendix VIII, Supplements 4 and 6."

- a. Please clarify whether this statement applies specifically to the limited-scope ultrasonic exams (e.g., those exams where examination coverage was limited to 51.7%, 50.1%, and 44.5%) of the subject nozzle-to-RV welds discussed in Request RR-47.
- b. Taking into consideration the 10 CFR 50.55a(g)(6)(ii)(C)(1)-(2) requirements quoted above, please provide additional information concerning the ASME Code, Section XI, Appendix VIII performance demonstration requirements to which ultrasonic examination personnel, procedures, and equipment were qualified for performing these limited scope nozzle-to-RV weld examinations, as follows:

- (i) State whether the qualification of ultrasonic examination personnel, procedures, and equipment was performed in accordance with ASME Code, Section XI, Appendix VIII, Articles VIII-1000 through VIII-5000, including all ASME Code, Section XI, Appendix VIII supplements that are applicable to the performance of ultrasonic examinations on nozzle-to-RV welds.
  - (ii) If ultrasonic examination personnel, procedures, and equipment were not qualified in accordance with the requirements listed in (i) above, please state the ASME Code, Section XI requirements to which the ultrasonic examination personnel, procedures, and equipment were qualified when performing the limited scope examinations of the subject welds. Please provide justification for the use of these qualification standards based on the requirements of 10 CFR 50.55a(b)(2)(xiv)-(xvi) and 10 CFR 50.55a(g)(6)(ii)(C)(1)-(2).
2. Please provide data for the examination coverage achieved for the Examination Category B-D, Item No. B3.100 RV Nozzle Inside Radius Sections. Please discuss the results of these examinations, including whether any relevant flaws were found that required screening using the ASME Code, Section XI, IWB-3500 acceptance standards.

#### **Response to Part 1.a**

The remarks contained in Table RR-47-1 have been revised to clarify when the component weld inspections were performed and the requirements applicable to those inspections.

Beginning November 22, 2000, 10 CFR 50.55a(g)(6)(ii)(C) required that personnel performing reactor pressure vessel (RPV) weld examinations meet the qualification requirements of Supplements 4 and 6 to Appendix VIII to Section XI, 1995 Edition with the 1996 Addenda of the ASME Boiler and Pressure Vessel Code. Supplement 4 applies to qualifications for RPV clad-to-base metal examinations within the inner 15 percent of the RPV thickness and Supplement 6 applies to qualifications for RPV clad-to-base metal examinations in the outer 85 percent of the RPV thickness. Supplements 4 and 6 provide examination requirements for the RPV horizontal and vertical welds and are not applicable to nozzle-to-shell welds.

Starting November 22, 2002, 10 CFR 50.55a(g)(6)(ii)(C) required that personnel performing RPV nozzle-to-shell weld examinations meet the qualification requirements of Supplement 7 to Appendix VIII to Section XI, 1995 Edition with the 1996 Addenda of the ASME Boiler and Pressure Vessel Code. To satisfy the Supplement 7 requirements, licensees can follow the requirements of 10 CFR 50.55a(b)(2)(K), which addresses provisions which must be used when the requirements contained in Supplement 7 to Appendix VIII are applied for nozzle-to-vessel welds in conjunction with Supplement 4 to Appendix VIII, with Supplement 6 to Appendix VIII, or combined Supplement 4 and Supplement 6 qualifications.

The nozzle-to-shell welds identified in Table RR-47-1 were examined in February 2001 and May 1999, which was prior to the required implementation date for Supplement 7 to

Appendix VIII. Furthermore, all but three of the nozzle-to-shell weld examinations were conducted before any Appendix VIII requirements became applicable.

The Table RR-47-1 remark regarding Appendix VIII, Supplements 4 and 6 was intended to indicate that the RPV nozzle-to-shell welds were examined prior to using the Supplement 4 and Supplement 6 requirements as modified by 10 CFR 50.55a(b)(2)(K). To clarify the requirements applicable to these examinations, the Table RR-47-1 remarks column has been revised to include the month and year that each listed weld was examined, and to indicate these examinations were performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds. A revised Table RR-47-1 is provided in Enclosure 2.

### **Response to Part 1.b**

Those examinations listed in Table RR-47-1 were performed in accordance with the 1989 Edition of the ASME Boiler and Pressure Vessel Code. These examinations were performed prior to the November 22, 2002, implementation date for Supplement 7 of Appendix VIII to Section XI, 1995 Edition with the 1996 Addenda of the ASME Boiler and Pressure Vessel Code.

### **Response to Part 2**

Because there were no limited examinations (i.e., no coverage issues) for the Examination Category B-D, Item No. B3.100 RPV nozzle inner radius sections (i.e., essentially 100 percent coverage was achieved), detailed examination data is not being provided. No relevant flaws were detected in any Category D, Item No. B3.100 RPV nozzle inner radius sections.

### **NRC Question 2**

#### RR-49

Request RR-49 states that the limited-scope ultrasonic examination achieved 64% of the ASME Code, Section XI-required volumetric coverage of the RV shell-to-flange weld (Welds 2B11-RPV-F1 and 2B11-RPV-F2) and were performed in calendar year 2000, using the industry-accepted technology that was available. RR-49 also states that "[t]hese weld examinations were completed prior to the implementation of inspection techniques qualified under Appendix VIII of the ASME Code, Section XI, administered by the EPRI PDI."

If ultrasonic examination personnel, procedures, and equipment were not qualified in accordance with the requirements of Appendix VIII of the ASME Code, Section XI, including the Appendix VIII Supplements applicable to the performance of the exams of the RV shell-to-flange weld, then please state the ASME Code, Section XI requirements to which ultrasonic examination personnel, procedures, and equipment were qualified when performing the limited scope examination of the subject component. Please provide justification for the use of these qualification standards based on the requirements of 10 CFR 50.55a(b)(2)(xiv)-(xvi), and 10 CFR 50.55a(g)(6)(ii)(C)(1)-(2).

## Response

The Unit 2 RPV shell-to-flange weld examinations were performed in calendar year 2001, rather than calendar year 2000, as stated in the July 23, 2010, submittal.

10 CFR 50.55a(g)(6)(ii)(C)(1) stipulates that Supplements 1, 2, 3, 4, 5, 6, 7, 8, 10, and 11 of Appendix VIII of the ASME Boiler and Pressure Vessel Code be implemented in accordance with the schedules specified. None of the Supplements of Appendix VIII identified in 10 CFR 50.55a(g)(6)(ii)(C)(1) applied to the RPV shell-to-flange weld examinations; therefore, neither 10 CFR 50.55a(g)(6)(ii)(C)(1) nor 10 CFR 50.55a(g)(6)(ii)(C)(2) were applicable to the examination of RPV shell-to-flange weld 2B11-RPV-F1 and 2B11-RPV-F2 and the welds were instead examined in accordance with the code of record for the third ISI interval (i.e., the ASME Code, Section XI, 1989 Edition with no Addenda).

## NRC Question 3

### RR-50

1. Request RR-50 states that the limited-scope ultrasonic examination achieved 47.9% of the ASME Code, Section XI-required coverage for the subject Residual Heat Removal System (RHR) heat exchanger nozzle-to-shell weld (Weld 2E11HX-2A-SWN4). Table RR-50-1 includes a statement under the "Examination Results" column stating that there were "[n]o service induced indications." The staff requests further detail concerning the results of the limited-scope examination of this weld.
  - (a) Please state whether any recordable indications were found as a result of the limited scope volumetric examination or the full-scope (100%) surface examination. The staff defines recordable indications as any indications not due to component design or geometry requiring screening under ASME Code, Section XI, IWC-3500 acceptance standards (regardless of whether the indications are fabrication-related or service-induced).
  - (b) If any recordable indications were found in the subject weld as a result of the limited-scope volumetric examination or the full-scope surface examination, please state whether any of these flaws were found to be unacceptable for continued service (without repair or analytical evaluation) in accordance with ASME Code, Section XI, IWC-3500 acceptance standards. For any such unacceptable flaws, please discuss the disposition of such flaws including repairs made under ASME Code, Section XI, IWC-4000 and/or analytical evaluations performed under ASME Code, Section XI, IWC-3600. If any flaws in the subject weld were evaluated under ASME Code, Section XI, IWC-3600, please provide references for any flaw evaluation reports documenting analytical evaluations for acceptance of such flaws.
2. Please state whether the limited scope ultrasonic examination of the subject weld was conducted using personnel, procedures, and equipment that were qualified in accordance

with the requirements of Appendix VIII of the ASME Code, Section XI, including the Appendix VIII Supplements applicable to the performance of examinations of the subject RHR nozzle-to-shell weld. If the ASME Code, Section XI, Appendix VIII qualification requirements were not met for this examination, then please state the ASME Code, Section XI requirements to which ultrasonic examination personnel, procedures, and equipment were qualified when performing the limited scope examination of the subject weld. Please provide justification for the use of these qualification standards based on the requirements of 10 CFR 50.55a(b)(2)(xiv)-(xvi), and 10 CFR 50.55a(g)(6)(ii)(C)(1)-(2).

**Response to Part 1.a**

Fabrication indications have been detected in Residual Heat Removal System (RHR) heat exchanger nozzle-to-shell weld 2E11HX-2A-SWN4. The indications have been determined to be slag inclusions. They have been evaluated and found acceptable based on the acceptance standards of ASME Code, Section XI, IWC-3500. Since the initial detection of these flaws during pre-service examinations, no growth or change in flaw characteristics has been detected.

**Response to Part 1.b**

The fabrication flaws referenced in the response to Part 1.a above were evaluated and found to be acceptable based on the ASME Code, Section XI, IWC-3500 acceptance standards. Analytical evaluations performed under ASME Code, Section XI, IWC-3600 were not required.

**Response to Part 2**

Weld 2E11HX-2A-SWN4 is a Code Class 2, Examination Category C-B component and is outside the scope of Appendix VIII of the ASME Boiler and Pressure Vessel Code. Examinations of weld 2E11HX-2A-SWN4 were performed to the requirements of ASME Code, Section XI, 1989 Edition with no Addenda, which was the code of record for the third ISI interval.

TABLE RR-47-1

Component ID	System and Component Description	Ultrasonic Technique S=Shear Wave L=Longitudinal Wave	Required Examination Volume	Percent Coverage Obtained	Examination Results	Remarks
2B11-RPV-N3A	Reactor Vessel, Main Steam Nozzle N3A	0, 45S, 60S,	ASME Code, Figure IWB-2500-7(b)	51.7%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed February 2001. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.
2B11-RPV-N3B	Reactor Vessel, Main Steam Nozzle N3B	0, 45S, 60S,	ASME Code, Figure IWB-2500-7(b)	51.7%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed February 2001. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.
2B11-RPV-N3C	Reactor Vessel, Main Steam Nozzle N3C	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	51.7%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.

TABLE RR-47-1

Component ID	System and Component Description	Ultrasonic Technique S=Shear Wave L=Longitudinal Wave	Required Examination Volume	Percent Coverage Obtained	Examination Results	Remarks
2B11-RPV-N3D	Reactor Vessel, Main Steam Nozzle N3D	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	51.7%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.
2B11-RPV-N6A	Reactor Vessel, Head Spray Nozzle N6A	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	50.1%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.
2B11-RPV-N6B	Reactor Vessel, Head Spray Nozzle N6B	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	50.1%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.

TABLE RR-47-1

Component ID	System and Component Description	Ultrasonic Technique S=Shear Wave L=Longitudinal Wave	Required Examination Volume	Percent Coverage Obtained	Examination Results	Remarks
2B11-RPV-N7	Reactor Vessel, Head Instrument Penetration Nozzle N7	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	50.1%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.
2B11-RPV-N10	Reactor Vessel, Core Differential Pressure Instrumentation, Nozzle N10	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	44.5%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.
2B11-RPV-N12A	Reactor Vessel, Level Instrumentation, Nozzle N12A	0, 45S, 60S,	ASME Code, Figure IWB-2500-7(b)	44.5%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed February 2001. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.

**TABLE RR-47-1**

<b>Component ID</b>	<b>System and Component Description</b>	<b>Ultrasonic Technique S=Shear Wave L=Longitudinal Wave</b>	<b>Required Examination Volume</b>	<b>Percent Coverage Obtained</b>	<b>Examination Results</b>	<b>Remarks</b>
2B11-RPV-N12B	Reactor Vessel, Level Instrumentation, Nozzle N12B	0, 45S, 60S, 70L	ASME Code, Figure IWB-2500-7(b)	44.5%	No Reportable Indications	Examination limited due to nozzle configuration. Examination performed May 1999. Examination performed prior to implementation of the Appendix VIII requirements applicable to the nozzle-to-shell welds.