Progress Energy

10 CFR 50.55a(g)(5)(iii)

APR 2 7 2009

SERIAL: BSEP 09-0024

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

Subject: Brunswick Steam Electric Plant, Unit No. 1
Docket No. 50-325/License No. DPR-71
Proposed Alternative for the Third 10-Year Inservice Inspection Program

Reference: Letter from Keith R. Jury to U.S. Nuclear Regulatory Commission, *Inservice Inspection Program Plan for the Third Ten-Year Interval (NRC TAC Nos. MA1115 and MA1116)*, dated August 6, 1998.

Ladies and Gentlemen:

By letter dated August 6, 1998, Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., submitted the third 10-year Inservice Inspection Program for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. During the third inspection interval, the 1989 Edition of the American Society of Mechanical Engineers (ASME) Code, Section XI, with no addenda, was used for Class 1, 2, and 3 components, unless otherwise permitted.

During the third 10-year interval, CP&L completed the required inservice examinations for BSEP, Unit 1, in accordance with the plan, except that certain components could not fully meet the examination requirements specified in the 1989 ASME Code, Section XI, including the clarifications provided in ASME Code Case N-460. CP&L has determined that conformance to the Code requirement of essentially 100 percent coverage of weld volume or area examined was impractical due to various constraints and limitations. Accordingly, in accordance with 10 CFR 50.55a(a)(g)(5)(iii), CP&L requests NRC approval of four 10 CFR 50.55a Requests for BSEP, Unit 1, copies of which are provided in Enclosures 1 through 4.

The third 10-year inservice inspection interval began on May 11, 1998. As allowed by subarticle IWA-2430(d) of the ASME Code, Section XI, the third 10-year inspection interval was extended for one year. This extension enabled the examination of Unit 2 components to coincide with the B219R1 refueling outage, currently scheduled to begin February 28, 2009. As such, the third 10-year inspection interval for BSEP, Unit 1 concluded on May 10, 2008, and the third 10-year inspection interval for BSEP, Unit 2 will conclude on May 10, 2009.

Progress Energy Carolinas, Inc.
Brunswick Nuclear Plant
PO Box 10429
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No regulatory commitments are contained in this letter. Please refer any questions regarding this submittal to Mr. Gene Atkinson, Supervisor - Licensing/Regulatory Programs, at (910) 457-2056.

Sincerely,

Phyllis N. Mentel

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

WRM/wrm

Enclosures:

1. 10 CFR 50.55a Request Number RR-42
2. 10 CFR 50.55a Request Number RR-43
3. 10 CFR 50.55a Request Number RR-44
4. 10 CFR 50.55a Request Number RR-45

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10 CFR 50.55a Request Number RR-42

Proposed Alternative In Accordance with 10 CFR 50.55a(g)(5)(iii)

- Inservice Inspection Impracticality -

1. ASME Components Affected

Code Class:	1
References:	Subarticle IWB-2500, Table IWB-2500-1
Examination Categories:	B-D
Item Numbers:	B3.90
Description:	Volumetric Examination Coverage
Component Numbers:	Listed in Table 1, attached.

2. Applicable Code Edition and Addenda

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda.

3. Applicable Code Requirement

Subarticle IWB-2500 states, in part: "Components shall be examined and tested as specified in Table IWB-2500-1." Table IWB-2500-1 requires a volumetric examination or a surface and volumetric examination be performed on the component based on Category and Item Number.

Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., adopted and applied ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1*, (i.e., Reference 1) at the Brunswick Steam Electric Plant (BSEP) during the third 10-year inservice inspection interval. Code Case N-460 is applicable when the entire examination volume or area cannot be examined due to interference by another component or part geometry. Under such circumstances, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided that the reduction in coverage for that weld is less than 10 percent.

In October 2007, the NRC issued Regulatory Guide (RG) 1.147, Revision 15, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1* (i.e., Reference 2). In RG 1.147, the NRC identifies the ASME Code Cases they have determined to be acceptable alternatives to applicable sections of Section XI, and that those Code Cases may be used by licensees without requesting NRC authorization provided they are used with any identified

limitations or modifications. Table 1 of RG 1.147 lists the following Code Case as acceptable for use by a licensee with no identified limitations or modifications:

> Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1*

Code Case N-460 states, in part:

> When the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

NRC Information Notice (IN) 98-42 (i.e., Reference 3) states that the NRC determined that a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states, in part:

> The NRC has adopted and further refined the definition of 'essentially 100 percent' to mean 'greater than 90 percent' in 10 CFR 50.55a(g)(6)(ii)(A)(2) for required examination coverage of reactor pressure vessel welds. This standard has been applied to all examinations of welds and other areas required by ASME Section XI.

The applicable examination area or volume and method required from Table IWB-2500-1, for the affected components, is shown in Table 1.

4. Impracticality of Compliance

BSEP, Unit 1 systems and components were designed and fabricated before the examination requirements of the ASME Code, Section XI, were formalized and published. Therefore, the BSEP was not specifically designed to meet the requirements of the ASME Code, Section XI, and full compliance is not feasible or practical within the limits of the current plant design.

10 CFR 50.55a recognizes the limitations to inservice inspection of components in accordance with Section XI of the ASME Code that are imposed due to early plants' design and construction, as follows:

> 10 CFR 50.55a(g)(1):
>
> For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued before January 1, 1971, components (including supports) must meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical.

10 CFR 50.55a(g)(4):

Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2 and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and that are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and materials of construction of the components.

10 CFR 50.55a(g)(5)(iii):

If the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in § 50.4, information to support the determinations.

In accordance with 10 CFR 50.55a(g)(5)(iii), CP&L has determined that it is impractical to meet the examination coverage requirements of ASME Code Case N-460. The ASME Code, Section XI, requires volumetric (i.e., UT) examination of nozzle-to-vessel welds from two sides of the weld in order to be 100 percent complete. Due to nozzle configurations of these components, ultrasonic examinations are limited to scanning on the shell-side of the nozzle welds.

5. Burden Caused by Compliance

Compliance with the examination coverage requirements of the ASME Code, Section XI, would require modification, redesign, or replacement of components where geometry is inherent to the component design.

6. Proposed Alternative and Basis for Use

Proposed Alternative

In accordance with 10 CFR 50.55a(g)(5)(iii), relief is requested for the components listed in Table 1 on the basis that the required examination coverage of "essentially 100 percent" is impractical due to physical obstructions and the limitations imposed by design, geometry and materials of construction. No alternative examination is being proposed.

CP&L performed qualified examinations that achieved the maximum, practical amount of coverage obtainable within the limitations imposed by the design of the components. Additionally, as Class 1 examination Category B-P components, a visual (VT-2) examination is performed on these Reactor Coolant Pressure Boundary (RCPB) components during system pressure tests each refueling outage. This was completed during the 2007 refueling

outage (i.e., the B117R1 outage), and no evidence of leakage was identified for these components.

Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), CP&L requests relief from the requirements of the ASME Code, Section XI, Table IWB-2500-1, Category B-D, Item B3.90, and proposes to credit the completed exams as acceptable alternatives that provide reasonable assurance of continued structural integrity.

Basis for Use

Due to the design of these welds it was not feasible to effectively perform a volumetric examination of "essentially 100 percent" of the required volume. The nozzle-to-vessel welds are accessible from the vessel plate side of the weld and are examined to the extent practical.

Additional coverage for the limited areas was not achievable or practical, based on the latest qualified ultrasonic technology, nor by other considered examinations methods, such as radiography. CP&L has concluded that if significant degradation existed in the subject welds, it would have been identified by the examinations performed.

Additionally, as Class 1 examination category B-P components, VT-2 examinations were performed on the subject components in association with the RCPB system pressure test performed during the 2007 refueling outage. No evidence of leakage was identified during this system test.

The BSEP reactor vessel water chemistry is controlled in accordance with the 2004 revision to the BWR Water Chemistry Guidelines (i.e., Reference 4). Also, a Hydrogen Water Chemistry System is used to reduce the oxidizing environment in the reactor coolant. These additional measures provide added assurance against the initiation of cracking or corrosion from the inside surface of the reactor vessel. An inerted primary containment environment during operation provides assurance of corrosion protection on the outside surface of the reactor vessel.

The provisions described above as an alternative to the Code requirement will continue to provide reasonable assurance of the structural integrity of the subject welds. The examinations were completed to the extent practical and evidenced no unacceptable flaws present. VT-2 examinations performed on the subject components during system pressure testing each refueling outage, in accordance with Examination Category B-P, provide continued assurance that the structural integrity of the subject components is maintained. Additionally, the BSEP Water Chemistry Program and inerted primary containment environment provide added measures of protection for the component materials.

6. Duration of the Proposed Alternative

Use of the proposed alternative is applicable to the third 10-year inservice inspection interval at BSEP, Unit 1. The third 10-year interval began on May 11, 1998, and ended on May 10, 2008.

7. Precedents

1. CP&L submitted a similar relief request in the second 10-year interval (i.e., see CP&L's letter dated February 19, 1999, Serial: BSEP 99-0009, which submitted Relief Request RR-12, Revision 1). In a Safety Evaluation Report issued February 1, 2000, TAC No. MA4869 and MA4870, Relief Request RR-23 was approved.

8. References

1. Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1.*

2. NRC Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1*, Revision 15, October 2007.

3. NRC Information Notice 98-42, *Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements*, December 1, 1998.

4. *BWRVIP-130: BWR Water Chemistry Guidelines – 2004 Revision*, Electric Power Research Institute Topical Report TR-1008192, October 2004.

TABLE 1				
Component ID	**System and Component Description**	**Required Examination Volume**	**Percent Coverage Obtained**	**Remarks**
1B11-RPV-N2F	Reactor Vessel, Recirculation Inlet, Nozzle N2F	ASME Code, Figure IWB-2500-7(b)	57.7%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N2G	Reactor Vessel, Recirculation Inlet, Nozzle N2G	ASME Code, Figure IWB-2500-7(b)	57.7%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N2H	Reactor Vessel, Recirculation Inlet, Nozzle N2H	ASME Code, Figure IWB-2500-7(b)	57.7%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N2J	Reactor Vessel, Recirculation Inlet, Nozzle N2J	ASME Code, Figure IWB-2500-7(b)	57.7%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.

TABLE 1				
Component ID	**System and Component Description**	**Required Examination Volume**	**Percent Coverage Obtained**	**Remarks**
1B11-RPV-N2K	Reactor Vessel, Recirculation Inlet, Nozzle N2K	ASME Code, Figure IWB-2500-7(b)	57.7%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N3A	Reactor Vessel, Main Steam, Nozzle N3A	ASME Code, Figure IWB-2500-7(b)	57.6%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N3B	Reactor Vessel, Main Steam, Nozzle N3B	ASME Code, Figure IWB-2500-7(b)	57.6%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N3C	Reactor Vessel, Main Steam, Nozzle N3C	ASME Code, Figure IWB-2500-7(b)	57.6%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.

TABLE 1				
Component ID	**System and Component Description**	**Required Examination Volume**	**Percent Coverage Obtained**	**Remarks**
1B11-RPV-N3D	Reactor Vessel, Main Steam, Nozzle N3D	ASME Code, Figure IWB-2500-7(b)	57.6%	Examination limited due to nozzle configuration. Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N6A	Reactor Vessel, Head Spray Nozzle N6A	ASME Code, Figure IWB-2500-7(b)	45.3%	Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N6B	Reactor Vessel, Head Spray Nozzle N6B	ASME Code, Figure IWB-2500-7(b)	45.3%	Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N7	Reactor Vessel, Head Instrument Penetration, Nozzle N7	ASME Code, Figure IWB-2500-7(b)	45.3%	Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N10	Reactor Vessel, Core Differential Pressure Instrumentation, Nozzle N10	ASME Code, Figure IWB-2500-7(b)	44.5%	Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.

TABLE 1				
Component ID	**System and Component Description**	**Required Examination Volume**	**Percent Coverage Obtained**	**Remarks**
1B11-RPV-N12A	Reactor Vessel, Level Instrumentation, Nozzle N12A	ASME Code, Figure IWB-2500-7(b)	44.5%	Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.
1B11-RPV-N12B	Reactor Vessel, Level Instrumentation, Nozzle N12B	ASME Code, Figure IWB-2500-7(b)	44.5%	Examination performed prior to implementation of Appendix VIII, Supplements 4 and 6.

COVERAGE CALCULATION FOR 1B11-RPV-N2F, N2G, N2H, N2J, N2K

See Fig. 1 for examination areas and coverage

Weld Required Volume (WRV) (AEHD) = 53.4 in²
Weld (BCFG) = 8.4 in² = 15.7% of WRV
Base Metal = (53.4 - 8.4) = 45 in² = 84.3% of WRV

0° (JMHD)

33 in²= 61.8%

45° Circ. CW (JMHD)

WELD = 100%

BM = 33 in² = 61.8%

=> 45° Circ CW coverage = 15.7 + (.618)(84.3) = 67.8%

45° Circ. CCW (JMEHD)

WELD = 100%

BM = 33 in² = 61.8%

=> 45° Circ CW coverage = 15.7 + (.618)(84.3) = 67.8%

60° Circ. CW (JMEHD)

WELD = 100%

BM = 33 in² = 61.8%

=> 45° Circ CW coverage = 15.7 + (.618)(84.3) = 67.8%

60° Circ. CCW (JMEHD)

WELD = 100%

BM = 33 in² = 61.8%

=> 45° Circ CW coverage = 15.7 + (.618)(84.3) = 67.8%

45° axial in (JbEHD)

WELD = 100%

BM = 37.8 in² = 84%

=> 45° axial in coverage = 15.7 + (.84)(84.3) = 86.5%

45° axial out = 0%

60° axial in (JaEHD)

WELD = 100%

BM = 39.9 in^2 = 88.7%

=> 60° axial in coverage = 15.7 + (.887)(84.3) = 90.4%

60° axial out = 0%

TOTAL COVERAGE = (61.8 +67.8 + 67.8 + 67.8 + 67.8 +86.5 + 90.4 + 0 + 0)/9

⇨ **Total Coverage = 57.7%**

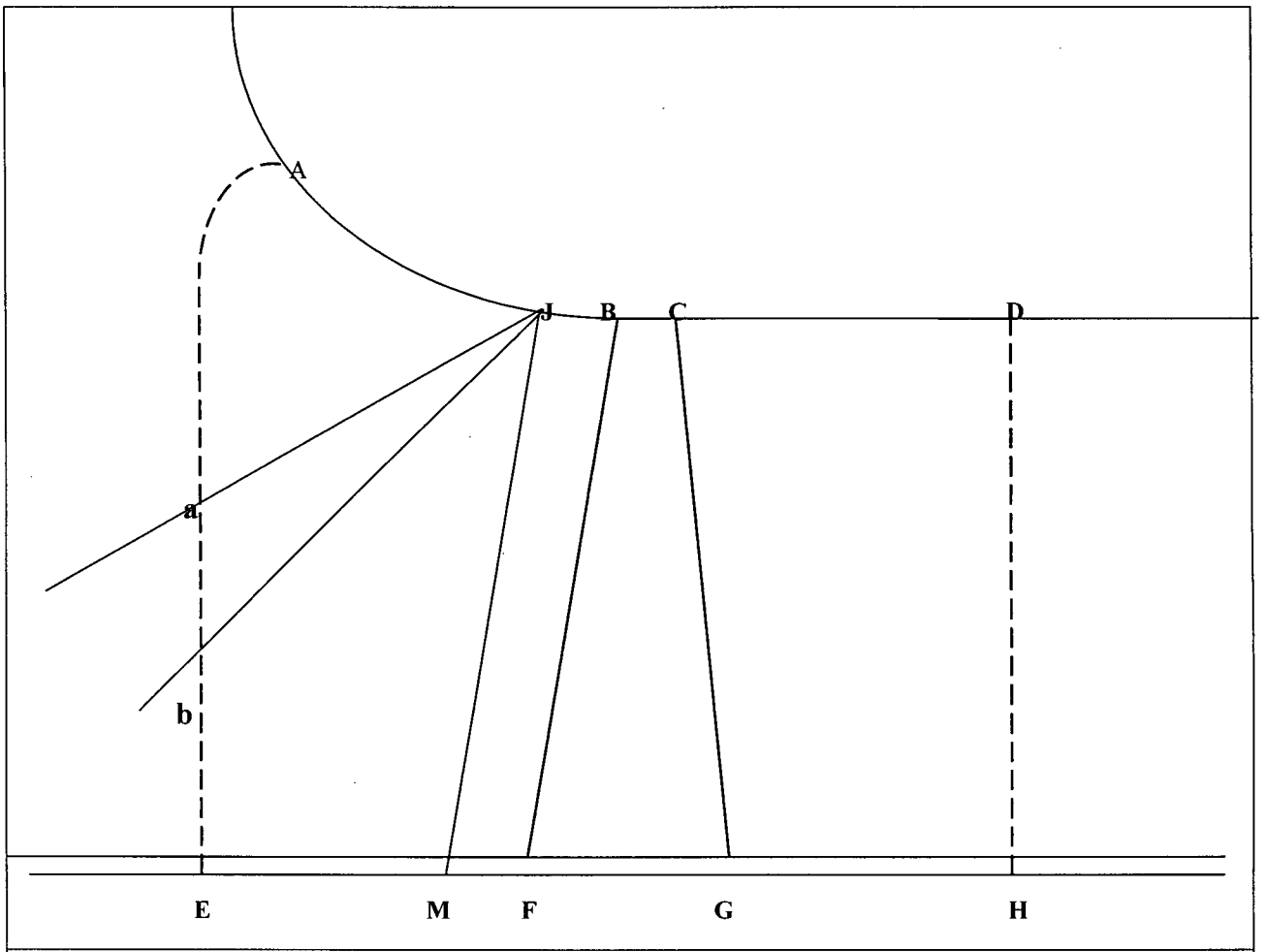

Figure 1
N2 Nozzle Coverage

Coverage Calculation for 1B11-RPV-N3A, N3B, N3C, N3D

See Figure 2 for examination areas and coverage

0° (JMEHD)

34.8 in^2= 67.7%

45° Circ. CW (JMEHD)

WELD = 100%

BM = 26.4 in^2 = 61.3%

=> 45° Circ CW coverage = 16.3 + (.613)(83.7) = 67.6%

45° Circ. CCW (JMEHD)

WELD = 100%

BM = 26.4 in^2 = 61.3%

=> 45° Circ CW coverage = 16.3 + (.613)(83.7) = 67.6%

60° Circ. CW (JMEHD)

WELD = 100%

BM = 26.4 in^2 = 61.3%

=> 45° Circ CW coverage = 16.3 + (.613)(83.7) = 67.6%

60° Circ. CCW (JMEHD)

WELD = 100%

BM = 26.4 in^2 = 61.3%

=> 45° Circ CW coverage = 16.3 + (.613)(83.7) = 67.6%

45° axial in (JbEHD)

WELD = 100%

BM = 37.2 in^2 = 86.6%

=> 45° axial in coverage = 16.3 + (.866)(83.7) = 88.8%

45° axial out = 0%

60° axial in (JaEHD)

WELD = 100%

BM = 38.8 in^2 = 90.3%

=> 60° axial in coverage = 16.3 + (.903)(83.7) = 91.9%

60° axial out = 0%

TOTAL COVERAGE = (67.7 +67.6 + 67.6 + 67.6 + 67.6 +88.8 + 91.4 + 0 + 0)/9

⇨ **Total Coverage = 57.6%**

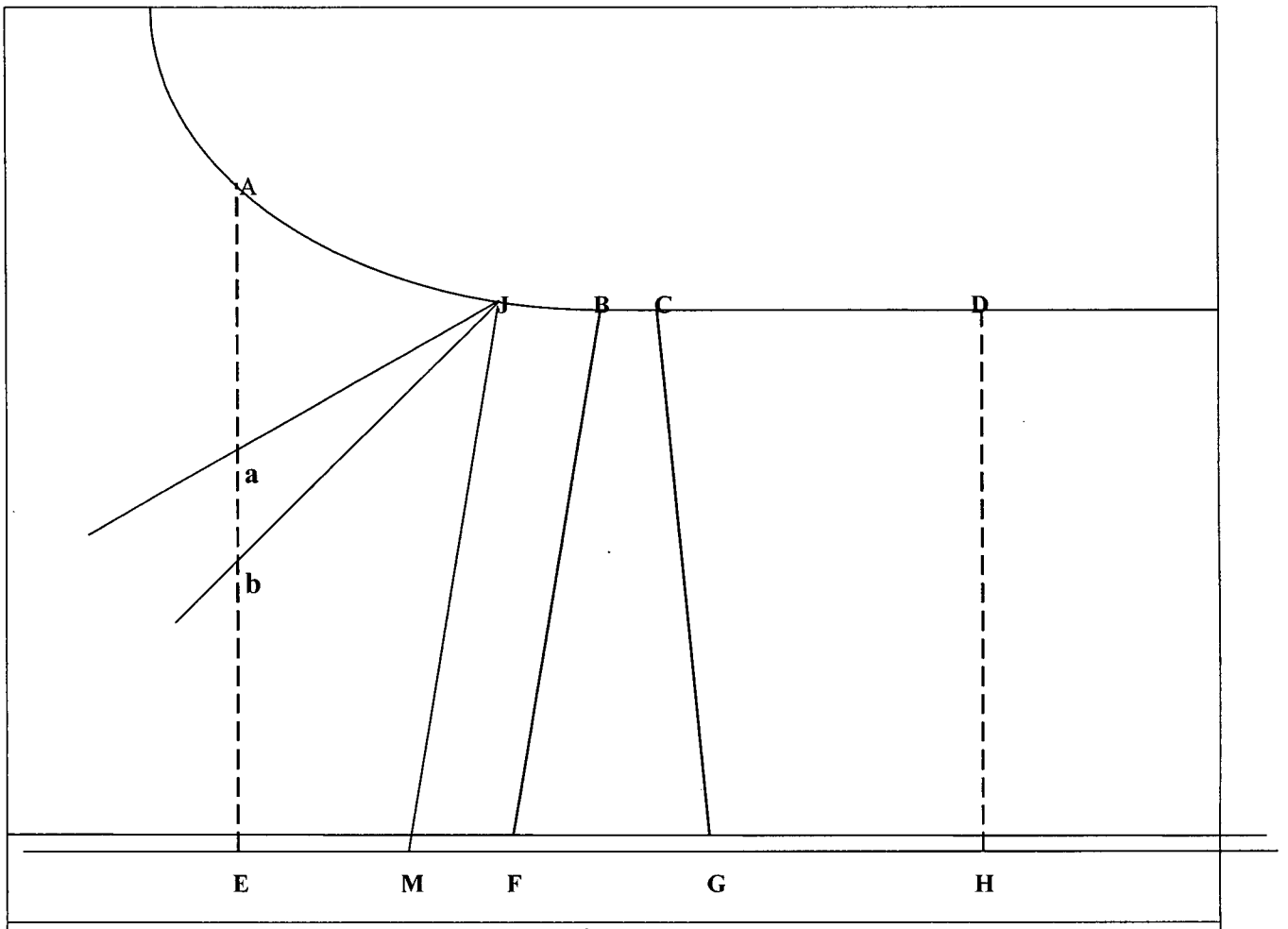

Figure 2
N3 Nozzle Coverage

Coverage Calculation for 1B11-RPV-N6A, N6B, N7

See Figure 3 for examination areas and coverage

0° Coverage (CHKE)

6.3 in^2= 46.7%

45° Circ. CW (CHKE)

WELD (CHJD) = 1.1 in^2 = 48.7%

BM (DJKE)= 5.5 in^2 = 48.7% => (.167)(48.7) + (.833)(48.7) = 48.7%

45° Circ. CCW (CHKE)

WELD (CHJD) = 1.1 in^2 = 48.7%

BM (DJKE)= 5.5 in^2 = 48.7% => (.167)(48.7) + (.833)(48.7) = 48.7%

60° Circ. CW (CHKE)

WELD (CHJD) = 1.1 in^2 = 48.7%

BM (DJKE)= 5.5 in^2 = 48.7% => (.167)(48.7) + (.833)(48.7) = 48.7%

60° Circ. CCW (CHKE)

WELD (CHJD) = 1.1 in^2 = 48.7%

BM (DJKE)= 5.5 in^2 = 48.7% => (.167)(48.7) + (.833)(48.7) = 48.7%

45° axial in

WELD (DCcGJ)= 100%

BM (ECfFK) = 8.52 in^2 = 75.7% => 16.7 + (.833)(75.7) = 79.8%

45° axial out(weld) = 0%

60° axial in

WELD(DCaGJ) = 100%

BM = 9.36 in^2 = 83.2% => 16.7 + (.833)(83.2) = 86%

60° axial out = 0%

TOTAL COVERAGE = (46.7 + 48.7 + 48.7 = 48.7 + 48.7 + 79.8 + 86+0 + 0)/9

⇨ **Total Coverage = 45.3%**

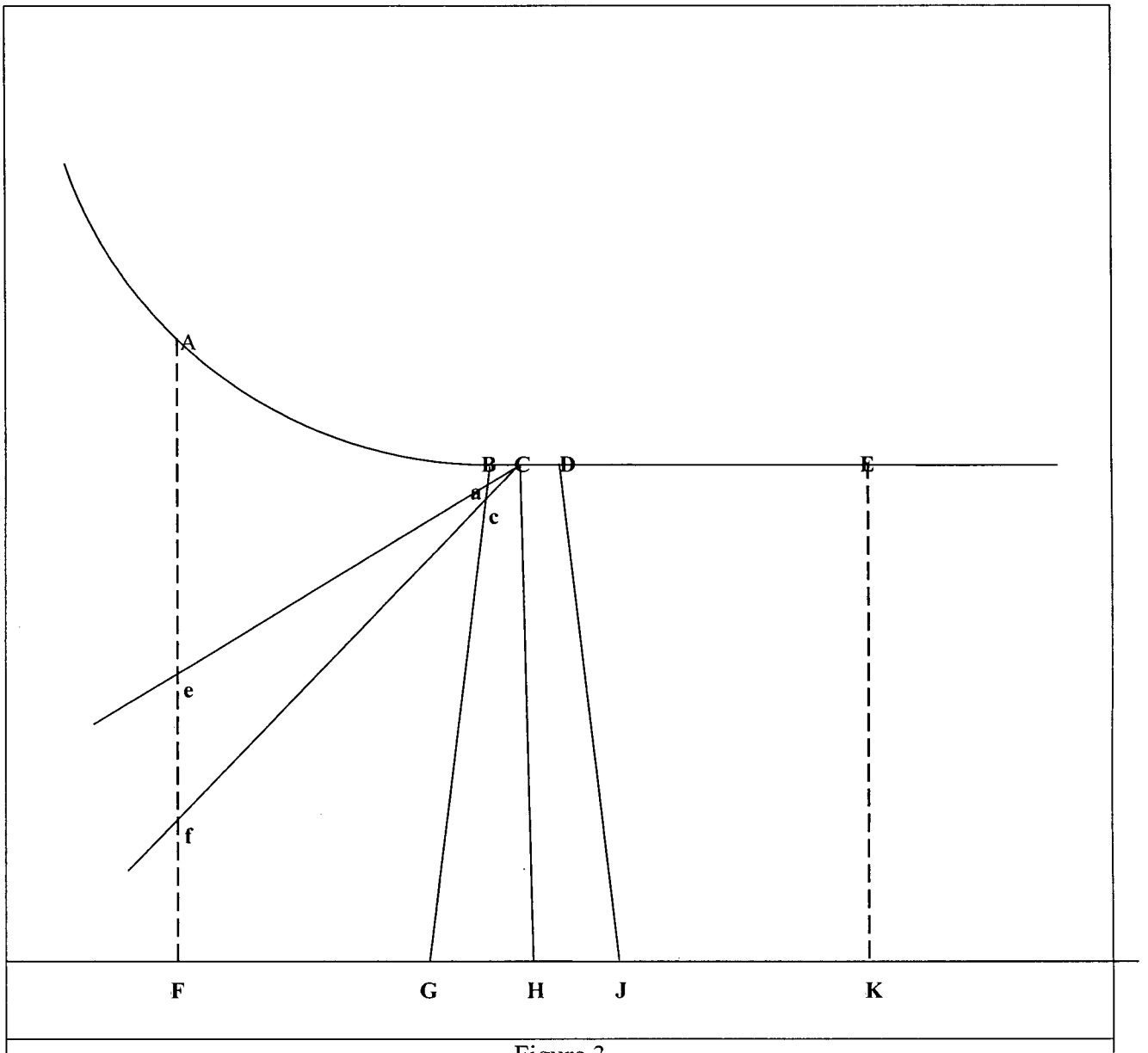

Figure 3
N6 and N7 Nozzle Coverage

Coverage Calculation for 1B11-RPV-N10, N12A, N12B

See Figure 4 for examination areas and coverage

0° Coverage (DBCH)

24.6 in²= **46.7%**

45° Circ. CW (BCHD)

WELD (CBcG)= 5.5 in² = 64.7%

BM = 19.8 in² = 44.7%

=> 45° Circ CW coverage = (.647)16.1 + (.447)83.9 = 47.9%

45° Circ. CCW BCHD)

WELD (CBcG)= 5.5 in² = 64.7%

BM = 19.8 in² = 44.7%

=> 45° Circ CCW coverage = (.647)16.1 + (.447)83.9 = 47.9%

60° Circ. CW (BCHD)

WELD (CBcG)= 5.5 in² = 64.7%

BM = 19.8 in² = 44.7%

=> 60° Circ CW coverage = (.647)16.1 + (.447)83.9 = 47.9%

60° Circ. CCW (BCHD)

WELD (CBcG)= 5.5 in² = 64.7%

BM = 19.8 in² = 44.7%

=> 60° Circ CCW coverage = (.647)16.1 + (.447)83.9 = 47.9%

45° axial in (BbEHD)

WELD (BCFG)= 100%

BM = 32.3 in² = 73.1%

=> 45° axial in coverage = 16.1 + (.731)(83.9) = 77.4%

45° axial out = 0%

60° axial in

WELD (BCFG)= 100%

BM = 36.3 in^2 = 82.1%

=> 60° axial in coverage 16.1 + (.821)(83.9) = 85%

60° axial out = 0%

TOTAL COVERAGE = (46.7 +49.7 + 49.7 + 49.7 + 49.7 +77.4 + 85 + 0 + 0)/9

⇨ **Total Coverage = 44.5%**

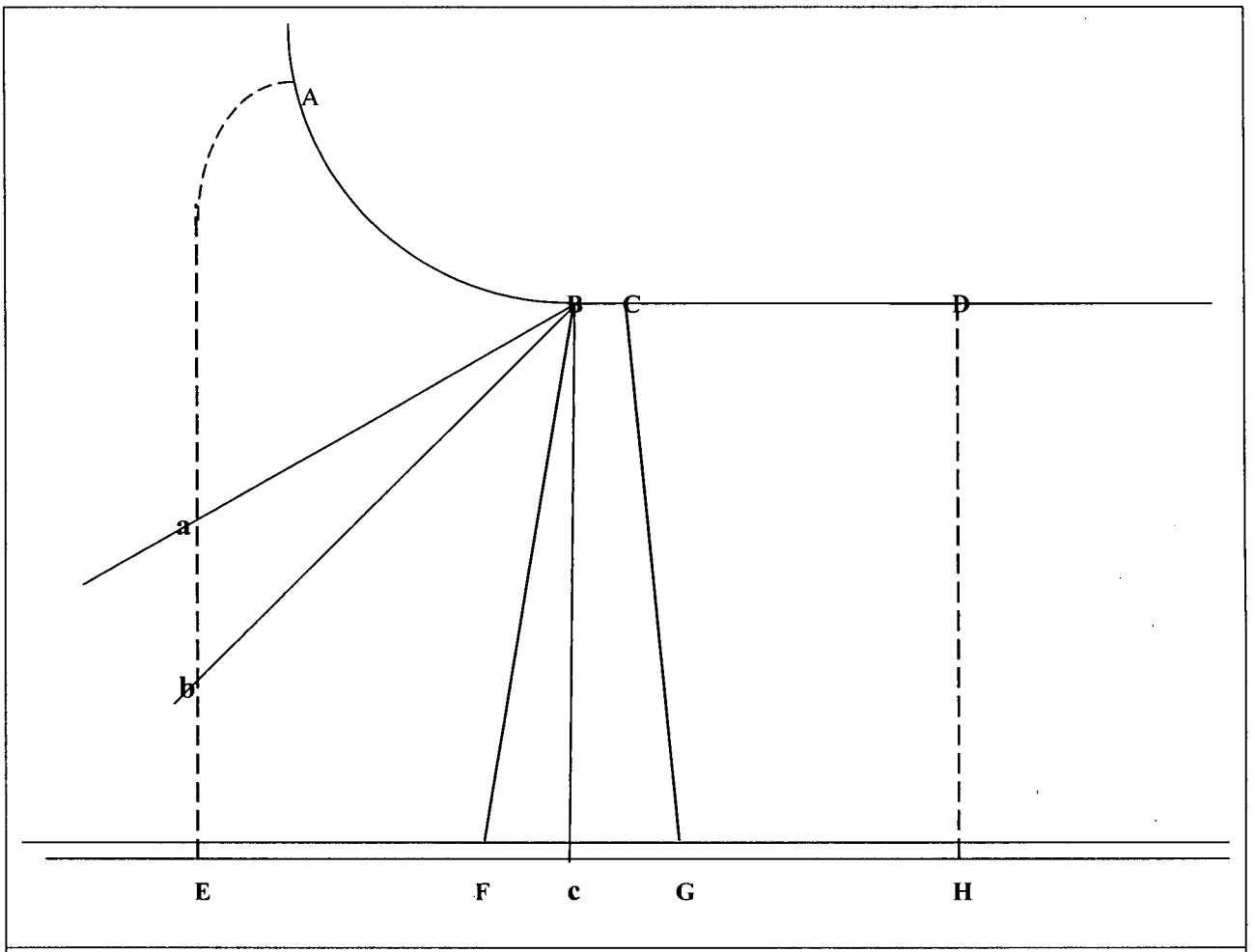

Figure 4
N10 and N12 Nozzle Coverage

10 CFR 50.55a Request Number RR-43

Proposed Alternative In Accordance with 10 CFR 50.55a(g)(5)(iii)

- Inservice Inspection Impracticality -

1. ASME Components Affected

Code Class:	1
References:	Subarticle IWB-2500, Table IWB-2500-1
Examination Categories:	R-A
Item Numbers:	Listed in Table 2, attached.
Description:	Limited Coverage for Welds in Examination Category R-A, Pressure Retaining Piping Welds
Component Numbers:	Listed in Table 2, attached.

2. Applicable Code Edition and Addenda

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda.

3. Applicable Code Requirement

By letter dated April 20, 2001 (i.e., Reference 1), Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., submitted the initial Risk-Informed Inservice Inspection (RI-ISI) Program for the Brunswick Steam Electric Plant (BSEP). The initial RI-ISI Program was developed using the process described in Electric Power Research Institute (EPRI) Topical Report (TR) 112657, Revision B-A, *Revised Risk-Informed Inservice Inspection Evaluation Procedure*, and using ASME Code Case N-578, *Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method B* (i.e., Reference 2). The program was approved for use by the NRC in a Safety Evaluation issued by letter dated November 28, 2001 (i.e., Reference 3).

This relief request applies to thirty-two (32) ASME Code Class 1 pressure-retaining piping welds. These welds consist of two Category B-F welds and 30 Category B-J welds. In the Brunswick RI-ISI Program, these welds correspond to Item R1.20 welds using the format in Code Case N-578-1. Use of Code Case N-578-1 nomenclature is not intended to imply that the BSEP RI-ISI Program is based on Code Case N-578-1. Code Case N-578-1 is an unapproved code case, as shown in Regulatory Guide (RG) 1.193 (i.e., Reference 4), and BSEP has not requested nor received approval to implement Code Case N-578-1. Rather, to maintain consistency with established ASME Code, Section XI conventions, the weld

categorization scheme of Code Case N-578-1 was adopted at BSEP to assist in assigning weld examination requirements. Code Case N-578-1 establishes a "R-A" weld category and weld item numbers R1.10 through R1.20, which allows BSEP to categorize RI-ISI piping welds in a manner similar to the standard ASME Section XI pipe weld program.

The applicable ASME Code Category and item numbers, and the corresponding RI-ISI Program Item Number, are shown in the attached Table 2.

Subarticle IWB-2500 states, in part: "Components shall be examined and tested as specified in Table IWB-2500-1." Table IWB-2500-1 requires a volumetric examination or a surface and volumetric examination be performed on the components based on their category and item numbers.

Figure IWB-2500-8 requires a volumetric examination of a minimum volume of the inner 1/3 thickness of the weldment. The weldment consists of the weld and the base material on each side of the weld equal to a distance of 1/4 inch on each side of the weld crown. In addition, the ultrasonic examination must meet the performance demonstration requirements in the ASME Code, Section XI, Appendix VIII. Essentially 100 percent of the required volume of each weld must be inspected. Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds* (i.e., Reference 5), is applicable when the entire examination volume or area cannot be examined due to interference by another component or part geometry. Under such circumstances, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided that the reduction in coverage for that weld is less than 10 percent.

In October 2007, the NRC issued RG 1.147, Revision 15, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1* (i.e., Reference 6). In RG 1.147, the NRC identifies the ASME Code Cases they have determined to be acceptable alternatives to applicable sections of Section XI, and that those Code Cases may be used by licensees without requesting NRC authorization provided they are used with any identified limitations or modifications. Table 1 of RG 1.147 lists the following Code Case as acceptable for use by a licensee with no identified limitations or modifications:

> Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1*

Code Case N-460 (i.e., Reference 5) states, in part:

> When the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

NRC Information Notice (IN) 98-42 (i.e., Reference 7) states that the NRC determined that a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states, in part:

> The NRC has adopted and further refined the definition of 'essentially 100 percent' to mean 'greater than 90 percent' in 10 CFR 50.55a(g)(6)(ii)(A)(2) for required examination coverage of reactor pressure vessel welds. This standard has been applied to all examinations of welds and other areas required by ASME Section XI.

4. Impracticality of Compliance

The BSEP, Unit 1 systems and components were designed and fabricated before the examination requirements of the ASME Code, Section XI, were formalized and published. Therefore, the BSEP was not specifically designed to meet the requirements of the ASME Code, Section XI, and full compliance is not feasible or practical within the limits of the current plant design.

10 CFR 50.55a recognizes the limitations to inservice inspection of components in accordance with Section XI of the ASME Code that are imposed due to early plants' design and construction, as follows:

> 10 CFR 50.55a(g)(1):
>
> For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued before January 1, 1971, components (including supports) must meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical.
>
> 10 CFR 50.55a(g)(4):
>
> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2 and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and that are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and materials of construction of the components.
>
> 10 CFR 50.55a(g)(5)(iii):
>
> If the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in § 50.4, information to support the determinations.

In accordance with 10 CFR 50.55a(g)(5)(iii), CP&L has determined that it is impractical to meet the examination coverage requirements of Code Case N-460. The ASME Code, Section XI, requires volumetric (i.e., UT) examination of the welds from two sides of the weld in order to be 100 percent complete. Due to the configurations of these components, ultrasonic examinations are limited to a single-sided examination for twenty-seven (27) of the components and limited due to structural interferences for five (5) of the components.

5. Burden Caused by Compliance

Compliance with the examination coverage requirements of the ASME Code, Section XI, would require modification, redesign, or replacement of components where geometry is inherent to the component design.

6. Proposed Alternative and Basis for Use

Proposed Alternative

In accordance with 10 CFR 50.55a(g)(5)(iii), relief is requested for the components listed in Table 2 on the basis that the required examination coverage of "essentially 100 percent" is impractical due to physical obstructions and the limitations imposed by design, geometry, and materials of construction. No alternative examination is being proposed.

CP&L performed qualified examinations that achieved the maximum, practical amount of coverage obtainable within the limitations imposed by the design of the components. Additionally, as Class 1 examination Category R-A components, a visual (VT-2) examination is performed on the subject components of the Reactor Coolant Pressure Boundary (RCPB) during system pressure tests each refueling outage. This was completed during the 2007 refueling outage (i.e., the B117R1 outage) and no evidence of leakage was identified for these components.

Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), CP&L requests relief from the requirements of the ASME Code, Section XI, Table IWB-2500-1, Category B-J, Items B9.11 and B9.31, and Category B-F, Items B5.10 and 5.130, and proposes to utilize the completed exams as acceptable alternatives that provide reasonable assurance of continued structural integrity.

Basis for Use

The CP&L Nondestructive Examination (NDE) procedures incorporate inspection techniques qualified under Appendix VIII of the ASME Code, Section XI, by the Performance Demonstration Initiative (PDI) for examination of the subject welds. For welds listed in Table 2, an ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI.

Additionally, as Class 1 examination category B-P components, VT-2 examinations were performed on the subject components in association with the RCPB system pressure test performed during the 2007 refueling outage. No evidence of leakage was identified during this system test.

The provisions described above as an alternative to the Code requirement will continue to provide reasonable assurance of the structural integrity of the subject welds. Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), CP&L requests relief from the ASME Code, Section XI, examination requirements for the subject welds.

6. Duration of the Proposed Alternative

Use of the proposed alternative is applicable to the third 10-year inservice inspection interval at BSEP, Unit 1. The third 10-year interval began on May 11, 1998, and ended on May 10, 2008.

7. References

1. Letter from David C. Dicello (CP&L to the U.S. Nuclear Regulatory Commission Document Control Desk, *Third 10-Year Inservice Inspection Program – Request for Approval of Risk-Informed Inservice Inspection Program*, April 20, 2001, ADAMS Accession Number ML011170157.

2. Electric Power Research Institute (EPRI) Topical Report (TR) 112657, Revision B-A, *Revised Risk-Informed Inservice Inspection Evaluation Procedure*, and using ASME Code Case N-578, *Risk-Informed Requirements for Class 1, 2, and 3 Piping, Method B.*

3. Letter from Richard P. Correia (NRC) to J. S. Keenan (CP&L), *Safety Evaluation for the Risk-Informed Inservice Inspection (RI-ISI) Program (TAC Nos. MB1760 and MB1761)*, November 28, 2001, ADAMS Accession Number ML013320632.

4. NRC Regulatory Guide 1.193, *ASME Code Cases Not Approved for Use*, Revision 2, October 2007.

5. Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1.*

6. NRC Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1*, Revision 15, October 2007.

7. NRC Information Notice 98-42, *Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements*, December 1, 1998.

TABLE 2						
Weld	**ASME IWB-2500 Category**	**ASME IWB-2500 Item No.**	**ASME Code Case N-578-1 Item No.**	**Description**	**Coverage**	**Limitation**
1B32RECIRC-28-A-9BC-1	B-J	B9.31	R1.20	Pipe – WOL	50%	Config. single sided exam
1B32RECIRC-28-A-15BC-1	B-J	B9.31	R1.20	Pipe – WOL	42.7%	Config. single sided exam
1B32RECIRC-28-A-11	B-J	B9.11	R1.20	Elbow - Pump	50%	Config. single sided exam
1B32RECIRC-28-A-12BC	B-J	B9.31	R1.20	Pipe – WOL	41.3%	Config. single sided exam
1B32RECIRC-28-A-8	B-J	B9.11	R1.20	Elbow - Pump	50%	Config. single sided exam
1B32RECIRC-22-AM-5BCA	B-J	B9.31	R1.20	Pipe – SOL	50%	Config. single sided exam
1B32RECIRC-28-A-9	B-J	B9.11	R1.20	Valve - Pipe	50%	Config. single sided exam
1B11N8A-JPI-FWR122-1	B-J	B9.11	R1.20	SE - Penetration	50%	Config. single sided exam
1B32FFE-12-FWRRB14A	B-J	B9.11	R1.20	Pipe – SOL	50%	Config. single sided exam
1B21N4D-5-FWN4D315-3	B-J	B9.11	R1.20	SE -SE	86.7%	Safe End taper
1B21N4D-5-SW1-2	B-F	B5.10	R1.14	SE -Pipe	84.8%	Adjacent weld crown
1B32FFE-12-FWRRA10A	B-J	B9.11	R1.20	Pipe – SOL	50%	Config. single sided exam
1B32RECIRC-22-AM-4	B-J	B9.11	R1.20	Pipe – Tee	43.2%	Config. single sided exam
1B32RECIRC-22-BM-5	B-J	B9.11	R1.20	Pipe – Valve	50%	Config. single sided exam
1B32RECIRC-28-A-13	B-J	B9.11	R1.20	Pipe – Valve	50%	Config. single sided exam
1B32RECIRC-28-A-5	B-J	B9.11	R1.20	Pipe – Tee	50%	Config. single sided exam
1B32RECIRC-28-B-11	B-J	B9.11	R1.20	Elbow - Pump	50%	Config. single sided exam
1B32RECIRC-28-B-12BC	B-J	B9.31	R1.20	Pipe – WOL	50%	Config. single sided exam
1B32RECIRC-28-B-15BC	B-J	B9.31	R1.20	Pipe – WOL	50%	Config. single sided exam
1B32RECIRC-28-B-2	B-J	B9.11	R1.20	Pipe – WOL	50%	Config. single sided exam
1B32RECIRC-28-B-9	B-J	B9.11	R1.20	Valve - Pipe	50%	Config. single sided exam
1B32RECIRC-28-B-9BC	B-J	B9.31	R1.20	Pipe – WOL	50%	Config. single sided exam
1B32RECIRC-28-B-16	B-J	B9.11	R1.20	Pipe – Tee	50%	Config. single sided exam
1B32RS2B2-10-FWB39	B-J	B9.11	R1.20	Pipe – Tee	50%	Config. single sided exam
1G3115-1-15-FWRWCUB2A	B-F	B5.130	R1.20	Valve - Pipe	50%	Config. single sided exam
1B32FFG-12-FWRRA11A	B-J	B9.11	R1.20	Pipe – SOL	50%	Config. single sided exam
1G31PC1-1-FWRWCUC1A	B-J	B9.11	R1.20	Nozzle - pipe	50%	Config. single sided exam

TABLE 2						
Weld	**ASME IWB-2500 Category**	**ASME IWB-2500 Item No.**	**ASME Code Case N-578-1 Item No.**	**Description**	**Coverage**	**Limitation**
1E21FF-8-FW1CS30	B-J	B9.11	R1.20	Elbow – elbow	84.4%	Support
1B32RECIRC-22-AM-3BCA	B-J	B9.31	R1.20	Pipe – SOL	35%	Config. single sided exam; Overlay of adjacent circ. weld
1B32RECIRC-22-AM-3BCB	B-J	B9.31	R1.20	Pipe – SOL	50%	Config. single sided exam
1B214-2-4-FWRFWB6	B-J	B9.11	R1.20	Pipe – valve	66% MT	Misc. structural supports/grating
1B21PS2A3-24-SWJ	B-J	B9.12	R1.20	Valve – Elbow	50% MT	Whip restraint

Weld 1B32RECIRC-28-A-9BC-1

This is a stainless steel-to-stainless steel branch connection (weld-o-let) weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is D2. This weld was examined twice during the third inspection interval

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI Performance Demonstration Initiative (PDI), achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-15BC-1

This is a stainless steel-to-stainless steel branch connection (weld-o-let) weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2) and the IGSCC category is D2. This weld was examined twice during the third inspection interval.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 42.7% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-11

This is a stainless steel-to-stainless steel elbow-to-pump weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-12BC

This is a stainless steel-to-stainless steel branch connection (weld-o-let) weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is D2. This weld was examined twice during the third inspection interval

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 41.3% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-8

This is a stainless steel-to-stainless steel elbow-to-pump weld. Due to configuration this is a one sided examination. The risk category for this weld is 4(2), and the IGSCC category is E1. This weld was examined three times during the third inspection interval and is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-AM-5BCA

This is a stainless steel-to-stainless steel branch connection (sock-o-let) weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4, and the IGSCC category is A3. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-9

This is a stainless steel to stainless steel valve-to-pipe weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI Performance PDI, achieving 50% coverage of the Code-required volume.

Weld 12B11N8A-JPI-FWR122-1

This is a stainless steel-to-stainless steel safe-end-to-penetration weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is E1. This weld was examined three times during the third inspection interval and is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32FFE-12-FWRRB14A

This is a stainless steel-to-stainless steel branch connection (sock-o-let) weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is B. This weld was examined twice during the third inspection interval and is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B21N4D-5-FWN4D315-3

This is a stainless steel-to-stainless steel safe-end-to-safe-end weld. Due to configuration, this weld can only be partially examined from the downstream side. The risk category for this weld is 4(2), and the IGSCC category is D3.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 86.7% coverage of the Code-required volume.

Weld 1B21N4D-5-SW1-2

This is a stainless steel-to-stainless steel safe-end-to-pipe weld that is partially limited on the downstream side by an adjacent weld crown. The risk category for this weld is 2(1), and the IGSCC category is D1.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 84.8% coverage of the Code-required volume.

Weld 1B32FFF-12-FWRRA10A

This is a stainless steel-to-stainless steel branch connection (sweep-o-let) weld. Due to configuration this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is B. This weld also received a penetrant examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-22-AM-4

This is a stainless steel-to-stainless steel pipe-to-tee weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 43.2% coverage of the Code-required volume.

Weld 1B32RECIRC-22-BM-5

This is a stainless steel-to-stainless steel pipe-to-valve weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-13

This is a stainless steel-to-stainless steel pipe-to-valve weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-A-5

This is a stainless steel-to-stainless steel pipe-to-tee weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This weld was examined twice during the third inspection interval and is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-11

This is a stainless steel-to-stainless steel elbow-to-pump weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-12BC

This is a stainless steel-to-stainless steel branch connection (weld-o-let) weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is D2. This weld was examined twice during the third inspection interval.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-15BC

This is a stainless steel-to-stainless steel branch connection (weld-o-let) weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is D2. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-2

This is a stainless steel-to-stainless steel safe-end-to-pipe weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-9

This is a stainless steel-to-stainless steel pipe-to-valve weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination. This weld also received a penetrant examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-9BC

This is a stainless steel-to-stainless steel branch connection (weld-o-let) weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is D3.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RECIRC-28-B-16

This is a stainless steel-to-stainless steel pipe-to-tee weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32RS2B2-10-FWB39

This is a stainless steel-to-stainless steel pipe-to-tee weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is C4. This is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1G3115-1-15-FWRWCUB2A

This is a stainless steel valve to carbon steel pipe weld. Due to configuration, this is a one sided examination. The risk category for this weld is 4(1), and the IGSCC category is D1. This weld was examined twice during the third inspection interval.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B32FFG-12-FWRRA11A

This is a stainless steel to stainless steel branch connection (sweep o let) weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is B. This weld is an additional weld not originally scheduled for examination.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1G31PC1-1-FWRWCUC1A

This is a stainless steel-to-stainless steel nozzle-to-pipe weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4(2), and the IGSCC category is D3.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1E21FF-8-FW1CS30

This is a carbon steel-to-carbon steel elbow-to-elbow weld. This weld is limited at two locations by a whip restraint. The risk category for this weld is 4.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 84.4% coverage of the Code-required volume.

Weld 1B32RECIRC-22-AM-3BCA

This is a stainless steel-to-stainless steel branch connection (sweep o let) weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4 and the IGSCC category is A3.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI. The weld is approximately 80 inches in length. 30% of the weld (i.e., 24 inches) receives 0% coverage due to the overlay of the adjacent circumferential weld and sweep-o-let configuration. The remaining 70% receives 50% coverage (one-sided examination) giving a combined 35% coverage of the Code-required volume.

Weld 1B32RECIRC-22-AM-3BCB

This is a stainless steel to stainless steel branch connection (sweep-o-let) weld. Due to configuration, this is a one-sided examination. The risk category for this weld is 4, and the IGSCC category is A3.

An ultrasonic examination was performed with examination personnel and examination procedures qualified to ASME Code, Appendix VIII, as administered by the EPRI PDI, achieving 50% coverage of the Code-required volume.

Weld 1B214-2-4-FWRFWB6

This is a carbon steel-to-carbon steel pipe-to-valve weld. The risk category is 4(1).

The bottom third of this weld is not accessible for MT due to proximity of an I-beam and floor grating. The weld received a code MT examination, achieving 66% code coverage. Since this examination was performed, CP&L has adopted ASME Code Case N-663, and MT examination of this weld is no longer required.

Weld 1B21PS2A3A3-24-SWJ

This is a carbon steel-to-carbon steel pipe-to-elbow weld. The risk category is 4.

The bottom half of this weld is not accessible for MT due to proximity of a whip restraint. The weld received a code MT examination, achieving 50% code coverage. Since this examination was performed, CP&L has adopted ASME Code Case N-663 and MT examination of this weld is no longer required.

10 CFR 50.55a Relief Request Number RR-44

Proposed Alternative In Accordance with 10 CFR 50.55a(g)(5)(iii)

- Inservice Inspection Impracticality -

1. ASME Components Affected

Code Class:	1
References:	Subarticle IWB-2500, Table IWB-2500-1
Examination Categories:	B-A, "Pressure Retaining Welds in Reactor Vessel"
Item Number:	B1.22, "Head Welds, Meridional" B1.30, "Shell to Flange Welds"
Description:	Volumetric examination
Component Numbers:	1B11-RPV-J31, Bottom Head Meridional Weld 1B11-RPV-J42, Bottom Head Meridional Weld 1B11-RPV-F1/1B11-RPV-F2 RPV Shell-to-Flange Weld

2. Applicable Code Edition and Addenda

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda.

3. Applicable Code Requirement

Subarticle IWB-2500 states, in part: "Components shall be examined and tested as specified in Table IWB-2500-1." Table IWB-2500-1, Examination Category B-A, Item B1.22, requires volumetric examination of meridional reactor vessel head welds as defined by Figure IWB-2500-3. Note 2 identifies that the examination include essentially 100 percent of the weld length.

Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., adopted and applied ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds*, (i.e., Reference 1) at the Brunswick Steam Electric Plant (BSEP) during the third 10-year inservice inspection interval. Code Case N-460 is applicable when the entire examination volume or area cannot be examined due to interference by another component or part geometry. Under such circumstances, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided that the reduction in coverage for that weld is less than 10 percent.

In October 2007, the NRC issued Regulatory Guide (RG) 1.147, Revision 15, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1* (i.e., Reference 2). In RG 1.147, the NRC identifies the ASME Code Cases they have determined to be acceptable alternatives to applicable sections of Section XI, and that those Code Cases may be used by licensees without requesting NRC authorization provided they are used with any identified limitations or modifications. Table 1 of RG 1.147 lists Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1*, as acceptable for use by a licensee with no identified limitations or modifications. Code Case N-460 states, in part:

> When the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

NRC Information Notice (IN) 98-42 (i.e., Reference 3) states that the NRC determined that a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states, in part:

> The NRC has adopted and further refined the definition of 'essentially 100 percent' to mean 'greater than 90 percent' in 10 CFR 50.55a(g)(6)(ii)(A)(2) for required examination coverage of reactor pressure vessel welds. This standard has been applied to all examinations of welds and other areas required by ASME Section XI.

4. Impracticality of Compliance

The BSEP, Unit 1 systems and components were designed and fabricated before the examination requirements of the ASME Code, Section XI, were formalized and published. Therefore, the BSEP was not specifically designed to meet the requirements of the ASME Code, Section XI, and full compliance is not feasible or practical within the limits of the current plant design.

10 CFR 50.55a recognizes the limitations to inservice inspection of components in accordance with Section XI of the ASME Code that are imposed due to early plants' design and construction, as follows:

> 10 CFR 50.55a(g)(1):
>
> For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued before January 1, 1971, components (including supports) must meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical.

10 CFR 50.55a(g)(4):

Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2 and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the ASME Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and that are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and materials of construction of the components.

10 CFR 50.55a(g)(5)(iii):

If the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in § 50.4, information to support the determinations.

In accordance with 10 CFR 50.55a(g)(5)(iii), CP&L has determined that it is impractical to meet the examination coverage requirements of Code Case N-460. The ASME Code, Section XI, requires volumetric (i.e., UT) examination of essentially 100 percent of the weld length. Due to the configurations of these components, ultrasonic examinations are limited to scanning on the accessible areas outside the reactor vessel support skirt and control rod drives.

5. Burden Caused by Compliance

Compliance with the examination coverage requirements of the ASME Code, Section XI, would require modification, redesign, or replacement of components where geometry is inherent to the component design.

6. Proposed Alternative and Basis for Use

Proposed Alternative

In accordance with 10 CFR 50.55a(g)(5)(iii), relief is requested for the affected components on the basis that the required examination coverage of "essentially 100 percent" is impractical due to physical obstructions and the limitations imposed by design, geometry, and materials of construction. No alternative examination is being proposed. The support skirt for the reactor pressure vessel would have to be redesigned for BSEP to achieve 100 percent volumetric coverage of the bottom head meridional welds.

Basis for Use (Welds 1B11-RPV-J31 and 1B11-RPV-J42)

Welds 1B11-RPV-J31 and 1B11-RPV-J42 extend meridionally from one side of the hemispherical bottom head to the other. These welds are approximately 213 inches in length. The reactor pressure vessel sits on an approximately 194 inch diameter integrally welded support skirt. This support skirt obstructs approximately 194 inches of each of the bottom head welds.

During the third 10-year inservice inspection interval, a UT examination was performed with examination personnel and examination procedures qualified to the ASME Code, Appendix VIII, as administered by the EPRI Performance Demonstration Initiative (PDI), achieved 8.9 percent Code-required coverage on each of the welds. This coverage is the maximum extent practical since access to the inside of the support skirt is not possible. In addition, each refueling outage, a visual (VT-2) examination is also performed in conjunction with system pressure testing. Reactor coolant system leak rate limitations and atmospheric particulate radioactivity monitoring also ensure that any leakage would be detected prior to gross failure.

Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), CP&L requests relief from the requirements of the ASME Code, Section XI, Table IWB-2500-1, Category B-A Item B1.22, and proposes to use the volume of coverage obtained for welds 1B11-RPV-J31 and 1B11-RPV-J42 during the UT examination and the associated pressure testing performed as acceptable alternatives that provide reasonable assurance of continued structural integrity.

Basis for Use (Weld 1B11-RPV-F1/F2)

1B11-RPV-F1 and 1B11-RPV-F2 is one weld, which has been assigned unique ID numbers for tracking purposes. 1B11-RPV-F1/F2 is a circumferential weld that attaches the RPV flange to the upper shell. 1B11-RPV-F1 designates the portion of the weld from 0° to 180° and 1B11-RPV-F2 designates the portion of the weld from 180° to 360°.

During the third 10-year inservice inspection interval, a UT examination was performed, to the extent practical, in accordance with ASME Code, Section XI. These 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 Performance Demonstration Initiative (PDI). As shown on Figure 2, the examination achieved 64 percent Code-required coverage on the weld. In addition, each refueling outage, a VT-2 examination is also performed in conjunction with system pressure testing. Reactor coolant system leak rate limitations and atmospheric particulate radioactivity monitoring also ensure that any leakage would be detected prior to gross failure.

The design configuration/restriction makes compliance with the ASME Code-required examination coverage requirements impractical. Reactor pressure vessel modifications would be needed to meet the ASME Code requirements, which would impose a considerable burden on BSEP, Unit 1.

Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), CP&L requests relief from the requirements of the ASME Code, Section XI, Table IWB-2500-1, Category B-A, Item B1.30, and proposes to use the volume of coverage obtained for welds 1B11-RPV-F1 and 1B11-RPV-F2 during the UT examination and the associated pressure testing performed provides reasonable assurance of the continued structural integrity of the subject welds and provides an acceptable level of quality and safety.

6. Duration of the Proposed Alternative

Use of the proposed alternative is applicable to the third 10-year inservice inspection interval at BSEP, Unit 1. The third began on May 11, 1998, and ended on May 10, 2008, for BSEP, Unit 1.

7. References

1. Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1.*

2. NRC Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1*, Revision 15, October 2007.

3. NRC Information Notice 98-42, *Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements*, December 1, 1998.

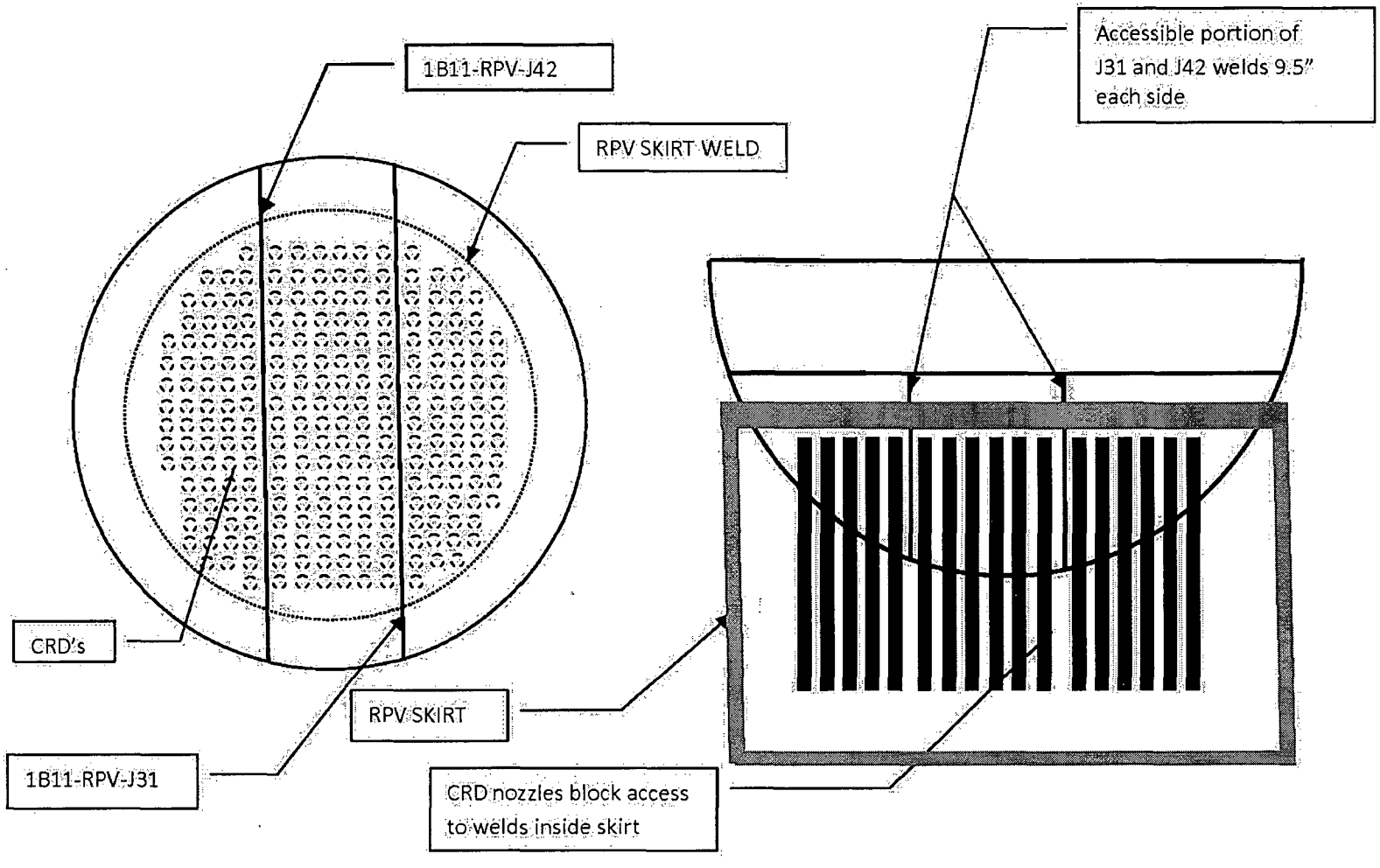

FIGURE 1

ACCESS LIMITATIONS OF 1B11-RPV-J31 & J42 WELDS

COVERAGE CALCULATION FOR 1B11-RPV-F1, F2

See Fig. 1 for examination areas and coverage

WRV (AEHD) = 60.5 in²
Weld (BCFG) = 9.5 in² = 15.7% of WRV
Base Metal = (60.5 – 9.5) = 45 in² = 84.3% of WRV

0^0 Coverage (AEba)

52.4 in²= 86.6%

45^0 Circ. CW (AEba)

WELD = 100%

BM = 36.9 in² = 82%

=> 45^0 Circ CW coverage = 15.7 + (.82)(84.3) = 84.8%

45^0 Circ. CCW (AEba)

WELD = 100%

BM = 36.9 in² = 82%

=> 45^0 Circ CCW coverage = 15.7 + (.82)(84.3) = 84.8%

60^0 Circ. CW (AEba)

WELD = 100%

BM = 36.9 in² = 82%

=> 45^0 Circ CW coverage = 15.7 + (.82)(84.3) = 84.8%

60^0 Circ. CCW (AEba)

WELD = 100%

BM = 36.9 in² = 82%

=> 45^0 Circ CCW coverage = 15.7 + (.82)(84.3) = 84.8%

45^0 axial in (BcHEA)

WELD = 6.4 in² =67.1%

BM = 35.8 in² = 70.2%

=> 45^0 axial in coverage = (.671)(15.7) + (.702)(84.3) = 69.7%

45^0 axial out = 0%

60^0 axial in (BdHEA)

WELD = 7.5 in^2 = 78.9%

BM = 41.1 in^2 = 80.5%

=> 60^0 axial in coverage = (.789)(15.7) + (.805)(84.3) = 80.2%

60^0 axial out = 0%

TOTAL COVERAGE = (86.6 + 84.8 + 84.8 +84.8 +84.8 +69.7 +80.2 + 0 + 0)/9

⇨ **Total Coverage = 64%**

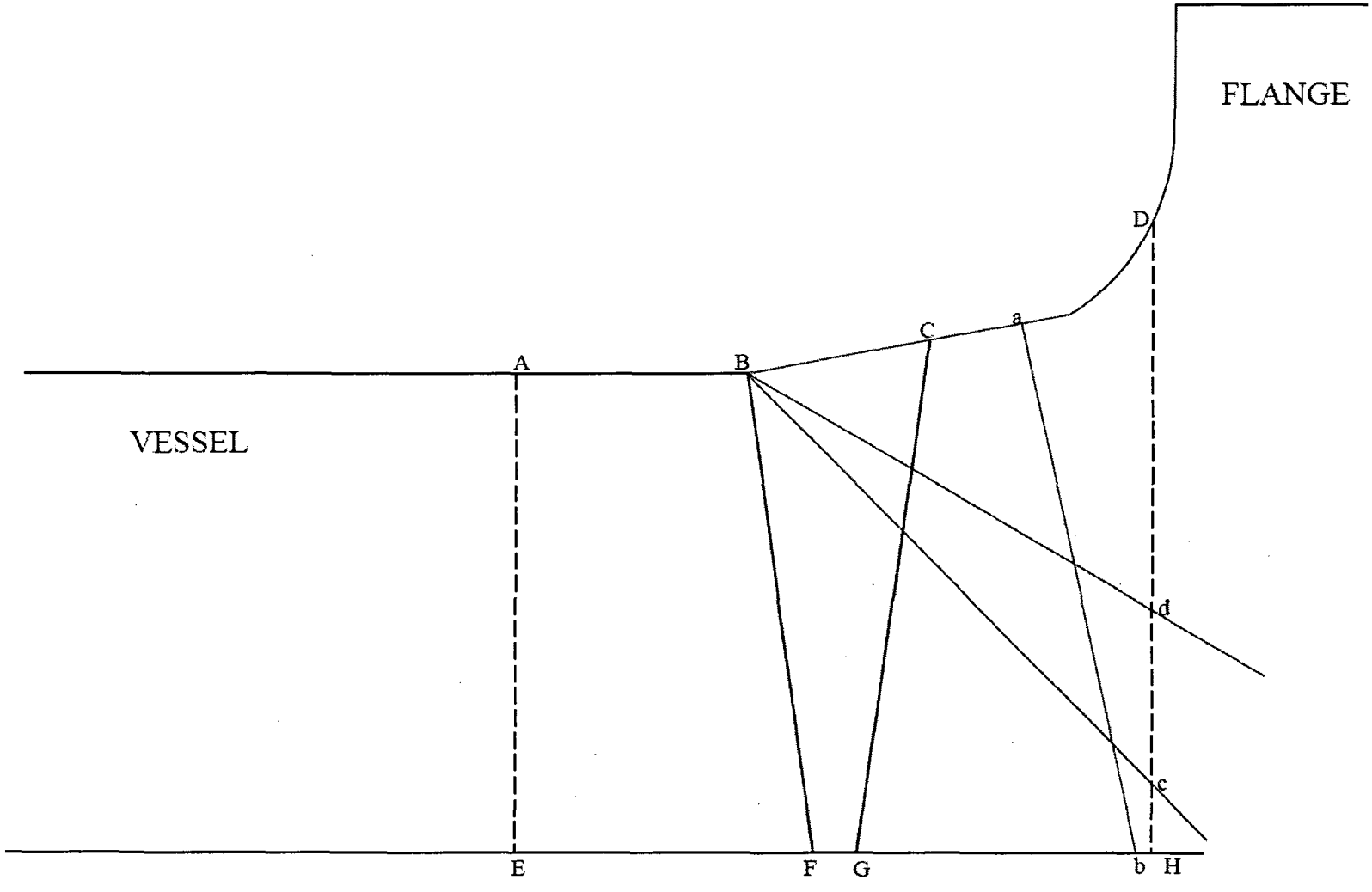

FIGURE 2
1B11-RPV-F1, F2

10 CFR 50.55a Request Number RR-45

Proposed Alternative In Accordance with 10 CFR 50.55a(g)(5)(iii)

- Inservice Inspection Impracticality -

1. ASME Components Affected

Code Class:	1
References:	Subarticle IWB-2500, Table IWB-2500-1
Examination Categories:	B-H
Item Number:	B8.10, "Reactor Vessel, Integrally Welded Attachments"
Description:	Surface examination
Component Numbers:	1B11-RPV-LUG45-ATT 1B11-RPV-LUG135-ATT 1B11-RPV-LUG225-ATT 1B11-RPV-LUG315-ATT

2. Applicable Code Edition and Addenda

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition with no Addenda.

3. Applicable Code Requirement

Subarticle IWB-2500 states, in part: "Components shall be examined and tested as specified in Table IWB-2500-1." Table IWB-2500-1, Examination Category B-H, Item B8.10, requires surface examination of the welds, as defined by Figure IWB-2500-15.

Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., adopted and applied ASME Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds*, (i.e., Reference 1) at the Brunswick Steam Electric Plant (BSEP) during the third 10-year inservice inspection interval. Code Case N-460 is applicable when the entire examination volume or area cannot be examined due to interference by another component or part geometry. Under such circumstances, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided that the reduction in coverage for that weld is less than 10 percent.

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alternatives to applicable sections of Section XI, and that those Code Cases may be used by licensees without requesting NRC authorization provided they are used with any identified limitations or modifications. Table 1 of RG 1.147 lists Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1*, as acceptable for use by a licensee with no identified limitations or modifications. Code Case N-460 states, in part:

> When the entire examination volume or area cannot be examined due to interference by another component or part geometry, a reduction in examination coverage on any Class 1 or Class 2 weld may be accepted provided the reduction in coverage for that weld is less than 10 percent.

NRC Information Notice (IN) 98-42 (i.e., Reference 3) states that the NRC determined that a reduction in coverage of less than 10 percent to be "essentially 100 percent." IN 98-42 states, in part:

> The NRC has adopted and further refined the definition of 'essentially 100 percent' to mean 'greater than 90 percent' in 10 CFR 50.55a(g)(6)(ii)(A)(2) for required examination coverage of reactor pressure vessel welds. This standard has been applied to all examinations of welds and other areas required by ASME Section XI.

4. Impracticality of Compliance

The Brunswick Steam Electric Plant (BSEP), Unit 1 systems and components were designed and fabricated before the examination requirements of the ASME Code, Section XI, were formalized and published. Therefore, the BSEP was not specifically designed to meet the requirements of the ASME Code, Section XI, and full compliance is not feasible or practical within the limits of the current plant design.

10 CFR 50.55a recognizes the limitations to inservice inspection of components in accordance with Section XI of the ASME Code that are imposed due to early plants' design and construction, as follows:

> 10 CFR 50.55a(g)(1):
>
> For a boiling or pressurized water-cooled nuclear power facility whose construction permit was issued before January 1, 1971, components (including supports) must meet the requirements of paragraphs (g)(4) and (g)(5) of this section to the extent practical.
>
> 10 CFR 50.55a(g)(4):
>
> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) which are classified as ASME Code Class 1, Class 2 and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI of editions of the ASME

Boiler and Pressure Vessel Code and Addenda that become effective subsequent to editions specified in paragraphs (g)(2) and (g)(3) of this section and that are incorporated by reference in paragraph (b) of this section, to the extent practical within the limitations of design, geometry and materials of construction of the components.

10 CFR 50.55a(g)(5)(iii):

If the licensee has determined that conformance with certain code requirements is impractical for its facility, the licensee shall notify the Commission and submit, as specified in § 50.4, information to support the determinations.

In accordance with 10 CFR 50.55a(g)(5)(iii), Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., has determined that it is impractical to meet the examination coverage requirements of Code Case N-460. The ASME Code, Section XI, requires surface examination of essentially 100 percent of the length of the attachment weld. Due to the close proximity of the stabilizer ring, surface examination is limited to just three sides of the welded attachment.

5. Burden Caused by Compliance

Compliance with the examination coverage requirements of the ASME Code, Section XI, would require modification, redesign, or replacement of components where geometry is inherent to the component design.

6. Proposed Alternative and Basis for Use

Proposed Alternative

In accordance with 10 CFR 50.55a(g)(5)(iii), relief is requested for the affected components on the basis that the required examination coverage of "essentially 100 percent" is impractical due to physical obstructions and the limitations imposed by design, geometry and materials of construction. No alternative examination is being proposed.

Basis for Use

1B11-RPV-LUG45-ATT, 1B11-RPV-LUG135-ATT, 1B11-RPV-LUG225-ATT, and 1B11-RPV-LUG315-ATT are integrally welded attachments on the outside diameter of the reactor pressure vessel. The lugs are rectangular, welded all around, with a weld length of approximately 34.5 inches. Each lug rests on the stabilizer ring, causing the bottom of the lug (i.e., approximately 13 inches) to be inaccessible. The examination of Reactor Vessel Stabilizer Lug Welds 1B11-RPV-LUG45-ATT, 1B11-RPV-LUG135-ATT, 1B11-RPV-LUG225-ATT, and 1B11-RPV-LUG315-ATT is limited due to the stabilizer ring obstructing bottom portion of the attachment weld.

During the third 10-year inservice inspection interval, CP&L performed qualified a magnetic particle examination with examination personnel and procedures meeting the requirements of the ASME Code, Section XI and Section V. Magnetic particle examinations achieved approximately 62% Code-required coverage on each of the welds. This coverage is the maximum extent practical since access to bottom portion of the attachment weld is not possible.

Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), CP&L requests relief from the requirements of the ASME Code, Section XI, Table IWB-2500-1, Category B-H, Item B8.10, and proposes to use the completed magnetic particle examinations as acceptable alternatives that provide reasonable assurance of continued structural integrity.

6. Duration of the Proposed Alternative

Use of the proposed alternative is applicable to the third 10-year inservice inspection interval at BSEP, Unit 1. The third began on May 11, 1998, and ended on May 10, 2008, for BSEP, Unit 1.

7. References

1. Code Case N-460, *Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1.*

2. NRC Regulatory Guide 1.147, *Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1*, Revision 15, October 2007.

3. NRC Information Notice 98-42, *Implementation of 10 CFR 50.55a(g) Inservice Inspection Requirements*, December 1, 1998.