UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 27, 2009

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

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 - RELIEF REQUEST ISI-04 FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL (TAC NOS. MD9948 AND MD9949)

Dear Mr. Waldrep:

By letter dated October 10, 2008, Carolina Power & Light Company (the licensee) submitted Relief Request (RR) ISI-04 regarding a proposed alternative for examinations of the reactor pressure vessel skirt support during the fourth 10-year inservice inspection (ISI) interval at Brunswick Steam Electric Plant (BSEP), Units 1 and 2, in lieu of the requirements specified in the American Society for Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. The fourth 10-year ISI interval began on May 11, 2008, and is scheduled to be completed by May 10, 2018.

The Nuclear Regulatory Commission (NRC) staff has evaluated RR ISI-04 and concluded that the licensee's proposed alternative is acceptable because it provides an acceptable level of reasonable assurance of structural integrity. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the implementation of RR ISI-04 is authorized for the BSEP, Units 1 and 2 fourth 10-year ISI interval.

The bases for the NRC staff's conclusion are contained in the enclosed Safety Evaluation. If you have any questions regarding this issue, please contact Farideh Saba at (301) 415-1447 or farideh.saba@nrc.gov.

Sincerely,

Thomas H. Boyce, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosure: Safety Evaluation

cc w/encl: Distribution via ListServ

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL

RELIEF REQUEST ISI-04

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NUMBERS 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated October 10, 2008, Carolina Power & Light Company (the licensee) submitted Relief Request (RR) ISI-04 regarding a proposed alternative for examinations of the reactor pressure vessel (RPV) skirt support during the fourth 10-year inservice inspection (ISI) interval at Brunswick Steam Electric Plant (BSEP), Units 1 and 2, in lieu of the requirements specified in the American Society for Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI. The fourth 10-year ISI interval began on May 11, 2008, and is scheduled to be completed by May 10, 2018.

2.0 REGULATORY EVALUATION

The inservice examination of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable edition and addenda, as required by Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g), except where specific relief has been granted by the Nuclear Regulatory Commission (NRC) pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) of 10 CFR Part 50 states, in part, that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if the licensee demonstrates that (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year ISI interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(b), 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein.

Enclosure

In accordance with the regulations described above, the licensee submitted RR ISI-04 pursuant to 10 CFR 50.55a(a)(3)(ii) for a proposed alternative in conducting examinations for the BSEP, Units 1 and 2 RPV skirt supports during the fourth 10-year ISI interval, in lieu of the requirements specified in the ASME Code, Section XI.

3.0 TECHNICAL EVALUATION

3.1 Component Identification, ASME Code Requirements, and Proposed Alternative

3.1.1 Components for which Relief is Requested

This relief request applies to BSEP, Units 1 and 2 RPV skirt support (Category F-A, Item F1.40).

3.1.2 ASME Code Requirements

ASME Code, Section XI, 2001 Edition through 2003 Addenda, IWF-2520, "Method of Examination," requires that the method of examination is to comply with those specified in Table IWF-2500-1. Item F1.40 of Table IWF-2500-1 requires a visual (VT-3) examination of supports other than piping supports. The interior and exterior surfaces of the RPV skirt support are subject to the examination requirements of Table IWF-2500-1, Item F1.40.

3.1.3 Proposed Alternative

During the fourth 10-year ISI interval, the licensee proposes no examination of the RPV skirt support's interior surfaces. However, a VT-3 visual examination will be performed of the RPV skirt support's exterior surfaces as specified by Table IWF-2500-1, Item F1.40.

3.2 Licensee's Evaluation of the Basis for the Proposed Alternative

The licensee, in letter dated October 10, 2008, stated that it has evaluated not performing this visual examination and determined that implementation of the proposed alternative will provide an acceptable level of quality and safety for the following reasons:

1. The design bases failure mode of the RPV skirt support is buckling caused by primary bending compressive stress. After forming, the material had ample ductility and is expected to exhibit significant plastic deformation prior to fracture. For these reasons, any potential service-induced damage would be evident during the VT-3 examination of the exterior surfaces. Thus, the VT-3 examination of the exterior surfaces will provide assurance of the continued structural integrity of the RPV skirt support.

2. Because of personnel radiation exposure, performing a VT-3 examination of the interior surfaces of the RPV skirt support constitutes a hardship to BSEP[,] Units 1 and 2 without a compensating increase in quality and safety. In order to examine the interior surface of the RPV skirt support, removal of the existing insulation would be required. Removal of the insulation would require disassembly, by either unscrewing each piece of the insulation or by cutting, and would result in permanent damage to the insulation. In addition, the

removed insulation could not be stored in the skirt support area because of the limited space between the control rod drives and the skirt support area. Removal of the insulation, to a location outside of the skirt support area, could cause additional damage due to the skirt's access opening. The access opening to the skirt support area is 18 inches in diameter, and the insulation sections are approximately 20 inches by 30-5/8 inches in size. For this reason, installation of a new insulation package would be required, which could result in additional time under vessel.

The activities associated with the removal and reinstallation of insulation would result in a significant hardship to [the licensee] in regards radiation exposure of the involved personnel. A radiation exposure of 1.4 [roentgen equivalent man] (rem) per unit has been estimated for this removal and reinstallation activity.

3.3 NRC Staff Evaluation

Examination Category F1.40 requires VT-3 visual examination of 100 percent of interior and exterior surfaces of the RPV skirt support surfaces. The licensee proposed to perform a VT-3 examination of only the exterior surfaces of the RPV support skirt. VT-3 examination of the interior surface of the RPV support skirt necessitates the removal of insulation. Tasks associated with the insulation removal would result in excessive radiation exposure to plant personnel (1.4 rem per unit) and large quantities of radwaste. The access opening for removal of insulation is 18 inches in diameter and the size of the insulation sections are of 20 inches by 30-5/8 inches. Attempts to remove and transport the insulation outside the support skirt area would damage it and make reinstallation more difficult or require design and installation of new insulation. Therefore, the tasks associated with removal and reinstallation would pose a hardship for the licensee.

The licensee is capable of performing the VT-3 examination of the exterior surface. This examination should enable detection of the primary failure mode (buckling) and provides adequate assurance of the continued structural integrity of the RPV support.

Based on the above evaluation, the staff determined that the licensee has provided information to support the determination that the ASME Code, Section XI requirement for surface examination of the interior surface of the RPV support skirt presents a hardship without a compensating increase in the level of quality and safety. The staff further determined that the alternative provides reasonable assurance of structural integrity of the RPV support. Therefore, it is recommended that the alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

4.0 CONCLUSIONS

The NRC staff has reviewed the submittal and finds that performing the VT-3 examination of the RPV skirt support in accordance with the ASME Code, Section XI would require removal of the insulation under additional personnel radiation exposure and would pose a hardship for the licensee without a compensating increase in the level of quality and safety. Further, the buckling failure mode of the RPV skirt support is not sensitive to the VT-3 results of its interior surface, therefore, the VT-3 examination of the exterior surface of the skirt support provides

reasonable assurance of structural integrity. Consequently, pursuant to 10 CFR 50.55a(a)(3)(ii), the alternative pertaining to ISI of the RPV skirt supports is authorized for the BSEP, Units 1 and 2 fourth 10-year ISI interval, that began on May 11, 2008, and will conclude on May 10, 2018.

All other requirements of the ASME Code, Sections III and XI, for which alternative has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Principal Contributors: Chris Sydnor

Date: August 27, 2009

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