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

SERIAL: BSEP 00-0086

U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2
DOCKET NOS. 50-325 AND 50-324/LICENSE NOS. DPR-71 AND DPR-62
REQUEST FOR APPROVAL OF REVISED RELIEF REQUEST FOR THE THIRD 10-YEAR
INSERVICE INSPECTION PROGRAM

Gentlemen:

Summary

In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power & Light (CP&L) Company requests relief from the requirements of the 1989 Edition of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. Specifically, CP&L requests approval of the enclosed Relief Request RR-17, "Leakage at Bolted Connections," Revision 4.

Relief Request RR-17, Revision 3, which allows evaluation of leaks at bolted connections instead of removing the bolting and performing a visual (i.e., VT-3) examination of the bolting for corrosion, was approved by NRC letter dated February 17, 2000. However, Relief Request RR-17, Revision 3 states that when control rod drives are replaced, the bolting is replaced and a baseline VT-3 visual examination of the new bolting is performed prior to installation. This conflicts with the provisions of Relief Request RR-4, "Use of Code Case N-547, 'Alternative Requirements for Pressure Retaining Bolting of Control Rod Drive (CRD) Housings.'" Relief Request RR-4, approved by the NRC in a letter dated February 17, 2000, eliminated the requirement to perform a VT-1 visual examination of new control rod drive bolting. The proposed Revision 4 to Relief Request RR-17 resolves this conflict by eliminating the baseline VT-3 visual examination of new control rod drive bolting prior to installation.

Background

By letter dated April 23, 1998, as supplemented on November 10, 1998, February 18, 1999, April 26, 1999, August 11, 1999, and September 14, 1999, CP&L submitted the third 10-year Inservice Inspection (ISI) Program for BSEP, Unit Nos. 1 and 2. The third 10-year ISI interval began on May 11, 1998. The code of record for the third 10-year inservice inspection program for BSEP, Unit Nos. 1 and 2, is the ASME Code, Section XI, 1989 Edition with no addenda.

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Three of the 25 proposed relief requests (i.e., Relief Requests RR-8, RR-15, and RR-17) for the third 10-year ISI interval were addressed by the NRC's letter dated May 4, 1999; the remaining relief requests were addressed by the NRC's letter dated February 17, 2000 (i.e., Reference: NRC TAC Nos. MA2108 and MA2109).

Justification

In the basis supporting Relief Request RR-17, Revision 3, CP&L stated that when control rod drives are replaced during each refueling outage, the bolting is replaced and a baseline VT-3 visual examination of the new bolting is performed prior to installation. However, Relief Request RR-4 and ASME Code Case N-547 eliminated the requirement to perform VT-1 visual examination of control rod drive bolting if the bolted connection is reinstalled with new bolting.

Since NRC approval of Relief Request RR-4, permitting the use of Code Case N-547, eliminated the requirement to perform VT-1 visual examination of new control rod drive bolting, CP&L believes that any examination that is less stringent than a VT-1 examination (i.e., a VT-3 visual examination) is superfluous and should also be eliminated. On this basis, Relief Request RR-17, has been revised to eliminate the baseline VT-3 visual examination of new control rod drive bolting prior to installation. Relief Request RR-17, Revision 4 is otherwise unchanged with respect to the previously approved Revision 3.

Requested Schedule

Approval of Relief Request RR-17, Revision 4, is requested prior to January 15, 2001, to support BSEP, Unit No. 2 Refueling Outage 14 (i.e., B215R1). The B215R1 outage is currently scheduled to begin on February 24, 2001.

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

Sincerely,



Warren J. Dorman
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Brunswick Steam Electric Plant

WRM/wrm

Enclosure: Relief Request RR-17, Revision 4

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ENCLOSURE

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Relief Request RR-17, Revision 4

RELIEF REQUEST: RR-17 (Rev. 4)

SUBJECT: LEAKAGE AT BOLTED CONNECTIONS

COMPONENTS FOR WHICH RELIEF IS REQUESTED:

This request for relief is applicable to the Class 1, 2, and 3 pressure retaining components subject to system pressure testing at the Brunswick Steam Electric Plant (BSEP), Units 1 and 2.

ASME SECTION XI CODE REQUIREMENT:

If leakage occurs at a bolted connection, paragraph IWA-5250(a)(2) requires the removal of the bolting, a visual (VT-3) examination of the bolting for corrosion, and an evaluation in accordance with paragraph IWA-3100.

REQUESTED RELIEF:

Relief is requested from the requirements specified in paragraph IWA-5250(a) of the ASME Code, Section XI, 1989 Edition. In accordance with 10 CFR 50.55a(a)(3)(i), Carolina Power and Light (CP&L) Company is requesting approval to use alternative requirements to those specified in paragraph IWA-5250(a)(2). If leakage is discovered at a bolted connection, the leakage will be located and evaluated for corrective measures. Where the evaluation of the variables determines the need for further evaluation, the bolt nearest the source of leakage will be removed and a VT-1 examination performed on the bolt.

PROPOSED ALTERNATIVE:

When leakage is detected at bolted connections, as an alternative to the requirements of IWA-5250(a)(2), the requirements of either 1 or 2 below shall be met:

1. The leakage shall be stopped and the bolting and component material shall be evaluated to determine joint integrity and the susceptibility of the bolting to corrosion and failure. The evaluation will, at a minimum, consider the following factors:
 - a) The number and service age of the bolts
 - b) Bolt and component material
 - c) Corrosiveness of the process fluid that is leaking
 - d) Leakage location and system function
 - e) Leakage history at the connection or other system components
 - f) Visual evidence of corrosion at the connection (i.e., while the connection is assembled)

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2. If the leakage is not stopped, the joint shall be evaluated in accordance with IWB-3142.4 to determine joint integrity and the susceptibility of the bolting to corrosion and failure. The evaluation will, at a minimum, consider the following factors:
- a) The number and service age of the bolts
 - b) Bolt and component material
 - c) Corrosiveness of the process fluid that is leaking
 - d) Leakage location and system function
 - e) Leakage history at the connection or other system components
 - f) Visual evidence of corrosion at the connection (i.e., while the connection is assembled)

When the evaluation of the above factors is concluded, and if the evaluation determines that the leaking condition has not degraded the fasteners, then no further action is required. However, reasonable attempts shall be made to stop the leakage as appropriate. In accordance with IWB-3144(b), the evaluation analyses will be submitted to the regulatory authority having jurisdiction at the plant site.

If the evaluation of the factors in 1 or 2 above indicates the need for further evaluation, then a bolt closest to the source of leakage shall be removed. The bolt will receive a VT-1 examination and be evaluated and dispositioned in accordance with IWB-3517. If the removed bolting shows evidence of rejectable degradation, all remaining bolts shall be removed and receive a VT-1 examination in accordance with IWB-3140. If leakage is identified when the bolted connection is in service and the information in the evaluation is supportive, the removal of the bolt for the VT-1 examination may be deferred until the next refueling outage.

BASIS FOR REQUESTING RELIEF:

Paragraph IWA-5250(a)(2) requires that if leakage occurs at a bolted connection, the bolting be removed, VT-3 visually examined for corrosion, and evaluated in accordance with IWA-3100. ASME Code Case N-566-1, "Corrective Action for Leakage Identified at Bolted Connections," which was approved by the ASME on February 15, 1999, provides an alternative to the requirements of IWA-5250(a)(2) if one of the following requirements is met:

- a) The leakage shall be stopped, and the bolting and component material shall be evaluated for joint integrity as described in (c) below.

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- b) If the leakage is not stopped, the joint shall be evaluated in accordance with IWB-3142.4 for joint integrity. This evaluation shall include the considerations listed in (c) below.
- c) The evaluation of (a) and (b) above is to determine the susceptibility of the bolting to corrosion and failure. This evaluation shall include the following:
 - (1) the number and service age of the bolts;
 - (2) bolt and component material;
 - (3) corrosiveness of process fluid;
 - (4) leakage location and system function;
 - (5) leakage history at the connection or other system components;
 - (6) visual evidence of corrosion at the assembled connection.

Code Case N-566-1 has not yet been incorporated into the latest revision of NRC Regulatory Guide 1.147, "Inservice Inspection Code Case Acceptability--ASME Section XI, Division 1."

Revision 1 of ASME Code Case N-566 (i.e., N-566-1) stipulates that either (1) the leakage at the bolted connection be stopped and the bolting and component material evaluated for joint integrity or (2) evaluating the joint integrity in accordance with IWB-3142.4 for joint integrity if the leakage is not stopped. IWB-3142.4 states that components containing relevant conditions are acceptable for continued service if an analytical evaluation demonstrates the component's acceptability. IWB-3142.4 also requires that the analysis and evaluation acceptance criteria be specified. Code Case N-566-1 also specifies the factors that should be used in performing the evaluation.

As an alternative to the requirements of IWA-5250(a)(2), CP&L proposes to follow the requirements of ASME Code Case N-566-1. Also, in addition to the requirements of Code Case N-566-1, CP&L proposes an additional action in those cases where the evaluation of the specified factors indicates the need for further evaluation. In such cases, a bolt closest to the source of leakage will be removed. The removed bolt will receive a VT-1 examination and be evaluated and dispositioned in accordance with IWB-3517. If the removed bolt shows evidence of rejectable degradation, all remaining bolts will be removed and receive a VT-1 examination in accordance with IWB-3140. If leakage is identified when the bolted connection is in service and the information in the evaluation is supportive, the removal of the bolt for the VT-1 examination may be deferred until the next refueling outage.

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CP&L has determined that implementation of the proposed alternative will provide an acceptable level of quality and safety for the following reasons:

1. CP&L has determined that implementation of the IWA-5250(a)(2) requirement can have an adverse impact on plant operation and personnel exposure. For example, the disassembly and re-assembly of components for the performance of the visual (VT-3) examination on the bolting has the potential to delay the return of a safety related system to service, delay of plant startup following the completion of the Class 1 leakage test, and the potential for significant additional radiation dose.
2. A significant portion of the pressure retaining bolting is made of stainless steel materials. Since the normal Class 1 pressure boundary of a boiling water reactor contains only demineralized water, the likelihood of severe corrosion is minimal. While stainless steel bolting is more susceptible to stress corrosion cracking under certain conditions, the detection of this type of corrosion on bolting material is difficult with the visual (VT-3) examination technique.
3. During each refueling outage, a Class 1 ASME Section XI leakage test is performed. A majority of the bolted connection leakage found during these leakage tests is associated with the Control Rod Drive (CRD) housing connections. This is a common industry occurrence and, in most cases, the leakage stops within 8 hours of being pressurized to greater than 1000 psig. Should leakage be detected at these CRDs, the requirements of IWA-5250(a)(2) would mandate removal of the bolting and performance of a VT-3 examination on the bolting. Removal of the bolting for the sole purpose of performing a visual (VT-3) examination would result in personnel exposure without a compensating increase in quality and safety.
4. The majority of the Class 2 systems transport a non-corrosive medium such as demineralized water, nitrogen, or air. Since the medium is non-corrosive, the bolted connections associated with these systems would not be susceptible to severe corrosion. Thus, the disassembly and re-assembly of a bolted connection for the performance of the visual (VT-3) examination of the bolting has the potential to delay the return of a safety related system to service.

Based on the above, the proposed alternative will ensure the structural integrity of the affected joint is maintained, while reducing operational, maintenance, and radiological hardships resulting from the current ASME Code requirement.

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REFERENCES:

1. ASME Code, Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1989 Edition with no Addenda.
2. ASME Code Case N-566-1, "Corrective Action for Leakage Identified at Bolted Connections," Section XI, Division 1.
3. Relief Request RR-4, "Use of Code Case N-547, 'Alternative Requirements for Pressure Retaining Bolting of Control Rod Drive (CRD) Housings.'"