



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

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

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-324/LICENSE NO. DPR-62  
INSERVICE INSPECTION PROGRAM RELIEF REQUEST - SERVICE WATER  
SYSTEM PIPING NON-CODE REPAIR

Ladies and Gentlemen:

In accordance with 10 CFR 50.55a(g)(5)(iii) and NRC Generic Letter 90-05, "Guidance For Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," Carolina Power & Light (CP&L) Company is requesting relief from requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI for the Brunswick Steam Electric Plant (BSEP), Unit 2. CP&L is requesting relief from the requirements of subparagraph IWA-4000(a) regarding the repair of a through-wall leak identified on Service Water System line 2-SW-103-24-157. The technical bases supporting the request for relief is provided in Enclosure 1. A list of regulatory commitments contained in this letter is provided in Enclosure 2.

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

Sincerely,

David C. DiCello  
Manager - Regulatory Affairs  
Brunswick Steam Electric Plant

WRM/wrm

Enclosures:

1. Request For Relief
2. List of Regulatory Commitments

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cc (with enclosures):

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BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2  
DOCKET NO. 50-324/LICENSE NO. DPR-62  
INSERVICE INSPECTION PROGRAM RELIEF REQUEST - SERVICE WATER SYSTEM  
PIPING NON-CODE REPAIR

Request For Relief

Unit: 2

Component: Service Water System Line Number 2-SW-103-24-157

System: Service Water System

Code Classification: Class 3

Code Requirement: The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition, subparagraph IWA-4000(a) states: "Repairs shall be performed in accordance with the Owner's Design Specification and the original Construction Code of the component or system."

Generic Letter 90-05, "Guidance For Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," defines impracticality to exist if "... the flaw detected during plant operation is in a section of Class 3 piping that cannot be isolated for completing a code repair within the time period permitted by the limiting condition for operation (LCO) of the affected system as specified in the plant Technical Specifications, and performance of code repair necessitates a plant shutdown."

On November 8, 2001, a through-wall leak was identified on the Brunswick Steam Electric Plant (BSEP), Unit 2 Service Water System line number 2-SW-103-24-157. Although the leak is located in a section of piping that is isolable, repair of the defect is impractical. Completion of a code repair of the defect on this line will require isolation and draining of the

BSEP, Unit 2 Nuclear Service Water header. The code repair cannot be completed with the applicable LCO action statement completion time.

Therefore, in accordance with 10 CFR 50.55a(g)(5)(iii), Carolina Power & Light (CP&L) Company requests relief from the requirements of subparagraph IW-4000(a) of the ASME Code, Section XI, for repair of the identified defect on Service Water System line number 2-SW-103-24-157.

**Proposed Action:**

An engineering evaluation of the defect on Service Water System line 2-SW-103-24-157, using the "through-wall flaw" approach described in NRC Generic Letter 90-05, has demonstrated that continued operation of the component in the as-found condition is structurally acceptable until the next refueling outage exceeding thirty days, but no later than the next scheduled refueling. Although leakage from the defect is currently small (i.e., approximately 200 drops per minute), a "soft patch" has been applied to prevent system leakage. The next refueling outage for BSEP, Unit 2 is currently scheduled to begin March 1, 2003.

**Basis for the Proposed Action:**

Service Water System line number 2-SW-103-24-157 is part of a moderate energy system and is classified as ASME Code Class 3. The defect in line 2-SW-103-24-157 is located between valves 2-SW-V104 and 2-SW-V105. Line number 2-SW-103-24-157 provides suction supply to service water booster pumps 2B and 2D. These pumps are required to supply sufficient cooling water flow to the RHR heat exchangers and to maintain Service Water System pressure higher than the primary system pressure to prevent leakage of primary coolant into the RHR Service Water System. The leak rate currently is approximately 200 drops per minute.

Until line 2-SW-103-24-157 can be isolated and examined from the inside, the cause of the defect cannot be definitely confirmed. However, the defect is believed to result from a local failure of the cement liner on the inside of the pipe which has allowed salt water to come into contact with the carbon steel pipe.

In accordance with the guidance contained in NRC Generic Letter 90-05, the defect has been examined using an ultrasonic examination (UT) method and wall thickness measurements have been taken. Based on these examinations, the defect has been characterized as localized corrosion of the pipe at the water contact location.

For Code Class 3 piping, Generic Letter 90-05 identifies two flaw evaluation approaches that should be considered, the "through-wall flaw" approach and the "wall thinning" approach. Generic Letter 90-05 states that a temporary non-code repair may be proposed if a defect is found acceptable by the "through-wall flaw" approach. CP&L has performed an evaluation of the defect using the "through-wall flaw" approach.

As described in Generic Letter 90-05, the "through-wall flaw" approach evaluates flaw stability using a linear elastic fracture mechanics methodology. Generic Letter 90-05 establishes a methodology for determining the through-wall flaw length "2a" and states that if the length "2a" exceeds either three inches or 15 percent of the length of the pipe circumference, the flaw is not acceptable using this approach. Because the defect has been characterized as a "pinhole" defect, the length of the defect has been assumed to be 1.0 inches for performance of the "through-wall flaw" evaluation. The affected piping is 24 inches in diameter, with a circumference of approximately 75 inches.

Generic Letter 90-05 also states that for defect stability, linear elastic fracture mechanics methodology specifies that the stress intensity factor "K" be less than the critical stress intensity factor representing the fracture toughness of the material. The generic letter specifies that the value of "K" should be less than  $35 \text{ ksi(in)}^{0.5}$  for ferritic steel. CP&L has also determined the stress intensity factor "K" to be approximately  $30.092 \text{ ksi(in)}^{0.5}$ , which is less than the applicable acceptance criterion of  $35 \text{ ksi(in)}^{0.5}$ .

During the next scheduled outage exceeding 30 days duration, but no later than Refueling Outage 15 for BSEP, Unit 2 (i.e., B216R1), CP&L will perform a repair, in accordance with the

ASME Code, Section XI, of the defect in line 2-SW-103-24-157 between valves 2-SW-V104 and 2-SW-V105. Based on the results of the "through-wall flaw" evaluation, CP&L has concluded that the component is acceptable until Refueling Outage 15 for BSEP, Unit 2, which is currently scheduled to begin on March 1, 2003.

Generic Letter 90-05 stipulates that if a defect is evaluated and found acceptable by one of the two evaluation approaches, an augmented inspection using UT or radiographic examination (i.e., RT) to assess overall degradation of the affected system should be performed. The generic letter indicates that an augmented inspection should be performed within 15 days of detection of the defect, and that the augmented inspection is a part of the relief acceptance criteria of the temporary non-code repair of the Class 3 pipe. Augmented inspections of five susceptible and accessible locations have been completed using the UT method. The results of these examinations were evaluated and found to be acceptable; all findings comply with the original code of construction (i.e., United States of America Standard (USAS) B31.1, "Power Piping" - 1967).

As stipulated by Generic Letter 90-05, until the code repair is completed, the integrity of the defect area will be assessed at least once every three months using a non-destructive examination technique. In addition, as stipulated by Generic Letter 90-05, a qualitative assessment of leakage through the defect area will be performed at least once every week to identify any degradation of structural integrity until the code repair is completed.

In conclusion, the overall degradation of the affected portion of the Service Water System has been assessed and evaluated as acceptable.

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List of Commitments

The following table identifies those actions committed to by Carolina Power & Light (CP&L) Company in this document. Any other actions discussed in the submittal represent intended or planned actions by CP&L. They are described for the NRC's information and are not regulatory commitments. Please notify the Manager - Regulatory Affairs at the Brunswick Steam Electric Plant of any questions regarding this document or any associated regulatory commitments.

Commitment	Committed date or outage
1. Assess the integrity of the defect area located on Service Water System line number 2-SW-103-24-157 between valves 2-SW-V104 and 2-SW-V105, in accordance with NRC Generic Letter 90-05, using a non-destructive examination technique.	At least once every three months until completion of a code repair.
2. Perform a qualitative assessment of leakage through the defect located on line number 2-SW-103-24-157 between valves 2-SW-V104 and 2-SW-V105, in accordance with NRC Generic Letter 90-05, to identify any degradation of structural integrity.	At least once every week until completion of a code repair.
3. Perform a repair, in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, of the defect area on line number 2-SW-103-24-157 between valves 2-SW-V104 and 2-SW-V105.	Next scheduled outage exceeding 30 days duration, but no later than Refueling Outage 15 (i.e., B216R1).