

March 15, 2002

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

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2 - REQUEST FOR  
RELIEF FROM ASME CODE REPAIR REQUIREMENTS FOR ASME CLASS 3  
SERVICE WATER SYSTEM PIPING (TAC NO. MB3498)

Dear Mr. Keenan:

In a letter dated November 28, 2001, as supplemented January 18, 2002, Carolina Power & Light Company (CP&L) requested relief from American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section XI, for the Brunswick Steam Electric Plant, Unit 2. Specifically, CP&L requested 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 request for relief was requested according to the guidance in Generic Letter (GL) 90-05. Based on the enclosed Safety Evaluation, the Nuclear Regulatory Commission (NRC) finds the requested relief acceptable.

The following regulatory commitments were made in CP&L's November 28, 2001, letter.

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 GL 90-05, using a 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-SW104 and 2-SW-V105, 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 ASME B&PV Code Section XI, of the defect area on line number 2-SW-103-24-157 between valves 2-SW-SW104 and 2-SW-V105.	Next scheduled outage exceeding 30 days duration, but no later than Refueling Outage 15.

If you have any questions, please contact Allen Hansen at 301-415-1390.

Sincerely,

**/RA/**

Richard P. Correia, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-324

Enclosure: Safety Evaluation

cc w/enclosure: See next page

If you have any questions, please contact Allen Hansen at 301-415-1390.

Sincerely,

**/RA/**

Richard P. Correia, Chief, Section 2  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM ASME CODE REPAIR REQUIREMENTS

FOR ASME CODE CLASS 3 PIPING

SERVICE WATER SYSTEM LINE 2-SW-103-24-157

BRUNSWICK UNIT NO. 2

CAROLINA POWER & LIGHT COMPANY

DOCKET NO. 50-324

1.0 INTRODUCTION

By letter dated November 28, 2001, as supplemented January 18, 2002, Carolina Power & Light Company (CP&L, the licensee) requested relief from the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (the Code), Section XI requirements regarding repair to a leak in a Class 3, moderate energy pipe at Brunswick Steam Electric Plant (BSEP), Unit 2. The leak was detected in a 24-inch nominal pipe size service water (SW) system line 2-SW-103-24-157, which provides suction supply to booster pumps for supplying cooling water to residual heat removal (RHR) heat exchangers. The SW system has a design temperature of 105°F and pressure of 150 psig. The pipe material is carbon steel, and the nominal wall thickness of the pipe is 0.375 inch.

An ultrasonic (UT) examination at the leak location revealed that the flaw is a through-wall pinhole about 0.2 inch surrounded by a degraded area approximately 1.0 inches in diameter and 0.12 inch in thickness ( $t_{min}$ ). The licensee currently attributed the leak to a local failure of the cement liner on the inside of the pipe that has allowed salt water to come into contact with the carbon steel pipe.

Although the flaw can be isolated, the Code repair cannot be completed with the applicable limiting condition for operation action statement completion time. Therefore, the licensee considered the on-line repair of the SW piping not practical.

Based upon the above, the licensee submitted a relief request in accordance with the provisions of Nuclear Regulatory Commission (NRC) Generic Letter (GL) 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping." The licensee requests relief until a Code repair can be performed during the next refueling outage scheduled to begin in March 2003.

## 2.0 DISCUSSION AND EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g), requires nuclear power facility piping and components to meet the applicable requirements of Section XI of the Code. This section of the Code specifies Code-acceptable repair methods for flaws that exceed Code acceptance limits in piping that is in service. A Code repair is required to restore the structural integrity of flawed Code piping, independent of the operational mode of the plant when the flaw is detected. Those repairs not in compliance with Section XI of the Code are non-Code repairs.

In some circumstances, the required Code repair may be impractical unless the facility is shut down. In such cases, the NRC may evaluate determinations of impracticality and may grant relief and impose alternative requirements pursuant to 10 CFR 50.55a(g)(6)(i). GL 90-05 provides guidance to the staff for evaluating relief requests submitted by licensees for temporary non-Code repairs to Code class 3 piping.

On November 7, 1991, the NRC issued GL 91-18, "Information to Licensees Regarding two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability." This GL and NRC Inspection Manual Part 9900 provided detailed discussions of specific operability determinations, one of which was operational leakage. In this regard, Section 6.15 of Part 9900 states the following:

"Upon discovery of leakage from a Class 1, 2, or 3 component pressure wall (i.e., pipe wall, valve body, pump casing, etc.) the licensee should declare the component inoperable. The only exception is Class 3 moderate energy piping as discussed in Generic Letter 90-05. For Class 3 moderate energy piping, the licensee may treat the system containing the through-wall flaw(s), evaluated and found to meet the acceptance criteria in Generic Letter 90-05, as operable until relief is obtained from the NRC."

The licensee has evaluated the flaw in accordance with GL 90-05. The licensee has used the "through-wall flaw" approach of the GL for the pinhole area of the SW pipe. The flaw is assumed to be 1.0 inch long, and the pipe wall is assumed conservatively to be 0.12 inch based on the UT data. The applied stress intensity factor due to the combination of deadweight, pressure, thermal expansion, and seismic loading was calculated to be 30.09 ksi $\sqrt{\text{in}}$ . The fracture toughness was 35 ksi $\sqrt{\text{in}}$ , the suggested value for ferric steel in GL 90-05. Since the applied stress intensity factor is less than the fracture toughness, the licensee concluded that the structural integrity of the SW system is adequate for continued operation of the unit until the next refueling outage scheduled to begin in March 2003. The staff has reviewed the licensee's evaluation and confirmed that it is in accordance with GL 90-05 and satisfies the requirements of GL 90-05. Hence, the staff agrees with the licensee's conclusion that the SW system is adequate for continued operation of the unit until the next refueling outage. A soft patch was installed over the hole using metal bands to stop the leakage from the SW pipe pinhole for housekeeping purposes. Further, the issues of flooding, water spraying on other equipment, and loss of flow were analyzed and found to be insignificant to the operation of the SW system.

The licensee has also performed an augmented UT inspection on five locations on SW piping having similar characteristics to the flawed line. This inspection did not reveal any other degraded areas. To monitor this non-Code repair, the licensee proposed to assess the integrity

of the degraded area using a non-destructive examination technique once every 3 months, and perform a qualitative assessment of leakage through the pinhole once every week in accordance with GL 90-05. The staff finds these commitments acceptable.

### 3.0 CONCLUSION

The staff has reviewed the licensee's request for relief and finds that the licensee's analytical methods and results meet the requirements of GL 90-05. Further, the staff finds that performing a Code repair on the leaking SW system piping while the unit is operating is impractical. The staff concludes that the granting of relief where Code requirements are impractical and imposing alternative requirements is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest, given due consideration to the burden upon the licensee and facility that could result if the Code requirements were imposed on the facility. Pursuant to 10 CFR 50.55a(g)(6)(i) and consistent with the guidance in GL 90-05, relief is granted through the next refueling outage scheduled to start in March 2003.

Principle contributor: Simon Sheng

Date: March 15, 2002

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