



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON A REQUEST FOR RELIEF FROM PRESSURE TEST REQUIREMENTS  
FOLLOWING A REPAIR OF PRESSURE BOUNDARY MATERIALS

CAROLINA POWER & LIGHT COMPANY  
BRUNSWICK STEAM ELECTRIC PLANT, UNIT 2  
DOCKET NO. 50-329

BACKGROUND

Section XI of the ASME Boiler and Pressure Vessel Code requires that pressure-boundary components be subjected to nondestructive examinations and pressure tests after repair. By letter dated December 9, 1983, Carolina Power & Light Company requested relief from the hydrostatic pressure test requirement for two welds which were repaired on the Reactor Recirculation System piping at Brunswick Unit 2. Information supporting the request was also provided. Pursuant to 10 CFR 50.55a(g)(6)(i), this information will be evaluated to determine if the necessary findings can be made to grant relief as requested.

RELIEF REQUEST

Relief is requested from the hydrostatic pressure test requirements of IWA-4400, IWA-5000, and IWB-5000 of the 1977 Edition through Summer 1978 Addenda for Section XI of the ASME Code. This relief request is applicable to the weld overlay repairs made on Reactor Recirculation piping system welds 2-B32-12"-K2 and 2-B32-12"-K3.

CODE REQUIREMENTS

IWA-4400: "After repairs by welding on the pressure retaining boundary, a system pressure test shall be performed in accordance with IWA-5000."

IWA-5000: "System leakage tests and system hydrostatic tests shall be conducted at the test conditions of pressure and temperature specified in IWB-5000."

IWB-5000: "The system hydrostatic test shall be conducted at a test pressure of 1.10 times the system nominal operating pressure,  $P_o$ , that corresponds with 100% rated reactor power except when the test is conducted at temperatures above 100° F to meet the requirements as specified by fracture prevention criteria applicable to ferritic materials. The system hydrostatic test may be conducted at the reduced test pressure of Table IWB-5220-1:

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TABLE IWB-5220-1  
TEST PRESSURE

Test Temperature

Test Pressure

100F  
200F  
300F  
400F  
500F

1.10 $P_o$   
1.08 $P_o$   
1.06 $P_o$   
1.04 $P_o$   
1.02 $P_o$

### BASIS FOR REQUESTING RELIEF

The Reactor Recirculation System piping cannot be isolated from the Reactor Pressure Vessel during a hydrostatic pressure test of the K riser weld overlays. Brunswick Unit 2 has a major refueling outage scheduled in the Spring of 1984 at which time the 10 year interval hydrostatic pressure test will be performed prior to returning the unit to service. Considering the exposure rates, expense, and short service duration until the spring outage, performance of a hydrostatic pressure test to satisfy Section XI is impractical. The utilization of the inservice leak pressure test coupled with the visual, liquid penetrant, and ultrasonic nondestructive examination already performed on the weld overlay provides adequate assurance of the integrity of the repair for return to commercial service until the spring outage.

The inservice leak test pressure is approximately 20 psi less than the hydrostatic test pressure with the hydro performed at the nominal operating temperature.

The performance of the hydrostatic pressure test at nominal operating temperature (540°F) is not feasible due to the inordinate amount of time involved attaining the required test temperature in a nonoperational status, and the cooldown time after hydro to prepare the unit for operational status before return to service. The performance of the hydrostatic test at lower temperature would also be time consuming, would involve considerable unnecessary exposure to personnel (for equipment installation and removal), and would be an unnecessary cycle of the pressure vessel when compared to the minimal additional safety margins it might provide with respect to the integrity of the weld overlays.

### ALTERNATE TEST PROPOSED

CP&L will perform a visual examination (VT-2) for leakage during the inservice leak-pressure test after pressurization to nominal operating pressure (1005 psig) and temperature (540°F).

### STAFF EVALUATION

The repairs (weld overlays) made on the Reactor Recirculation System welds were in accordance with the requirements of IE Bulletin 83-02 and Orders contained in a letter dated August 26, 1983 from the NRC. Welds 2-B32-12"-K2 and 2-B32-12"-K3 are located such that they cannot be isolated from the reactor vessel in order to hydrostatically test them to the Code required pressure while preventing the vessel from being subjected to an additional pressure cycle. In light of the fact that the leak test pressure and the Code required hydrostatic test pressure at temperature differ by 20 psi only, the staff finds the licensee's proposed leak test and visual examination of the welds adequate to determine their structural integrity. We therefore conclude that relief from the hydrostatic test pressure requirement may be granted as requested.

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Dated: January 27, 1984