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

February 11, 1991

Docket Nos. 50-325
and 50-324

Mr. Lynn W. Eury
Executive Vice President
Power Supply
Carolina Power & Light Company
Post Office Box 1151
Raleigh, North Carolina 27602

Dear Mr. Eury:

SUBJECT: EVALUATION OF FEEDWATER NOZZLE WELD INDICATION - BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1 (TAC NO. 79381)

By letter dated January 7, 1991, Carolina Power & Light Company (CP&L) submitted the examination/evaluation results of an indication discovered in the feedwater (FW) nozzle weld for the Brunswick Steam Electric Plant (BSEP), Unit 1. The examination was performed to evaluate the dissimilar metal (carbon steel to Inconel) welds on Feedwater piping per NUREG-0313, Revision 2, Inspection Scope. The indication was reported to the staff by a conference call on December 20, 1990.

The ultrasonic testing (UT) indication on the identified FW nozzle weld was reported to be located circumferentially in the Inconel 182 material with a depth of 0.38 inch and a total length of 1.0 inch. The flaw evaluation was performed for CP&L by Structural Integrity Associates, Inc. (SIA) and submitted with CP&L's January 7, 1991, letter. SIA's flaw evaluation indicates that, at the end of an 18 month operation period, the initial 0.38 inch depth of the flaw will grow to 0.42 inch, which is within the 0.504 inch allowed by the ASME Code, Section XI IWB-3640. CP&L has also committed to monitor the crack growth rate of the Inconel 182 material by the crack arrest verification (CAV) system.

In its crack-growth evaluation, SIA employed the distribution of the residual stresses typical for large-diameter stainless-steel piping weld. However, SIA did not provide any experimental data to support the use of such residual stress distribution for the Inconel-to-carbon-steel (dissimilar metal) weld with safe-end configuration. Furthermore, the crack growth assumption used in the SIA evaluation was derived from the CAV system data for Inconel 182 tested in a water chemistry typical of the recirculation system, not that of the annulus of a FW nozzle. The nozzle annulus will have a more aggressive water chemistry than that of the recirculation system, because the flow in the annulus is very small and a significant amount of crud may be trapped in the stagnant area.

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The staff discussed these concerns with CP&L and SIA by conference calls on January 30, 1991, and February 7, 1991.

Based on the review of information provided in CP&L's January 7, 1991, submittal and the conference calls referred to above, the staff is reasonably assured that the structural integrity of the above-identified FW nozzle to safe-end weld can be maintained within the limits of the ASME code at least through mid-cycle operation (approximately nine months from restart). On this basis, the staff concurs that the restart of BSEP, Unit 1 from the current outage is acceptable. It is requested that you provide additional information for the NRC staff to complete its evaluation and to determine whether the flaw indication on the subject FW nozzle should be ultrasonically re-examined at mid-cycle inspection to ensure that there is no excessive crack growth. This additional information should contain detailed justification to support the acceptability of operating the BSEP, Unit 1 for the duration of Cycle 8, should address options for obtaining actual or representative crack growth data during the cycle, and should address other concerns that were discussed with your staff in the January 30, 1991, and February 7, 1991, conference calls.

Following review of this additional information, the NRC staff will issue a safety evaluation addressing the BSEP, Unit 1 operation with the existing indication for the duration of Cycle 8.

The reporting requirements in this letter affect fewer than 10 respondents; therefore, OMB clearance is not required under Public Law 96-551.

Sincerely,
Orignal signed by:

Ngoc B. Le, Project Manager
Project Directorate II-I
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

cc:
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