Progress Energy

10 CFR 50.55a(a)(3)(ii)

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SERIAL: BSEP 04-0166

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2
Docket Nos. 50-325 and 50-324/License Nos. DPR-71 and DPR-62
Response to Request for Additional Information Regarding Relief
Request RR-34, Control Rod Drive Hydraulic System

Ladies and Gentlemen:

On November 4, 2004, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., submitted a relief request (i.e., Serial: BSEP 04-0146) from the requirements of the American Society of Mechanical engineers Boiler and Pressure Vessel Code, Section XI, 1989 Edition, for the third 10-year interval Inservice Inspection Program for the Brunswick Steam Electric Plant, Unit Nos. 1 and 2. The request for relief pertained to structural integrity of insert, withdrawal, and charging water piping for the Control Rod Drive System.

During a telephone call on December 9, 2004, the NRC requested additional information regarding the requested relief. The enclosure of this letter provides the response to this request for additional information.

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

Sincerely,

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A047

WRM/wrm

Enclosure: Response to Request for Additional Information - Relief Request RR-34

cc (with enclosure):

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Response to Request for Additional Information - Relief Request RR-34

On November 4, 2004 (i.e., Serial: BSEP 04-0146), Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc. (PEC), submitted a relief request from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1989 Edition, for the third 10-year interval Inservice Inspection Program for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2. The request for relief (i.e., Request No. RR-34) pertained to structural integrity of insert, withdrawal, and charging water piping for the Control Rod Drive (CRD) System. Specifically, RR-34 proposed that defects identified in CRD piping would be dispositioned through an engineering evaluation that demonstrates the affected piping will maintain structural integrity in lieu of the ASME Section XI Code, Subarticle IWA-4300 requirement to remove the defect or reduce it to an acceptable limit.

During a conference call on December 9, 2004, the NRC requested additional information regarding the requested relief. The response to this request for additional information (RAI) follows.

NRC Question:

On November 24, 2004, Progress Energy submitted a response to an RAI regarding relief request RR-34. In response to Question 9, Progress Energy presented test data, based on a 22 percent NaCl solution concentration, to support the use of a 5.0×10^{-5} in/hr crack growth rate in an engineering evaluation performed under the relief request. Justify the use of the 22 percent NaCl concentration as representative for crack growth rates that may occur in the Brunswick CRD piping.

Response to NRC Question:

Question 9 in the November 24, 2004, submittal requested data demonstrating that the assumed crack growth rate to be used in any engineering evaluation performed under Relief Request RR-34 is conservative. The response to Question 9 stated that the use of a 5×10^{-5} in/hr crack growth rate in this proposed application is conservative. A graph from page (I) 3-63 of Electric Power Research Institute (EPRI) Final Report 1002792, which was provided as part of the response, presented data showing the effect of temperature on crack growth rates in highly concentrated chlorides (i.e., using a 22 percent NaCl solution).

At temperatures of about 120°F, which are typical for the CRD piping being addressed by the relief request, the crack growth rate from the constant load test data for annealed type 304 stainless steel in a 22 percent NaCl solution was reported to be about 1.8×10^{-5} in/hr, a factor of 2.8 less than that which will be used in the structural integrity evaluation. A 22 percent NaCl

solution was chosen for the fracture-mechanics stress corrosion cracking test reported in EPRI Report 1002792, Figure 3-23. Although the basis was not documented in the EPRI Report 1002792, it is believed that this concentration was chosen since it is near the solubility limit for NaCl in water. In addition, the 22 percent dissolved NaCl in the stress corrosion cracking test solution is a factor of six higher than the amount of dissolved salts in seawater (i.e., typically seawater contains approximately 3.5 percent dissolved salts).

Because the source of the salt water leakage, and thus the source of additional chlorides, has been eliminated, any rewetting and/or concentrated chloride effects on crack propagation have been eliminated. Based on these factors, the 22 percent NaCl in the stress corrosion cracking test for determining growth rate was determined to be applicable to the actual dryout condition of the affected CRD lines.

In conclusion, the test data reported in EPRI Report 1002792, Figure 3-23, is much more severe than, and thus bounds, the actual saltwater exposure conditions to which the affected CRD hydraulic lines were subjected, and is also more severe than the condition of these CRD lines following their subsequent clean-up, metal removal and liquid penetrant examinations. Therefore, this test data represents a crack growth rate in a saltwater environment and demonstrates the assumed growth rate is conservative.