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March 16, 2005

SERIAL: BSEP 05-0042  
TSC-2002-09

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  
Core Flow Operating Range Expansion  
(NRC TAC No. MB6692 and MB6693)

- References:
1. Letter from John S. Keenan to the U. S. Nuclear Regulatory Commission (Serial: BSEP 02-0169), "Request for License Amendments - Core Flow Operating Range Expansion," dated November 12, 2002 (ML023240227)
  2. Letter from Cornelius J. Gannon to the U. S. Nuclear Regulatory Commission (Serial: BSEP 04-0015), "Supplement to Request for License Amendments - Core Flow Operating Range Expansion," dated March 5, 2004 (ML040770048)
  3. Letter from Cornelius J. Gannon to the U. S. Nuclear Regulatory Commission (Serial: BSEP 04-0048), "Response to Request for Additional Information - Core Flow Operating Range Expansion," dated April 5, 2004 (ML041040585)

Ladies and Gentlemen:

On November 12, 2002, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., requested a revision to the Technical Specifications (TSs) for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The proposed license amendments revise TSs, as necessary, to support an expansion of the core flow operating range (i.e., Maximum Extended Load Line Limit Analysis Plus (MELLLA+)). The request was supplemented on March 5, 2004.

On February 23, 2005, the NRC provided a faxed request for additional information (RAI) concerning the affects of MELLLA+ on Irradiation Assisted Stress Corrosion

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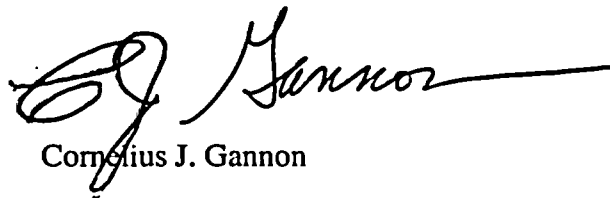
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Cracking (IASCC). This RAI is a follow-up to an RAI response provided by PEC on April 5, 2004. The response to this RAI is enclosed.

Please refer any questions regarding this submittal to Mr. Edward T. O'Neil, Manager - Support Services, at (910) 457-3512.

I declare, under penalty of perjury, that the foregoing is true and correct. Executed on March 16, 2005.

Sincerely,



Cornelius J. Gannon

MAT/mat

Enclosure:

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cc:

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## Response to Request for Additional Information (RAI) 9

### Background

On November 12, 2002, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc., requested a revision to the Technical Specifications (TSs) for the Brunswick Steam Electric Plant (BSEP), Units 1 and 2. The proposed license amendments revise TSs, as necessary, to support an expansion of the core flow operating range (i.e., Maximum Extended Load Line Limit Analysis Plus (MELLLA+)). The request was supplemented on March 5, 2004.

On February 23, 2005, the NRC provided a faxed request for additional information (RAI) concerning the affects of MELLLA+ on Irradiation Assisted Stress Corrosion Cracking (IASCC). This RAI is a follow-up to an RAI response provided by PEC on April 5, 2004. The response to this RAI follows.

### NRC Question 9-1

In response to NRC request for additional information (RAI) #8, Progress Energy Carolinas, Inc., by letter dated April 5, 2004, provided a plant-specific irradiation assisted stress corrosion cracking (IASCC) evaluation for implementing the core flow operating range expansion. The licensee stated that Brunswick Steam Electric Plant (BSEP), Units 1 and 2 will manage potential IASCC of the top guide with the vessel internals inspection program as described in Boiling Water Reactor Vessel and Internals Project (BWRVIP)-26 "BWR Top Guide Inspection and Flaw Evaluation Guidelines."

Based on the staff's review of the licensee's response to RAI #8, the staff requests the licensee provide additional information as discussed below.

BWRVIP-26 lists  $5 \times 10^{20}$  n/cm<sup>2</sup> as the threshold fluence beyond which components may be susceptible to IASCC. The location on the top guide that will see a fluence level in excess of this value is the grid beams. This is location 1, as defined in BWRVIP-26, Table 3-2, "Matrix of Inspection Options." In its evaluation of the top guide assembly, including the grid beams, General Electric (GE) assumed a lower allowable stress value, acknowledging the high fluence value at this location. The conclusion of this analysis, considering also the fact that a single failure at this location has no safety consequence, was that no inspection was considered necessary to manage this potential aging effect.

The staff is concerned that multiple failures of the top guide beams are possible when the threshold fluence for IASCC is exceeded. According to BWRVIP-26, multiple cracks have been observed in top guide beams at Oyster Creek. In addition, baffle-former bolts on PWRs that exceeded the threshold fluence have had multiple failures. In order to exclude the top guide beam from inspection when its fluence exceeds the threshold value, the licensee must demonstrate that failures of multiple beams (all beams that exceed the threshold fluence) will not

impact the safe shutdown of the reactor during normal, upset, emergency, and faulted conditions. If this can not be demonstrated, then the licensee should propose an inspection program to manage this aging effect to preclude loss of the component's intended function. The inspection program should include a sufficient number of high fluence locations to preclude multiple failures of the top guide. The licensee should identify the high neutron flux top guide beam locations, the locations to be inspected, the inspection frequency, and should provide justification for the selected locations to be inspected.

Response to NRC Question 9-1

On October 18, 2004, PEC submitted a request to renew the operating licenses for BSEP, Units 1 and 2 (i.e., Serial: BSEP 04-0006, "Application for Renewal of Operating Licenses"). As part of this application, PEC provided the following commitment, to be implemented prior to the period of extended operation:

BSEP will perform augmented inspections for the top guide similar to the inspections of Control Rod Drive Housing (CRDH) guide tubes. The sample size and frequency for CRDH guide tubes is a 10% sample of the total population within 12 years; one half (5%) to be completed within six years. The method of examination is an enhanced visual examination (EVT-1). The top guide inspections will focus on the high fluence region. These augmented inspections may be modified should BWRVIP 26 be revised in the future.

The proposed augmented inspections for the top guide will be sufficient to manage this aging effect and preclude loss of the component's intended function. The augmented inspection is consistent with that proposed by Exelon Generation Company, in its application for license renewal for the Peach Bottom Atomic Power Station, Units 2 and 3, as supplemented by a letter from M. P. Gallagher to the NRC dated January 14, 2003 (ML030230676). The NRC found these augmented inspections to be acceptable in NUREG-1769, "Safety Evaluation Report Related to the License Renewal of Peach Bottom Atomic Power Station, Units 2 and 3," published in March 2003 (ML031611051).