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August 24, 1994

SERIAL: BSEP 94-0335

United States Nuclear Regulatory Commission  
ATTENTION: Document Control Desk  
Washington, DC 20555

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-325 & 50-324/LICENSE NOS. DPR-71 & DPR-62  
NRC GENERIC LETTER 94-03, "INTERGRANULAR STRESS CORROSION CRACKING OF  
CORE SHROUDS IN BOILING WATER REACTORS"

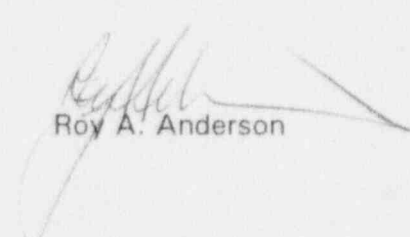
Gentlemen:

On July 25, 1994, the NRC staff issued Generic Letter (GL) 94-03, "Intergranular Stress Corrosion Cracking of Core Shrouds in Boiling Water Reactors." The purpose of this letter is to provide the NRC staff the thirty-day response required by the generic letter for Carolina Power & Light Company's Brunswick Steam Electric Plant, Units 1 and 2.

Enclosure 1 provides CP&L's required thirty-day response to Generic Letter 94-03.  
Enclosure 2 provides a list of commitments in this letter.

Please refer any questions regarding this letter to Mr. R. P. Lopriore at (910) 457-2212.

Sincerely,

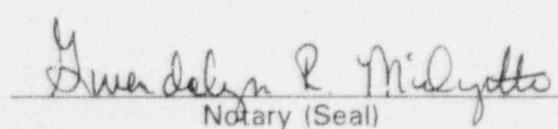
  
Roy A. Anderson

KAH/shc

Enclosures

Roy A. Anderson, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.

310003

  
Notary (Seal)

My commission expires: August 12, 1996

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ACU 1

cc: Mr. S. D. Ebnetter, NRC Regional Administrator, Region II  
Mr. P. D. Milano, NRC/NRR Senior Project Manager - Brunswick  
Mr. C. A. Patterson, NRC Senior Resident Inspector - Brunswick  
The Honorable H. Wells, Chairman - North Carolina Utilities Commission

## ENCLOSURE 1

### BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 NRC DOCKET NOS. 50-325 & 50-324 OPERATING LICENSE NOS. DPR-71 & DPR-62

#### RESPONSE TO NRC GENERIC LETTER 94-03, INTERGRANULAR STRESS CORROSION CRACKING OF CORE SHROUDS IN BOILING WATER REACTORS

##### BACKGROUND

The NRC staff issued Generic Letter 94-03 on July 25, 1994 to holders of operating licenses or construction permits for boiling water reactors (BWRs) that have a core shroud. The purpose of NRC Generic Letter 94-03 is to request that each addressee 1) inspect the core shrouds in their BWR plants no later than the next scheduled refueling outage, and perform an appropriate evaluation and/or repair based on the results of the inspection, and 2) perform a safety analysis supporting continued operation of the facility until inspections are conducted.

The specific actions requested by NRC Generic Letter 94-03 are:

1. Inspect the core shrouds in BWR plants no later than the next scheduled refueling outage;
2. Perform a safety analysis supporting continued operation of the facility until inspections are conducted. The safety analysis should consider, but not be limited to the following factors:
  - a. Details of the conditions that would influence the probability of the occurrence of cracking and rate of crack growth (e.g., material types and forms, water chemistry, fluence, carbon contents, welding materials and procedures).
  - b. A plant-specific assessment accounting for uncertainties in the amount of cracking, which should include but not be limited to, the following:
    - (1) An assessment of the shroud response to the structural loadings resulting from design basis events (e.g., steam line break, recirculation line break). If asymmetric loads can affect the shroud response, these should also be considered.
    - (2) An assessment of the ability of plant safety features to perform their function considering the shroud response to structural loadings (e.g., control rod insertion, ECCS injection).
3. Develop an inspection plan which addresses: (a) all shroud welds (from support attachments to the vessel to the top of the shroud) and/or provides a justification for elimination of particular welds from consideration; and (b) examination methods with appropriate consideration given to use of the best available technology and

industry inspection experience (e.g., enhanced VT-1 visual inspections, optimized UT techniques). Standard methods for inspection of core shroud structures as specified by the ASME Code, Section XI, have been shown to be inadequate for consistent detection of IGSCC in core shrouds.

4. Develop plans for evaluation and/or repair of the core shroud.
5. Work closely with the BWROG on coordination of inspections, evaluations and repair options for all BWR internals susceptible to IGSCC.

Reporting requirements of NRC Generic Letter 94-03 are to submit, under oath and affirmation:

1. Within 30 days from the date of this generic letter:
  - (a) A schedule for inspection of the core shroud.
  - (b) A safety analysis, including a plant-specific safety assessment, as appropriate, supporting continued operation of the facility until inspections are conducted.
  - (c) A drawing or drawings of the core shroud configuration showing details of the core shroud geometry (e.g., support configurations for the lower core plate and the top guide, weld locations and configurations).
  - (d) A history of shroud inspections for the plant should be provided addressing date, scope, methods and results, if applicable.
2. No later than 3 months prior to performing the core shroud inspections (if the inspections are scheduled to begin in less than 3 months from the receipt of this letter, the licensee should contact their NRC project manager to establish a schedule for providing the following information):
  - (a) The inspection plan requested above in item 3 of Requested Actions.
  - (b) Plans for evaluation and/or repair of the core shroud based on the inspection results.
3. Within 30 days from the completion of the inspection, provide the results of the inspection.

The following discussion provides CP&L's thirty-day response to NRC Generic Letter 94-03, including specific discussions for each of the requested actions.

#### REQUESTED LICENSEE ACTION 1.

1. Inspect the core shrouds in BWR plants no later than the next scheduled refueling outage.

#### CP&L RESPONSE

CP&L inspected the core shrouds for both Brunswick Nuclear Plant Units 1 and 2 during refueling outages B109R1 (Summer 1993) and B211R1 (Spring 1994), respectively. The next refueling outage for Unit 1 is scheduled for Spring, 1995 (B110R1). The next refueling outage for Unit 2 is scheduled for Spring, 1996 (B212R1). CP&L is actively working with the Boiling Water Reactor Vessel & Internals (BWRVIP) Committee on this issue and is awaiting their recommendations before finalizing plans for future outages. As requested by Generic Letter 94-03, CP&L will provide the NRC staff the inspection results for Unit 1 and Unit 2 within 30 days following completion of the inspections for the B110R1 and B212R1 outages.

#### REQUESTED LICENSEE ACTION 2.

2. Perform a safety analysis supporting continued operation of the facility until inspections are conducted. The safety analysis should consider, but not be limited to the following factors:
  - a. Details of the conditions that would influence the probability of the occurrence of cracking and rate of crack growth (e.g., material types and forms, water chemistry, fluence, carbon contents, welding materials and procedures).
  - b. A plant-specific assessment accounting for uncertainties in the amount of cracking, which should include but not be limited to, the following:
    - (1) An assessment of the shroud response to the structural loadings resulting from design basis events (e.g., steam line break, recirculation line break). If asymmetric loads can affect the shroud response, these should also be considered.
    - (2) An assessment of the ability of plant safety features to perform their function considering the shroud response to structural loads (e.g., control rod insertion, ECCS injection).

#### CP&L RESPONSE

By letter dated November 18, 1993, CP&L submitted an evaluation of the cracks found in the Unit 1 core shroud during the B109R1 refueling outage, and design information for the modification of the H-2 and H-3 weld locations. CP&L performed two safety assessments which were incorporated in Engineering Evaluation Report (EER) 93-0536, Revision 1, and

Plant Modification (PM) 93-038. The scope of these documents covers the evaluation and weld modification of the Brunswick Unit 1 core shroud during the B109R1 refueling outage. The NRC staff subsequently evaluated these safety assessments and, by letter dated January 14, 1994, issued a safety evaluation which concluded that the identified flaws would not adversely impact the shroud's structural integrity during the next operating cycle (Cycle 9).

CP&L inspected the Unit 2 core shroud during the B211R1 refueling outage. Findings and evaluation of the findings are included in attached EER 94-0077. In lieu of extensive examination and evaluation of the H-2 and H-3 weld areas, CP&L opted to implement a modification (PM 94-007) of those welds that is essentially identical to that implemented in Unit 1. The results of the operability assessment completed for Unit 2 indicate that the identified flaws in Unit 2 would not adversely impact the shroud's structural integrity during the next operating cycle (Cycle 11). The operability assessment for Unit 2 is included in EER 94-0077. Attachment 1 provides EER 94-0077. Attachment 2 provides PM 94-007, including the modification design basis document.

#### REQUESTED LICENSEE ACTION 3.

3. Develop an inspection plan which addresses: (a) all shroud welds (from support attachments to the vessel to the top of the shroud) and/or provides a justification for elimination of particular welds from consideration; and (b) examination methods with appropriate consideration given to use of the best available technology and industry inspection experience (e.g., enhanced VT-1 visual inspections, optimized UT techniques). Standard methods for inspection of core shroud structures as specified by the ASME Code, Section XI, have been shown to be inadequate for consistent detection of IGSCC in core shrouds.

#### CP&L RESPONSE

As previously stated, CP&L completed inspections of the Unit 1 and Unit 2 core shrouds during the B109R1 and B211R1 refueling outages, respectively. CP&L is awaiting the recommendations of the BWRVIP committee before finalizing inspection plans for future outages. CP&L will provide inspection plans for the B110R1 Unit 1 outage and the B212R1 Unit 2 outage in accordance with the reporting requirements of NRC Generic Letter 94-03. The inspection plan for the Spring 1995 B110R1 refueling outage will evaluate and incorporate, as appropriate, lessons-learned from the Fall 1994 BWR outages.

#### REQUESTED LICENSEE ACTION 4.

Develop plans for evaluation and/or repair of the core shroud.

#### CP&L RESPONSE

CP&L has modified the Brunswick Unit 1 and Unit 2 shroud H-2 and H-3 welds with a bracket configuration, as described in Plant Modifications 93-038 and 94-007, respectively. CP&L is awaiting the recommendations of the BWRVIP committee before finalizing future repair/modification options. CP&L is actively participating with the BWRVIP committee to develop generic repair, modification, and evaluation criteria and has

formed a project team to address the reactor vessel internals issue for the Brunswick units. CP&L will provide, consistent with the requirements of NRC GL 94-03, plans for evaluation and/or repair of the core shroud based on the inspection results along with the inspection plan no later than 3 months prior to performing core shroud inspections for B110R1 and B212R1 refueling outages.

#### REQUESTED LICENSEE ACTION 5.

Work closely with the BWROG on coordination of inspections, evaluations and repair options for all BWR internals susceptible to IGSCC.

#### CP&L RESPONSE

CP&L continues to work closely with the BWRVIP to address the BWR internals cracking issues. CP&L has formed a project team for the Brunswick Plant to address the issues. The project team is structured to interface directly with the BWRVIP subcommittee. CP&L will continue to keep the NRC staff informed with respect to actions being taken regarding this issue for the Brunswick Nuclear Plant.

#### SUMMARY

The 30-day response information required by Generic Letter 94-03 has been included in this Enclosure as follows:

The inspection schedule for the core shroud (Item 1a) was provided in CP&L's response to Requested Action 1. The next scheduled inspections of the shroud will be performed during the Spring 1995 B110R1 refueling outage and the Spring 1996 B212R1 refueling outage.

EER 93-0536, Revision 1, EER 94-0077, and Plant Modifications 93-038 and 94-007 provide the 30-day information required by Items 1b, 1c, and 1d of NRC Generic Letter 94-03, including:

- The plant specific safety assessment which supports continued operation of Brunswick Units 1 and 2,
- Drawings of the core shroud configuration showing details of the core shroud geometry and weld modification information, and
- History of shroud inspections for Brunswick Units 1 and 2 as well as information from the B109R1 and B211R1 refueling outage inspections.

EER 93-0536, Revision 1, and Plant Modification 93-038 were provided to the NRC staff by letter dated November 18, 1993. EER 94-0077 and Plant Modification 94-007 provided with this submittal as Attachment 1 and Attachment 2, respectively, to this Enclosure.

ATTACHMENT 1

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2  
NRC DOCKET NOS. 50-325 & 50-324  
OPERATING LICENSE NOS. DPR-71 & DPR-62

RESPONSE TO NRC GENERIC LETTER 94-03, INTERGRANULAR STRESS CORROSION  
CRACKING OF CORE SHROUDS IN BOILING WATER REACTORS

ENGINEERING EVALUATION REPORT 94-0077

EVALUATION OF UNIT 2 CORE SHROUD INDICATIONS AND OPERABILITY ASSESSMENT

JUNE 1994