

May 23, 1997

Mr. C. S. Hinnant, Vice President
Carolina Power & Light Company
Brunswick Steam Electric Plant
Post Office Box 10429
Southport, North Carolina 28461

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING THE REACTOR VESSEL
MATERIAL SURVEILLANCE PROGRAM - BRUNSWICK STEAM ELECTRIC PLANT
(TAC NO. M98710)

Dear Mr. Hinnant:

By letter dated February 25, 1997, Carolina Power & Light Company (CP&L) submitted WCAP-14474, "Analysis of the 300 Deg. Capsule from Carolina Power & Light Co. Brunswick Unit 2 Reactor Vessel Radiation Surveillance Program," for NRC staff review.

As a result of examining this submittal as well as information from previous CP&L submittals related to your reactor vessel material surveillance program, the staff has identified a need for additional information. The information is described in the enclosed request for additional information (RAI).

Please provide your response within 60 days of the receipt of this letter.

Sincerely,

(Original Signed By)

David C. Trimble, Project Manager
Project Directorate II-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket Nos. 50-325
and 50-324

Enclosure: RAI

cc w/enci: See next page

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Carolina Power & Light Company

Brunswick Steam Electric Plant
Units 1 and 2

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**REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE CAROLINA POWER AND LIGHT COMPANY'S
BRUNSWICK STEAM ELECTRIC PLANT UNIT 1 AND UNIT 2
REACTOR VESSEL MATERIAL SURVEILLANCE PROGRAMS**

The staff noted during its review of Reference 1 that some information on the unirradiated material properties of the material in the Brunswick Steam Electric Plant Unit 2 (BSEP-2) surveillance program were not reported. Specifically, on page 24, Table 5-7 indicated that the 30 ft-lb Charpy test transition temperature, the 50 ft-lb Charpy test transition temperature, the 35 mil lateral expansion Charpy test transition temperature, and the Charpy Upper Shelf Energy were "not available for the unirradiated surveillance program materials." These values were not available for the surveillance plate material (from Lower Intermediate Shell Plate 301), the surveillance weld material, or the surveillance heat affected zone (HAZ) material. Subsequently, the staff examined Reference 2 and noted that the same information was not reported for the surveillance materials in the Brunswick Steam Electric Plant Unit 1 (BSEP-1) surveillance program. However, Appendix F to References 3 and 4 and section 5.3.1.6 of the Brunswick Updated Final Safety Analysis Report (UFSAR) indicate that some amount of surveillance material has been maintained by licensee at plant site as archive material.

Appendix H to Title 10 of the Code of Federal Regulations Part 50 (10 CFR 50 Appendix H), "Reactor Vessel Material Surveillance Program Requirements," states in its introduction that, "The purpose of the material surveillance program required by this appendix is to *monitor changes* [emphasis added] in the fracture toughness properties of ferritic material in the reactor vessel beltline region...which result from exposure of these materials to neutron irradiation and the thermal environment." In Section III.1 of 10 CFR 50 Appendix H, it is noted that in order to achieve this objective, "the surveillance program...must meet the requirements of the edition of ASTM E 185 [American Society for Testing and Materials Standard E 185, author's note] that is current on the issue date of the ASME Code to which the reactor vessel is purchased." Finally, to do so (as further indicated on page 5.3.1-4 of the Brunswick UFSAR) the facilities would be required to comply with the 1966 edition of ASTM E 185 (E 185-66), which states in paragraph 3.3 that to "establish the unirradiated mechanical properties, at least 15 impact and 3 tension specimens shall be tested...."

Based on the above information, the staff requests a response to the following questions:

- [1] Determine and state whether or not sufficient unirradiated Charpy impact data exist to establish a full Charpy impact curve for the units' surveillance materials in the unirradiated state. In this process, the weld wire heat and flux should be determined for the BSEP-2 surveillance weld, since this data has not been reported. The staff expects that the availability of additional unirradiated impact test data for the BSEP-1 and BSEP-2 surveillance materials (e.g. from other licensees, vendors, or fabricator records) will also be examined and any relevant data reported to the staff.

- [2] Identify what surveillance program materials are available in archived storage at the plant. Indicate whether sufficient quantities of these materials are available in the form of fabricated Charpy specimens or as unfabricated material to establish a Charpy curve per the requirements of E 185-66. If, per question 1, sufficient data does not exist already, determine what activities will be taken to obtain sufficient data (if possible) by using this archived material and provide a schedule for performing the necessary testing.
- [3] If a full Charpy impact curve cannot be established from the existing data and if insufficient quantities of the archived surveillance materials exist from which additional Charpy tests can be run to obtain the necessary data, propose an alternative methodology which will accurately make use of the existing data (and any supplementary data) to bring the BSEP 1 & 2 reactor vessel surveillance programs into compliance with ASTM 185-66 and 10 CFR 50 Appendix H. Provide additional data from materials similar to those found in the BSEP 1 & 2 surveillance program to demonstrate that this methodology provides an accurate assessment of expected material properties changes due to the irradiation and thermal effects.

It should be noted, however, that per 10 CFR 50.60(b), approval of an alternative to 10 CFR 50 Appendix H will require an exemption. This exemption request should be submitted in accordance with the requirements of 10 CFR 50.12 along with the technical justification to support this alternative methodology.

REFERENCES

1. Letter from W.H. Campbell (CP&L) to the United States Nuclear Regulatory Commission Document Control Desk, "Brunswick Steam Electric Plant, Unit No. 2, Docket No. 50-324/License No. DPR-62, Reactor Vessel Material Surveillance Specimen Test Results" with attachment, WCAP-14474, "Analysis of the 300 Deg Capsule from Carolina Power & Light Co. Brunswick Unit 2 Reactor Vessel Radiation Surveillance Program," February 25, 1997.
2. Letter from R.P. Lopriore (CP&L) to the United States Nuclear Regulatory Commission Document Control Desk, "Brunswick Steam Electric Plant, Units Nos. 1 and 2, Docket Nos. 50-324 & 50-325/License Nos. DPR-71 & DPR-62, Submittal of Reactor Vessel Material Surveillance Specimen Test Results for Brunswick Unit 1" with attachment, SR-BNP1-1005-001, "Brunswick Unit 1 PRV Surveillance Program First Capsule (300°) Removal After 8 Fuel Cycles, Test Results and Projections," August 17, 1994.
3. NEDO-24157, Revision 2, "Information on Reactor Vessel Material Surveillance Program, Brunswick Steam Electric Plant Unit 2," June 1994.
4. NEDO-24161, Revision 1, "Information on Reactor Vessel Material Surveillance Program, Brunswick Steam Electric Plant Unit 1," June 1994.