CP&L

Carolina Power & Light Company

APR 19 1993

SERIAL: NLS-93-106

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
RESPONSE TO NRC QUESTIONS FROM APRIL 1, 1993 STRUCTURAL MEETING

Gentlemen:

The purpose of this letter is to provide the Carolina Power & Light Company's (CP&L) response to NRC questions raised during the April 1, 1993 structural meeting between CP&L and NRC at the NRR White Flint offi[illegible] Enclosure 1 provides the CP&L response to those questions.

Please refer any questions regarding this submittal to Mr. D. B. Waters at (919) 546-3678.

Yours very truly,

D. B. Waters for
D. [illegible] McCarthy
Manager
Nuclear Licensing Section

DBW/kah (nls93106.wpf)

Enclosure

cc: Mr. S. D. Ebneter
Mr. F. D. Miliano
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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 STRUCTURAL QUESTIONS

Question 1:

What basis exists for assuring short-term structural integrity items resulting from corrosion will continue to be qualified until the items are repaired?

CP&L Response:

Numerous corrosion repairs have been completed in the Service Water Building and Reactor Building since CP&L began a corrosion upgrade program in April 1992. Completion of this program is included in the Brunswick Nuclear Plant (BNP) Three-Year Plan. Short-term structural integrity items will be repaired by the end of next Unit 2 refueling outage except for those items associated with the Service Water pump replacements, which will be completed by November, 1994 when the last Service Water pump is scheduled to be replaced.

Short-term structural integrity items associated with the Service Water System were evaluated in February 1993 to confirm their acceptability until repairs are made. Items exhibiting corrosion were reviewed for the significance of the corrosion to structural integrity and the relative degree of corrosion. The most heavily corroded or sensitive conditions were tested with a loading of two (2) times the postulated design basis loading. The results of these tests showed that the items were capable of withstanding the applied loads without failure.

Maintenance in the Service Water Building has been improved such that additional corrosion of these supports will not be significant. In addition, the testing performed adequately envelopes the expected conditions until the items are replaced.

Question 2:

Provide sources for equations included in the presentation, particularly:

- Non-compact bending allowable
- Weld allowable
- Nelson Stud allowable

CP&L Response:

The primary source for the allowable stress limits established in Design Guide DG-II.20 is Appendix F of Section III of the ASME Code, 1986 Edition. For components and materials not specifically addressed in Appendix F, additional industry documents were consulted and engineering judgement used to establish stress limits which would ensure the structural integrity of the component under review. The basis for each of these limits is documented in CP&L calculation NED-C/STRU-1002, Revision 0. The source of the specific stress limits for the requested items are:

- Non-compact bending allowable: ASME III, Appendix F, Article F1000: "Rules for Evaluation

of Service Loadings with Level D Service Limits", 1986, Section F-1334.4.c.

- Weld allowable: The weld allowable stress of .48 S_u is based on the AISC (Section 1.5.1.2) limit for a material in shear given by $Sy/3^{1/2}$ = .58 S_y. The ratio of S_u to S_y for weld metal is approximately 1.2 (reference Design of Welded Structures, Blodgett, Table 1, page 7.4-1). Therefore, when given in terms of S_u (as is typical for weld metal), the STSI limit for weld metal is .48 S_u.

- Nelson Stud allowable: Historically, Design Guide DG-II.20 has permitted the use of a factor of safety of 1.4 against the ultimate strength of the concrete for operability evaluations of Nelson Studs. The normal factor of safety for Nelson Studs is 2.0. The 1.4 factor of safety used in operability assessments was reviewed in accordance with the requirements of ACI 349-80 and judged to be adequate to assure the structural integrity of the Nelson Studs due to their ductile nature.

Question 3:

Address criteria used for compression in bending.

CP&L Response:

No specific check of the compression flange of a section subjected to bending is required by Design Guide DG-II.20. Evaluation of localized instability within a structure is performed at the discretion of the responsible Engineer.

Question 4:

Address the loading conditions for which .48S_u is appropriate for welding. (i.e., Is .48 S_u used for welds under Normal Loading?)

CP&L Response:

The allowable stress limit of .48 S_u used for the evaluation of weld metal in Operability Assessments is intended for use with all load cases (Normal - Upset - Emergency). The intent of this allowable limit is to ensure structural integrity of the component regardless of the service loading. It is, therefore, considered adequate for use for any design basis load case in an operability assessment.

Generic Letter 91-18 does not specify what load case should be evaluated when making operability evaluations of piping and supports. The generic letter merely references other documents to be used when performing these evaluations (such as IE Bulletins 79-02 & 79-14 and Appendix F of Section III of the ASME code). A review of the applicable sections of these documents indicates that specific load cases are not defined for use with the specified service limits.

Question 5:

Address the use of tested mechanical properties or mill certification.

CP&L Response:

The use of tested mechanical properties or mill certification of material properties has not been used at the Brunswick Plant for operability evaluations. In addition, there are no plans to use this information in the future for structures at Brunswick for which this information may be available. DG-II.20 will be revised to eliminate the option for use of test data to exceed minimum material properties.

Question 6:

Address the use of transient loading in the operability equation for piping.

CP&L Response:

Consistent with our previous procedure employed for operability determinations at Brunswick (Brunswick Procedure M-20), short-term structural integrity items are qualified for loading combinations which include design basis transient loadings. DG-II.20 will be revised to incorporate the requirements of Brunswick Procedure M-20.

Specific transient loading design requirements were recently investigated, and the results of this investigation are summarized in CP&L Report RLCA/P238/01-92/001.