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Carolina Power & Light Company

P. O. Box 101, New Hill, N. C. 27562
June 1, 1984

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-226

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986 - 900,000 KW - UNIT 1
**BOLTED STRUCTURAL CONNECTIONS WITH EXCESSIVE GAPS AND
ASTM A325 NUTS ON ASTM A490 BOLTS, ITEM 92**

Dear Mr. O'Reilly:

Attached is our third interim report on the subject item which was deemed reportable per the provisions of 10CFR50.55(e), on April 26, 1983. CP&L is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by January 1, 1985.

Thank you for your consideration in this matter.

Yours very truly,

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMI/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

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CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

THIRD INTERIM REPORT

BOLTED STRUCTURAL CONNECTIONS WITH EXCESSIVE GAPS
AND ASTM A325 NUTS ON ASTM A490 BOLTS
ITEM 92

June 1, 1984

REPORTABLE UNDER 10CFR50.55(e)

SUBJECT: Shearon Harris Nuclear Power Plant/Unit No. 1 10CFR50.55(e), reportable deficiency, Bolted Connections with Excessive Gaps and ASTM A325 Nuts on ASTM A490 Bolts.

ITEM: Bolted structural steel connections in the Unit No. 1 Turbine and Containment Buildings have gaps, or areas with 0% contact between mating surfaces in friction connections. The part of this problem concerning the use of A325 nuts on A490 bolts was previously found to be non-reportable and so reported on November 30, 1982 (CP&L letter NRC-26).

SUPPLIED BY: Not a supplier-related deficiency. All structural connections concerned were field assembled.

NATURE OF DEFICIENCY: The Turbine Building is seismically designed per Regulatory Guide 1.29, and the Containment Building is a Seismic Class I structure. All structural connections were designed as friction type connections requiring solid seating of the mating surfaces. These connections were previously inspected and accepted.

DATE PROBLEM OCCURRED: June 22, 1982

DATE PROBLEM REPORTED: On July 2, 1982, Mr. L. E. Jones notified the NRC (Mr. A. Hardin) that the item was potentially reportable. On April 26, 1983, Mr. N. J. Chiangi notified the NRC (Mr. A. Hardin) that this item was reportable per the provisions of 10CFR50.55(e).

SCOPE OF PROBLEM: A reinspection of the entire Turbine and Containment Buildings, including all structural connections where there was a potential for these gaps occurring, has been completed. An engineering evaluation had determined that the gaps would not occur in connections with beam end clips or plates less than 5/8" thick. In standard design, these clips deflect slightly under bolt tension to make contact with the adjacent mating surface. Main support girder end clips were generally fabricated from 1" thick angle, and end plate thicknesses in some members exceeded 2".

A total of approximately 878 connections were reinspected in the Turbine Building and approximately 500 in the Containment, with gaps being found in approximately 154 and approximately 36, respectively. An additional 59 connections in the Turbine Building with gaps have been identified in inspections since the reinspection addressed by this reportable item was completed. These connections were found to lack documentation, indicating they had not been inspected previously.

SAFETY IMPLICATION:

The inability of the end clips and end plates to deflect under bolt tension, to close the mating surface gaps resulting from fabrication tolerances (allowing the girders to be fabricated slightly short for erection purposes) has two implications. The lack of contact area may affect the slip resistance in the friction connection. But more importantly, where the surfaces are not in contact, the bolt tension load is transferred to the weld attaching the clip or plate to the girder, potentially overstressing the weld.

**REASON DEFICIENCY
IS REPORTABLE:**

Reportable due to the magnitude of the problem plus the extensive evaluation and/or rework required.

CORRECTIVE ACTION:

Appropriate site technical procedures have been revised to specifically require inspection for mating surface gaps during erection. Inspection and craft personnel have received additional training in inspection and erection of structural steel through formal classes and on-the-job training.

Permanent Waivers (PW's) were written, requiring engineering evaluation, for each deficient connection. Each connection not accepted "as-is", as not being significantly deficient, is being repaired to make it acceptable, based on this engineering evaluation. To date, 100% of the connections with gaps in the Turbine Building and in the Containment Building have been evaluated for acceptability. Of these, 11 in the Turbine Building and 12 in the Containment Building still require rework and/or final acceptance of work already performed. Rework and reinspection of those connections for which it is required is in progress.

FINAL REPORT:

A final report will be issued when the rework is complete. We now expect to issue a final report by January 1, 1985.