SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

DEFICIENCIES IN WELDED STUDS ON EMBEDDED STRIP PLATES

Final Report
February 4, 1980

Reportable Under 10CFR50.55(e)

Prepared by: Carolina Power & Light Company

8002140396

SUBJECT: 10CFR50.55(e) Reportable Item
Shearon Harris Nuclear Power Plant (SHNPP)
Embedded Strip Plates with Inadequate Welds on Studs

ITEMS: Embedded Strip Plates Received at Site November 12, 1979; November 15, 1979; November 23, 1979; December 3, 1979; December 19, 1979

SUPPLIED BY: Alfab, Inc.
P. O. Box 727
Enterprise, Alabama 36330

NATURE OF DEFECT: During receipt inspection the studs on the strip plates are inspected. This inspection resulted in the conclusion that the shipments of embedded plate referenced above contained studs with inadequate strength.

DATE PROBLEM WAS CONFIRMED TO EXIST: Upon investigation, it was determined, January 8, 1980, that the strip plates could not fulfill their design function, with the studs not able to meet their design strength.

PROBLEM REPORTED: November 19,1979 - CP&L (N. J. Chiangi) informed NRC Region II office (Mr. R. Bradley) by telephone that the problem was "potentially reportable" under 10CFR21.

December 14, 1979 - CP&L (N. J. Chiangi) informed NRC Region II office (Mr. R. Bradley) by telephone that the problem was not reportable under 10CFR Part 21.

December 17, 1979 - CP&L sent a letter to NRC Region II, 101 Marietta Avenue, Suite 3100, Atlanta, Georgia, 30303, confirming December 14, 1979, telephone report and stating that CP&L now considered the item to be potentially reportable under 10CFR50.55(e) requirements.

December 20, 1979 - CP&L (N. J. Chiangi) informed NRC that another shipment of strip plates contained faulty studs and was potentially reportable under 10CFR50.55(e) and 10CFR21 criteria.

January 7, 1980 - CP&L (N. J. Chiangi) informed NRC Region II office (Mr. R. Bradley) that CP&L had evaluated the items and considered them to be reportable under 10CFR50.55(e) criteria but not reportable under 10CFR21 criteria.

SCOPE OF PROBLEM: Five shipments of embedded strip plates were found to contain studs which would not pass the specified acceptance test (AWS D1.1). Details of the shipments are shown in the table below.

Embed Plate List

Date Received	Total No. of Plate's	No. of Rejected Plate's
11/15/79	252	101
11/12/79	283	14
11/23/79	459	44
12/3/79	486	56
12/19/79	36	4

SAFETY IMPLICATIONS: Strip plates are used to support any load (seismic, nonseismic, safety related or nonsafety related) within the design envelope loads. These plates are not controlled in their use and any plate accepted for use can be used in any location where a strip plate is needed. Plates from the shipments containing faulty studs could have been used to carry loads required for Seismic Category I Safety Related Equipment. According to the analysis performed on these plates, the plates would have had minor overstress when loaded to the envelope loads. Some loads less than envelope loads could be carried by the plates even with the faulty studs.

The application of envelope or near envelope loads to a plate with missing or faulty studs and to support safety related loads would have resulted in permanent deformation of the strip plates, shifting of load and violation of seismic design criteria. However, the analysis of this condition is conservative. The more accurate analysis for this condition is a limiting or plastic analysis which has not been performed. In general, a plastic analysis results in indicating much less severe conditions and would probably have indicated that very little, if any, stress above ultimate strength would have been experienced.

REASON(S) PROBLEM WAS REPORTABLE: The strip plates cannot meet their original design criteria with inadequate studs. This condition is addressed in 10CFR50.55(e) and is a condition which "...were it to have remained uncorrected, could have affected adversely the safety of operations...and which represents:

(iii) A significant deficiency in construction... which will require extensive evaluation,... or extensive repair to meet the criteria and bases stated in the Safety Analysis Report or construction permit...." (Quotation from 10CFR50.55(e).

CORRECTIVE ACTIONS: All shipments found to contain defective studs were returned to Alfab. Alfab performed a detailed inspection of the plates in the returned shipment and upgraded any studs found to be defective. The upgraded plates with studs were then shipped to CP&L and found satisfactory.

During the course of investigation of welding processes at Alfab, both plant power supply voltage and welding procedure were checked. The cause of these stud weld failures was determined to be the welding procedure. The welding procedure was modified to result in a changed lift height resulting in a better contact surface between the stud and the plate. The welding procedure change results in changing the stud height from 7" - 7 1/6" to 6 15/16" - 7". This change will eliminate future instances of this type of failure.