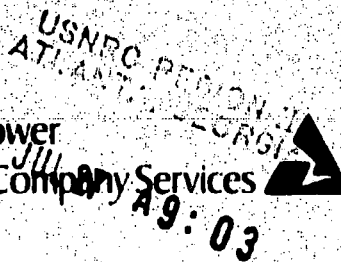


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**D. O. Foster**  
Vice President and General Manager  
Vogtle Project

July 21, 1983

United States Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region II-Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30303

File: X7BG03-M35  
Log: GN-243

Reference: Vogtle Electric Generating Plant - Units 1 & 2  
50-424, 50-425; Use of Caldwell's End Anchorages

Attention: Mr. James P. O'Reilly

Gentlemen:

Georgia Power Company has conducted an evaluation to determine the reportability of the above referenced concern under Part 10 CFR 50.55(e) and Part 10 CFR 21. Our evaluation has concluded that this concern does not present a significant deficiency or a substantial safety hazard and, therefore, is not reportable under Part 10 CFR 50.55(e). A summary of the engineering evaluation is attached.

This letter contains no proprietary information and may be placed in the NRC Public Document Room upon receipt.

Yours truly

D. O. Foster

DOF/CWH/cc

attachment

xc: U. S. Nuclear Regulatory Commission  
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Washington, D. C. 20555

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EVALUATION FOR A SUBSTANTIAL SAFETY HAZARD  
EVALUATION FOR A SIGNIFICANT DEFICIENCY

Use of Cadwelds as End Anchorages

Initial Report:

On January 13, 1983, Mr. C. W. Hayes of Georgia Power Company informed Mr. John Rogge of the USNRC of a potential deficiency concerning the use of Cadwelds as end anchorages.

Background Information:

Mechanical end anchorages are utilized for developing the reinforcement while maintaining concrete integrity. The design for the Vogtle project utilizes a Cadweld sleeve attached to the end of a reinforcing bar as a mechanical end anchorage. This concern was identified during an INPO pilot audit.

Engineering Evaluation:

Section 12.12 of ACI 318-71 permits the use of mechanical analysis in lieu of conventional reinforcing bar development and requires test results showing the adequacy of such devices.

In order to satisfy the requirement for test results, a review was made of existing test data on anchor bolts and welded studs for relevance to Cadweld sleeves used as mechanical anchorages. As a result of this review it has been determined that the test data are relevant for this design application based upon a comparison of the mechanics of load transfer and the bearing head stress levels. From the test data Bechtel has developed conservative empirical design relationships for anchor head area and the prevention of lateral bursting. These empirical relationships are consistent with the design expressions developed by the Working Group on Appendix B to ACI 349 which have been endorsed by the ACRS in draft Regulatory Guide MS 129-4.

The following steps in the design process are used in the design of Cadweld Sleeves as mechanical end anchorages:

a. Concrete bearing against end of Cadweld sleeve:

The empirical relationships require that the anchor head (Cadweld sleeve) gross area (including the area of the tensile stress component) be at least 2.5 times the tensile stress area of the connecting rod (reinforcing bar). It was confirmed that this requirement is satisfied for reinforcing bar sizes number 6 through number 18.

b. Lateral Bursting:

Determination of minimum cover or confinement reinforcement to prevent lateral bursting have been calculated in accordance with the empirical relationships.

c. Punching shear to resist direct pullout:

Punching shear is considered regardless of whether the reinforcing bar is anchored by a straight development length, a hook, a mechanical anchor or any combination thereof.

The utilization of mechanical anchorages in areas of high congestion represents a design with improved concrete placement and vibration and results in improved structural integrity.

Conclusion:

Georgia Power Company and Bechtel Power Corporation have performed an extensive re-evaluation of the use of Cadweld as end anchorages. This evaluation has included the detailed re-review of test results and the empirical design relationships developed from these tests for relevance to the application utilized at Plant Vogtle, as well as to assure that the ACI 318-71 requirements are met.

Based on the results of this evaluation, the design basis requirements are appropriately met and that since there has not been an adverse affect upon a safety-related structure, system or component, a significant deficiency and a substantial safety hazard cannot exist. Therefore, this concern is not reportable to the NRC under 10 CFR 21 or 10 CFR 50.55(e).