

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS
NCR CEB 79-16 AND CEB 79-17
10CFR50.55(e) REPORT NO. 3 (FINAL)
TENSILE ANCHOR CAPACITIES LOWER THAN
ASSUMED IN DESIGN ALLOWABLES

Description of Deficiency

Progressive cracking of the heat affected zone of welded stud anchors in flexible plate connections has occurred in TVA general research and development tests. This results in lower tensile anchor capacities than assumed in establishing design allowables.

Safety Implications Statement

Based on the results and conclusions of the testing program, a review of welded anchorages found the anchorages for heavy embedments were adequate and would perform as designed under design loadings. For embedments subject to small loadings/bending moments, their ability to withstand their design loadings cannot be determined except by actual testing of each embedment. Therefore, it is conservatively assumed that had the deficiency gone uncorrected, design loadings could be exceeded for these embedments. Since some portions of the safety systems are supported by these embedments, the safe operation of the plant could have been adversely affected.

Corrective Action

When this problem was discovered, a testing program was initiated to quantify the effect of plate flexibility on stud capability. The results of the tests are contained in CEB Report 79-18 (attachment 1).

A review of welded stud attachments for safety-related systems within the balance-of-plant at Hartsville and Phipps Bend was conducted to verify the plant's compliance with CEB Report 79-18. Plate flexibility problems were eliminated in heavy embedments by utilizing knee brace brackets instead of cantilever brackets, thus eliminating high bending moments on the plates. The decision to add these knee brackets was made before this discovery of the tensile anchor capacity problem and, therefore, was not performed as corrective action for the problem.

For embedments subject to small loadings/bending moments, cantilever brackets and the test data of CEB Report 79-18 were utilized for modification of the structural deflection design of the affected embedments.

As a result of the review conducted, TVA has determined that the anchorages at Hartsville and Phipps Bend Nuclear Plants are now adequate.

1373 355

7911200 579