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TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

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July 24, 1980

Mr. James P. O'Reilly, Director  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Region II - Suite 3100  
101 Marietta Street  
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

HARTSVILLE NUCLEAR PLANT UNITS A1 AND B1 - REPORTABLE DEFICIENCY -  
CONTAINMENT ANCHOR BOLT CHAIR WELD DEFICIENCIES (NCR HNP-A-062 AND -B-029)

Initial report of the subject reportable deficiency was made to  
F. S. Cantrell, NRC-OIE, Region II, on August 2, 1979. The first,  
second, and third interim reports were submitted on August 30, 1979,  
January 11, and March 19, 1980, respectively. In compliance with paragraph  
50.55(e) of 10 CFR Part 50, we are enclosing the final report of the  
subject deficiency. If you have any questions concerning this subject,  
please call Jim Domer at FTS 857-2014.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

*L. M. Mills*

L. M. Mills, Manager  
Nuclear Regulation and Safety

Enclosure

cc: Mr. Victor Stello, Director (Enclosure)  
Office of Inspection and Enforcement  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555

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ENCLOSURE  
HARTSVILLE NUCLEAR PLANT UNITS A1 AND B1  
CONTAINMENT ANCHOR BOLT CHAIR  
WELD DEFICIENCIES  
10CFR50.55(e) REPORT NO. 4 (FINAL)  
NRC HNP-A-062 AND HNP-B-029

On August 2, 1979, TVA notified NRC-OIE Region II, Inspector F. S. Cantrell, of a potentially reportable condition under 10CFR50.55(e) regarding deficient welds between the containment anchor bolt chair (stiffener plate) and both the containment shell and the containment base plate. This is the final report on the subject reportable condition.

Description of Deficiency

During the course of investigating items concerning quality control investigation reports (QCIR's) on containment anchor bolt chair welds for unit B1, a welding QC group leader noticed other unacceptable welds between containment anchor bolt chairs (CABC) and the containment shell and/or the containment base plate. Further investigations identified additional unacceptable welds on some of the 960 chair plates on units A1 and B1. These welds had been inspected and signed off by QC welding inspectors (hereinafter referred to as inspectors) as acceptable even though they did not meet the acceptance requirements of QCI N501 and N201 with respect to either weld size, undercut, surface condition, or a combination of the three. In total, 366 welds were rejected on the CABC's of unit A1 and 345 on unit B1. None of the unit A2 or B2 CABC welds are involved with this deficiency because they were not installed at the time of discovery of this condition.

This deficiency is a combination of a breakdown in implementation of the welding QA/QC program and the existence of the unacceptable welds.

Cause of the Deficiency

The deficiency is and resulted from a breakdown in implementation of the TVA welding QA/QC program in which some inspectors were allowing welds which did not meet specification requirements to pass inspection. This situation appears to have resulted from incomplete understanding on the part of some inspectors as to weld acceptance criteria and not from intentional disregard of acceptance criteria by the inspectors.

Safety Implications

Some of the deficiencies existing in the CABC welds, undersize or undercut welds, might have reduced the strength of the attachment between the containment shell and base plate at the plates where the specific deficiencies existed. The overall containment design strength and integrity may not have been jeopardized because many

of the deficiencies were of the type which would not reduce the strength of the welds and other design features, such as additional stiffening provided by concrete in the annulus between the containment shell and shield building, would provide additional strength to the area in question. The primary safety concern is the significant breakdown in the welding QA/QC program in that a large number of welders were producing inadequate welds and a large number (25) of welding QC inspectors were accepting them. If this condition had not been corrected, it might have led to further inadequacies in the welding program for the Hartsville Nuclear Plant.

#### Corrective Action

As a result of this deficiency, all of the CABC welds on units A1 and B1 were reexamined so that all deficient welds were identified. Those welds which were identified as deficient will be repaired to original specifications and the repaired areas tested accordingly. This work will be completed for the 366 deficient welds on unit A1 on or by December 19, 1980. The 345 deficient welds on unit B1, which is currently deferred, may not be completed until resumption of work on that unit. In order to ensure the completion of the work on unit B1 CABC welds, a new NCR, HNP-B-029, will be opened and will be maintained as an open item on Plant B until the CABC welds are repaired and accepted.

TVA reviewed all CABC weld inspection records on units A1 and B1 and compared them with the results of the reinspection to determine the number of welding QC inspectors involved. Twenty-five inspectors were found to have passed unacceptable containment anchor bolt chair (CABC) welds on units A1 and B1. The magnetic particle examination (MT) and/or visual examination certifications for all 25 of the inspectors were subsequently administratively revoked. Since then 23 of the inspectors have been retrained and recertified as appropriate. One of the inspectors was terminated for other reasons. The remaining inspector has not been retrained or recertified to the MT method. He is currently assigned to inspection duties not requiring MT certification and will be retrained and recertified as appropriate before any reassignment requiring MT certification.

As a result of this deficiency, TVA undertook an extensive investigation of other welds that had been previously accepted. This investigation was supervised by an independent inspector certified as NDE Level III Construction, and included an evaluation of other completed weldments in units A1 and B1 to determine if the deficiencies present in the CABC welds existed in other areas of the site. This evaluation included a complete reinspection to specification requirements of 150 randomly selected welds and a visual survey of welds in the general area of the 150 selected welds. The overall reinspection indicates that the deficiencies present on the anchor bolt chair welds were not generally present in other areas at the Hartsville Nuclear Plant. The overall evaluation of the independent Level III inspector was that the anchor chair deficiencies were an isolated condition and that the overall weld inspection program is adequate and comparable to the industry standard.

### Action Taken to Prevent Recurrence

Discussions with and retraining and recertification of the welding QC inspectors involved should prevent the recurrence of this type of QA/QC program breakdown.

All welders and welding foremen were scheduled to attend a welder QA orientation program which began on February 29, 1980. To date, a total of 681 welders and foremen have attended the orientation. The program includes indoctrination in AWS/ASME welding requirements. Implementation of this training should upgrade the quality of the welds presented to welding QC for approval because welders will have more understanding of applicable acceptance criteria.

Also, TVA (OEDC) has formed a special task force to investigate the welding program at TVA construction sites, including Hartsville, to determine the cause for continued welding problems (deficiencies of the type discussed herein) at the sites and to provide recommendations for improvement. The findings of the task force should strengthen and upgrade the welding program at Hartsville through identification of any residual problems.