TENNESSEE VALLEY AUTHORITY
400 Chestnut Street Tower II
CHATTANOOGA, TENNESSEE 37401

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March 8, 1985

U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - RESPONSE TO VIOLATION 50-438/85-02-01, 50-439/85-02-01 - CORRECTIVE ACTIONS FOR CONCRETE EXPANSION WEDGE ANCHORS

This is in response to D. M. Verrelli's letter dated February 11, 1985, report numbers 50-438/85-02, 50-439/85-02 concerning activities at the Bellefonte Nuclear Plant which appeared to have been in violation of NRC regulations. Enclosed is our response to the citation.

If you have any questions, please get in touch with R. H. Shell at FTS 858-2688.

To the best of my knowledge, I declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. W. Hufham, Manager
Licensing and Regulations

Enclosure
cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
RESPONSE TO SEVERITY LEVEL V VIOLATION
50-438/85-02-01, 50-439/85-02-01
CORRECTIVE ACTIONS FOR CONCRETE EXPANSION WEDGE ANCHORS

Description of Deficiency

10 CFR 50, Appendix B, Criterion XVI, as implemented by TVA Bellefonte FSAR Section 17, requires, in part, that measures shall be established to assure that conditions adverse to quality, such as nonconformances are promptly identified and corrected. This included the adequacy of investigations to determine causes of the conditions and adequacy of corrective action taken to preclude repetition.

Contrary to the above, the adequacy of investigations to determine the causes of the conditions had not been performed in that a review of the response for NCR 2833 revealed that the response was misleading as such that the lack of washers would result in wedge bolts being torqued to a higher value than expected. The response was based on judgment instead of detailed evaluations.

TVA Response

Admission or Denial of the Alleged Violation

Although the justification on the attachment to nonconformance report (NCR) 2833 was unclear in stating the basis for engineering approval of the use-as-is disposition, TVA denies that a violation of our commitments to 10CFR50, Appendix B, Criterion XVI exists. This is because:

a. the nonconformance was promptly identified and corrected,
b. the cause of the condition was established,
c. corrective action to preclude its recurrence has been taken, and
d. adequate investigations to establish the justification for the use-as-is disposition of the NCR were performed prior to disposition of the NCR.

NCR 2833 was written because wedge bolt anchors were installed without washers. Washers are required by TVA General Construction Specification G-32, and this requirement was incorporated into Construction Quality Control Procedure (QCP) 2.8.

The use-as-is disposition was approved because the torques used for installation of wedge bolt anchors provide a preload at least 50-percent greater than the maximum design load. The installation torque is determined in onsite qualification tests based on a required lift-off load of 1.5 times the design load. The purpose of the excess torque is to account for variations in condition of the bolt and washer.

The judgment of TVA engineers' experienced in anchorage design area was that any reduction in anchor preload as the result of deletion of the washers would be significantly less than 50 percent, and that the preload achieved without washers would be adequate. The potential reduction in preload would be much less than that which would occur for other structural and mechanical applications using high strength bolts. For those applications, hardened washers are needed to assure predictable preloads based on torque. The torque applied to wedge bolts is significantly lower than the torque used for most bolting applications because the capacity of wedge bolts is controlled by slip of the wedges, not the material properties of the bolt.

A further consideration in the acceptance of the use-as-is disposition was that the preloading of wedge bolt anchors is not intended to provide a permanent prestress of the structural joint, but to limit the anchor deformation under extreme loading conditions and to assure that the wedge bolt anchorage mechanism is properly engaged. Torques substantially less than required by G-32 would achieve these results.

The justification for the response on NCR 2833 was unclear because a misunderstanding occurred with respect to the use of the terms "torque" and "preload." The wedge bolts were not torqued to a higher value but to the same value normally used for wedge bolt installation. Acceptance of the use-as-is disposition was technically correct and was based on knowledge of the behavior and design requirements for wedge bolt anchors.