

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

June 25, 1985

BLRD-50-438/81-56

BLRD-50-439/81-58

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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:

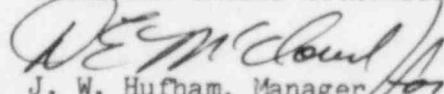
BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - REACTOR COOLANT SYSTEM SUPPORTS  
AND RESTRAINTS - BOLT TORQUES - BLRD-50-438/81-56, BLRD-50-439/81-58 -  
FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector  
R. V. Crlenjak on August 24, 1981 in accordance with 10 CFR 50.55(e) as  
NCR BLN NEB 8111. This was followed by our interim reports dated  
September 24 and December 7, 1981; March 10, June 7, and December 13, 1982,  
June 29, 1983; and June 24, 1985. Enclosed is our final report. The  
report concludes that TVA no longer considers 10 CFR 50.55(e) applicable to  
this item.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY



J. W. Hufham, Manager  
Licensing and Risk Protection

Enclosure

cc (Enclosure):

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

Mr. H. B. Barkley  
205 Plant Project Services  
P.O. Box 10935  
Lynchburg, Virginia 24505

Records Center  
Institute of Nuclear Power Operations  
1100 Circle 75 Parkway, Suite 1500  
Atlanta, Georgia 30339

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## ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2  
REACTOR COOLANT SYSTEM SUPPORTS AND RESTRAINTS - BOLT TORQUE  
NCR BLN NEB 8111  
BLRD-50-438/81-56, BLRD-50-439/81-58  
10 CFR 50.55(e)  
FINAL REPORT

### Description of Deficiency

Babcock and Wilcox (B&W), Lynchburg, Virginia, specified ASME SA540 classes 1 and 2 material and a preload of 70 percent of ultimate tensile strength for many of the reactor coolant system (RCS) anchor bolts for supports and restraints. These materials have a minimum yield strength of 150 ksi and 140 ksi, respectively. However, it has been documented that stress corrosion cracking (SCC) is a potential failure mode for high-yield strength (120 ksi) low-alloy steel bolting material subjected to appreciable steady-state loads (generally preload in the case of supports and restraints) and typical reactor containment corrosive environments (humid air or borated water on occasion) for extended periods of time.

When the Bellefonte Nuclear Plant (BLN) supports were being designed (the early 1970s), the general philosophy of support design (basically an AISC approach with relatively large preloads) did not take into account SCC as a potential failure mode.

### Safety Implications

The Atomic Industrial Forum/Metals Property Council (AIF/MPC) Task Group on Bolting developed a screening criteria for component support bolting which established that bolting with a minimum specified yield strength of 180 ksi or less did not require further evaluation (this information was submitted to the NRC as Appendix I, Task 14 of the Task Group's bolting program enclosed with Richard M. Eckert's letter from the AIF to R. H. Vollmer dated July 19, 1983). Based on this criteria, TVA concluded that a generic evaluation of the support and restraint bolting is not warranted at BLN since the minimum specified yield strength of the material at BLN is not greater than 150 ksi. Also, since TVA has not experienced failures of the support and restraint bolting, case-by-case evaluation via a plant-specific plan was similarly not warranted. However, because the minimum specified yield strength of the SA540 class 1 bolting is at the dividing line of 150 ksi, TVA performed a case-by-case review of class 1 bolting using the certified material test records (CMTRs) of each heat of the SA540 class 1 bolting used and a seven-point CMTR review criteria established by APTECH Engineering Services. Each heat met all seven of the criteria and again demonstrated that the bolting material is acceptable for use "as is." Therefore, TVA concludes that there is no condition which could adversely affect plant safety. As such, TVA no longer considers 10 CFR 50.55(e) applicable to this item.