

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

83 DEC 19 P12:49 December 16, 1983

BLRD-50-438/83-38
BLRD-50-439/83-33

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - BREAKING OF WELDED STUDS
- BLRD-50-438/83-38, BLRD-50-439/83-33 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
P. E. Fredrickson on June 6, 1983 in accordance with 10 CFR 50.55(e) as
NCR BLN 2377. This was followed by our interim report dated July 5, 1983.
Enclosed is our final report.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

D S Kammer

for L. M. Mills, Manager
Nuclear Licensing

Enclosure

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

Records Center (Enclosure)
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
BREAKING OF WELDED STUDS
BLRD-50-438/83-38, BLRD-50-439/83-33
10 CFR 50.55(e)
NCR BLN 2377
FINAL REPORT

Description of Deficiency

Some of the 1/4-inch welded studs used on seismic conduit supports are breaking during torque-tightening or after a period of time subsequent to tightening. An informal test of approximately 30 studs conducted by TVA's Division of Construction (CONST) personnel indicated a breaking torque of 7-1/2 to 12-1/2 ft-lbs. TVA drawing 4RA0560-X2-13 R6, "Typical Seismic Conduit Support" specifies a minimum torque requirement of 6 ft-lbs. However, TVA's process specification 3.C.5.3(a) specifies a torque value of 5 ft-lb for 1/4-inch studs. This corresponds to the maximum torque value for 1/4-inch studs recommended by the American Welding Society (AWS) Code D1.1. Stud manufacturers recommend a torque value of no more than 60 percent of the yield strength. For 1/4-inch studs which have a yield strength of 55 ksi, 60 percent of 55 ksi corresponds to a torque value slightly in excess of 4 ft-lbs. Therefore, the specified minimum torque on the installation drawing is 20-30 percent higher than the maximum torque recommended by the steel manufacturers and AWS D1.1. The root cause of this nonconformance may be attributed to a misunderstanding of the vendor's literature from which the torque requirements were drawn.

Watts Bar NCR WBN SWP 8230, which was referenced in our first report, is being reported on separately.

Safety Implications

If the threaded connections used on seismic supports or steel structures should be over-torqued and break, the ability of the affected support or structure to accomplish it's design purpose could be compromised. This could reduce the ability of the affected systems and structures to withstand the effects of a design basis seismic event and thus be adverse to the safety of operations of the plant.

Corrective Action

TVA drawings 4BA0892-X2-9, 4BB0892-X2-2, and 4RA0560-X2-13 have been revised to correspond to the maximum torque values specified in the AWS Code D1.1. All broken welded studs have been replaced by TVA's Division of Construction.

The root cause of this nonconformance has been determined to be an isolated case; consequently, no actions to prevent recurrence are required.