TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

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June 22, 1982

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - FILLET WELD MISSPECIFICATION - NCR BLN BLP 8007 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector R. W. Wright on November 7, 1980 in accordance with 10 CFR 50.55(e). This was followed by our interim reports dated December 3, 1980, January 19, April 9, July 6, and September 23, 1981, and February 17, 1982. Enclosed is our final report. This deficiency has also been reported for every TVA nuclear plant.

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

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, DC 20555

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ENCLOSURE
BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
FILLET WELD MISSPECIFICATION
NCR BLN BLP 8007
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

In a number of Bellefonte Nuclear Plant systems, fillet welds were specified, in lieu of beveled groove welds, to connect members whose angle of intersection is outside the limits for fillet weld application as stipulated in the American Institute of Steel Construction (AISC) standards. The AISC Standard states that the welds which are made joining members at an angle of 60 degrees or less, or 135 degrees or more, are to be defined as acute angle welds. Acute angle welds should be specified as beveled groove welds according to AISC.

Safety Implications

Had the welded connections failed, safety-related piping, HVAC, and electrical equipment could have been damaged to the extent that safe shutdown of the plant would have been jeopardized. However, since the adequacy of the weld configuration used by TVA has been demonstrated, no condition adverse to the safety of operations of the plant exists.

Corrective Action

TVA conducted a testing program to verify the structural adequacy of fillet welds designed and fabricated outside the prequalified limits of AISC. TVA fabricated representative mockups of the misspecified fillet welds. For comparison, "control mockups" were also fabricated within the prequalified limits of AISC. Fabrication instructions included the requirement that these fillet welds be fabricated according to normal practice utilized at Bellefonte Nuclear Plant before November 1980, the time at which the subject NCR was initiated.

TVA's Singleton Laboratory performed destructive tests on these mockups with the results reported in report BLN 810812 017 dated August 12, 1981.

The results of the testing program confirmed that TVA's usage of all-around fillet welding for skewed angle joints between 30 degrees and 60 degrees and joints between 135 degrees and 150 degrees produced factors of safety comparable to angles presently contained in AISC. This testing program validates TVA's practice of fillet welding all around skewed joints at angles exceeding the AISC recommendations.

General Construction Specification G-29C has been revised to further define construction requirements for skewed angle joints to allow all-around fillet welding for joints (angles) exceeding AISC requirements.

Information (TVA memorandum dated March 1, 1982, CEB 820301 026) has been provided to all engineers and designers further emphasizing the AISC and TVA's G-29C requirements for fillet welded skewed angle joints.