TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

October 22, 1981

WBRD-50-390/81-01
WBRD-50-391/81-01

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:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - FILLET WELD MISSPECIFICATION - WBRD-50-390/81-01 AND WBRD-50-391/81-01 - FOURTH INTERIM REPORT

This deficiency was initially discovered on Bellefonte Nuclear Plant and was reported to the NRC on November 7, 1980, as NCR BLN BLP 8007. Subsequent investigation revealed that this deficiency was applicable to all TVA plants. The deficiency was reported to NRC-OIE Inspector R. W. Wright on December 10, 1980, in accordance with 10 CFR 50.55(e) for Watts Bar as NCR's WBN SWP 8008 and WBN 2807R. Interim reports were submitted on January 9, April 8, June 8, and July 16, 1981. Enclosed is our fourth interim report. We expect to provide additional information by February 12, 1982.

If you have any questions, please get in touch with R. H. Shell at FTS 857-2581.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

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

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
FILLET WELD MISSPECIFICATION
SKEWED TEE JOINTS
WBRD-50-390/81-01, WBRD-50-391/81-01
10 CFR 50.55(e)
FOURTH INTERIM REPORT

Description of Condition

Our investigation has identified violations of the 135 degree maximum, 60 degree minimum angle permitted for intersecting members of prequalified fillet-welded skewed tee joints. This requirement is imposed by the American Institute of Steel Construction (AISC) specification and the American Welding Society (AWS) D1.1 structural welding code.

This condition was found to exist in miscellaneous Category I steel features and for Category I mechanical and electrical component supports. The Category I buildings are not involved in the nonconformance since none of these structures are steel framed. Further investigation has also identified this condition in engineered pipe supports in the intake and essential raw cooling water pumping stations and in gates, cranes, locks, doors, hatches, and other miscellaneous mechanical features in both TVA and vendor designs.

Corrective Action

All drawings of the steel civil features will be reviewed for presence of the nonconforming geometry. These features include cable tray supports, platforms, pipe-rupture protective devices, monorails, and tank and equipment supports. These structures are located in the auxiliary, control, reactor, diesel generator, and carbon dioxide storage buildings. For all civil structures, approximately 100 representative nonconforming joints were selected for detailed structural analysis. This analysis was conservative in that it either neglected the load-carrying capacity of the fillet weld in the acute and obtuse angle portions of all joints or only considered a portion of the weld throat as structurally effective.

Fourteen joints were found to have welds inadequate in size. These welds will be increased to the required size or the joints will be strengthened by other means (gusset plates, additional bracing, etc.).

TVA plans to review engineered support drawings for all piping sizes and typical mechanical support drawings for conduit, instrumentation, ducts, and alternately analyzed piping 2 inches and under. The systems to be reviewed are as follows:

Reactor coolant	Component cooling
Residual heat removal	Main feedwater
Safety injection	Upper head injection
Chemical and volume control	Containment spray
Auxiliary feedwater	Steam generator blowdown
Main steam	Essential raw cooling water

Regarding the joints not yet reviewed, any nonconforming skewed tee joints which are found by analysis to be structurally inadequate will either have the adequacy established by other methods or will be repaired.

TVA has completed identification and evaluation of nonconforming weld joints occurring on all TVA and vendor drawings involving gates, cranes, locks, doors, hatches, screens, bulkheads, seals, and platforms. Evaluation methods and criteria were as discussed above for other civil and mechanical features. All were found to be structurally adequate.

All Westinghouse supplied and/or designed RCS equipment supports, ice condenser, refueling equipment, fuel-handling equipment, cranes, etc., skewed T-joint fillet welds have either been qualified by analysis and/or testing, or are considered nonload carrying welds.

Engineers and designers have been alerted to the AISC/AWS requirements for limiting angles for skewed tee joints.

The problem identified in previous reports on this deficiency concerning inadequate welding design information is being dealt with by the Welding Taskforce group. This group is addressing a wide range of welding problems documented in this and previous NCR's and has as one of its major objectives a revision of General Construction Specification G-29c. This specification establishes procedures for implementing AISC/AWS and other industry standards at TVA plants.