

**TENNESSEE VALLEY AUTHORITY**

CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

**MAR 11 1987**

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Attention: Dr. J. Nelson Grace

**WATTS BAR NUCLEAR (WBN) PLANT UNIT 1 - NRC-OIE INSPECTION REPORT  
NO. 50-390/86-17 - RESPONSE TO VIOLATION**

Enclosed is our response to G. G. Zech's letter dated February 5, 1987 to S. A. White which transmitted Inspection Report No. 50-390/86-17, citing TVA activities which appeared to involve three violations of NRC regulations. Enclosed is our response to these three apparent violations.

As discussed in the enclosure, TVA denies the first violation. TVA has verified that the welding activities involved were conducted with qualified procedures that were in compliance with NRC regulations and that were technically adequate. In the second case, TVA believes that a violation is not warranted.

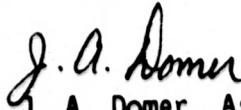
TVA admits that the third violation did occur. Engineering evaluations have shown that, notwithstanding the discrepancies from the drawings, the welds themselves are suitable for service and met all licensing commitments. TVA will identify the root causes that led to the development of the situation that resulted in these problems and develop appropriate corrective actions to avoid further violations as part of the TVA Weld Evaluation Program.

If there are any questions, please get in touch with J. T. Beard at (615) 365-3284.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY



J. A. Domer, Assistant Director  
Nuclear Safety and Licensing

Enclosure  
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U.S. Nuclear Regulatory Commission

**MAR 11 1987**

cc (Enclosure):

Mr. G. G. Zech, Director  
U.S. Nuclear Regulatory Commission  
TVA Projects  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

U.S. Nuclear Regulatory Commission  
Watts Bar Resident Inspector  
P.O. Box 700  
Spring City, Tennessee 37381

ENCLOSURE  
WATTS BAR NUCLEAR PLANT UNIT 1  
RESPONSE TO NRC LETTER  
FROM GARY G. ZECH TO S. A. WHITE, DATED FEBRUARY 5, 1987  
REFERENCE: NRC INSPECTION REPORT 50-390/86-17

This report responds to the notice of violations of the subject letter and the referenced inspection report, which cite three apparent violations of NRC regulations. Each of the three is addressed separately below. This is our final report on this matter.

Violation 390/86-17-01

10 CFR 50, Appendix B, Criterion IX, as implemented by Topical Report TVA-TR75-1A, Rev.8, Section 17.1.9 requires that special processes are controlled and accomplished by qualified personnel using qualified written procedures.

Contrary to the above, on August 27, 1986, the inspectors determined that certain flare-bevel-groove welds involving material 1/16 inch or less in thickness were fabricated without a qualified welding procedure.

This is a Severity Level IV Violation (Supplement II).

1. Admission or Denial of the Alleged Violation

TVA denies that a violation occurred.

The referenced NRC inspection report states that an area of special interest to the inspector involved flare-bevel-groove welds on light-gauge material, i.e., measuring 1/16-inch or less in thickness. The report indicates that some utilities use the AWS D1.3, Structural Steel Code, Sheet Steel as the governing requirement in this area. The inspection report states that TVA has not committed to AWS D1.3 and, therefore, that TVA appeared not to have a qualified welding procedure for light-gauge material.

TVA believes this matter involves two distinct aspects: first, compliance with NRC regulations and licensing commitments; and second, the technical adequacy of the welding procedures used by TVA for thin-gauge materials. Each of these is addressed below.

NRC's issuance of the construction permit for Watts Bar Nuclear Plant (WBN) (CPPR-91) is based upon NRC review and concurrence with the use of AWS D1.1 (1972 Edition with the 1974 revisions). TVA did not commit to AWS D1.3 because that Code did not exist at the time; it was issued several years later. The AWS D1.1 Code of record does not include any minimum thickness of material for which it is applicable. That is, AWS D1.1 covered thicknesses less than 1/16-inch. TVA welding procedures comply with AWS D1.1, including materials of 1/16-inch or less in thickness. TVA special processes in this area were, in fact, controlled and accomplished using properly qualified written procedures. Therefore,

TVA activities are in full compliance with NRC regulations, the NRC construction permit for WBN, and TVA licensing commitments.

Although not specifically referenced in the inspection report, TVA believes the alleged violation related to welding on Unistrut P-1000 supports where a support channel is connected to structural members or where welds are made on the Unistrut itself. To verify the technical adequacy of TVA's commitment to AWS D1.1 for this application, TVA conducted special weld tests. These tests involved welding test assemblies in accordance with WBN welding procedures and then performing physical tests on the welds. The physical tests were: effective throat measurements (required by AWS D1.1); bend tests (from AWS D1.3); and tensile tests (beyond the requirements of AWS D1.1 and D1.3). The results of these tests demonstrated the technical adequacy of the welding procedures used at WBN.

The results of the welding tests conducted on Unistrut P-1000 supports are available at the WBN site for NRC review. To strengthen the documentation, TVA intends to amend the welding procedures to provide specific references to these welding tests.

In summary, TVA has verified that the subject welding activities at WBN were performed using qualified written procedures that are in full conformance with NRC regulations, the NRC construction permit, and TVA licensing commitments. Further, the technical adequacy of the procedures has been confirmed by physical tests.

2. Reason for the Violation if Admitted

Not applicable.

3. Corrective Steps Which Have Been Taken and Results Achieved

Not applicable.

4. Corrective Steps Which Will Be Taken To Avoid Further Violations

Not applicable.

5. Date When Full Compliance Will Be Achieved

TVA is in full compliance at this time.

Violation 390/86-17-02

10 CFR 50.55a requires that structures shall be constructed to quality standards commensurate with the importance of the safety function to be performed. ASME, Section III, paragraph NB5320 states, in part, that welds shown by radiography to have a zone of lack of fusion are unacceptable.

Contrary to the above, on August 17, 1986, the inspectors determined that radiographs of welds 1-063A-D07604-5, 1-062A-D030-10, and 1-015A-T002-12 with lack of fusion indications had been evaluated and found acceptable by the licensee.

This is a Severity Level IV Violation (Supplement II).

1. Admission or Denial of the Alleged Violation

TVA denies the violation. The original TVA acceptance of the welds was in error; however, TVA identified this error and initiated corrective action before the NRC inspection.

In 1985, TVA undertook a major evaluation effort of its welding activities. This effort includes a contract arrangement with DOE/EG&G to perform a Weld Evaluation Program, which has been described in detail previously to NRC. In performing this evaluation, EG&G is acting as an agent of TVA.

In July and August 1986, NRC conducted a special inspection of the TVA evaluation program being performed by EG&G. As part of that inspection, the inspectors reviewed a sample of weld radiographs for geometric unsharpness, film quality, and weld quality. These inspection activities are described in section 11 of NRC Inspection Report 50-390/86-17, beginning on page 28.

In the first paragraph at the top of page 30, the report states that an unresolved item has been identified concerning an apparent inconsistency between acceptance criteria used by TVA/EG&G and the ASME criteria. Since NRC has determined that this matter is to be treated as an unresolved item, it is not part of the violation identified as 390/86-17-02 which is discussed later in the report.

The inspection report goes on to describe the TVA/EG&G reevaluation of the radiographs associated with a sample of 84 welds. TVA/EG&G had determined that three of these welds contained indications of lack of fusion, a code rejectable condition, and that 81 of the welds were acceptable. The inspection report identifies the TVA deviation report for each of these three welds. Based upon the reevaluation by its agent, EG&G, TVA rejected the three welds and initiated repair action to have the welds meet the ASME Section III requirements, as stated in the inspection report.

Fracture mechanics analyses were performed on the welds to determine their suitability for service. However, as stated in the inspection report, this was an additional activity. These analyses have no bearing on the rejection of the welds or on the decision to repair the welds.

TVA identified the three subject welds as unacceptable because of indications of lack of fusion. The welds were rejected and are being repaired to meet the Code requirements. Additionally, on November 26, 1986, TVA reported a 10 CFR 50.55(e) report on unacceptable weld radiographs and on January 14, 1987, committed to an additional review of all radiographs. On January 11, 1987, S. A. White, in a letter to the NRC Executive Director of Operations, Victor Stello, stated: "Further, I have directed that all WBN unit 1 and unit 2 piping welds fabricated by TVA which have already been radiographed shall have a second independent evaluation of the radiographs and that a 100-percent overinspection of those welds using Level III inspectors shall be performed. For future welds, all new radiographs shall be evaluated by a Level II and Level III inspector."

TVA has reviewed the inspection report carefully and had discussions with the TVA personnel who assisted the NRC inspectors during the inspection and other knowledgeable personnel. TVA concludes that since this problem was identified by TVA, was reported under 10 CFR 50.55(e), and involves a comprehensive corrective action program to ensure all deficiencies are corrected, a violation issued February 5, 1987, is not warranted.

2. Reason for Violation if Admitted

Not applicable.

3. Corrective Steps Which Have Been Taken and Results Achieved

Not applicable.

4. Corrective Steps Which Will Be Taken to Avoid Further Violations

Not applicable.

5. Date When Full Compliance Will Be Achieved

Not applicable.

Violation 390/86-17-03

10 CFR 50, Appendix B, Criterion III, as implemented by TVA Topical Report TR75-1A, Rev. 8, Section 17.1.3 requires that processes that are essential to the safety-related functions of structures be selected and reviewed for suitability of application. Criterion V, and TVA Topical Report TR75-1A require that activities affecting quality be prescribed by drawings of a type appropriate to the circumstance and be accomplished in accordance with those drawings. Criterion IX and TVA Topical Report TR75-1A require that a program for inspection of activities affecting quality be established and executed by or for the organization performing the activity to verify conformance with the drawing for the accomplishing activity.

Drawings 48N914-4 R6, 48E956-2 R0, and 48W1263 depicted weld joint details for (1) a structural support assembly to No. 3 reactor coolant pump upper bearing spray shield, and (2) for joints in a miscellaneous steel safety-related structural assembly (ladders), in the auxiliary building.

Contrary to the above, on August 26, 1986, the suitability of weld joint design shown on the above drawings was not assured, in that 11 as-built weldments shown on drawing 48N914-4 R6 and four other weldments shown in drawings 48E956-2 R0, and 48W1263 differed from joint designs stipulated on the engineering drawings. Also, quality control inspections performed on these weldments failed to identify these discrepancies.

This is a Severity Level IV Violation (Supplement II).

1. Admission or Denial of the Violation

TVA admits that a violation did occur. However, in the specific case of the lap-joint weld shown on drawing 48N914 R6, the joint could have been welded as stipulated by the drawing, contrary to the inspection report. Therefore, this particular weld does not represent a weakness in the design process.

2. Reasons for the Violation

For the other two drawings, the designers failed to consider adequately the physical configuration of the joints when specifying the weld symbol.

For all three drawings, the field welders failed to adhere to the design drawings and also failed to obtain design approvals for changes found necessary in the field. QC inspectors failed to document the discrepancies during the inspection process.

The root causes of these failures will be determined as part of the TVA Weld Evaluation Program.

3. Corrective Steps Which Have Been Taken and Results Achieved

The TVA Division of Nuclear Engineering has performed engineering evaluations of the welds related to this violation and have determined that, notwithstanding the discrepancies with the original design drawings, the weldments are suitable for service and satisfy all licensing commitments. EG&G has independently concurred in these evaluations. Based on this determination, the as-built drawings will be corrected. These evaluations have been documented on TVA Problem Identification Report WBN-CEB-8658 R1. No further engineering action for these welds is necessary.

4. Corrective Steps Which Will be Taken to Avoid Further Violations

TVA's Weld Evaluation Program is continuing to identify potential welding discrepancies. This program will also define corrective actions appropriate to the root causes.

5. Date When Full Compliance Will Be Achieved

TVA's Weld Evaluation Program will assure that the welding is acceptable before commencing fuel loading.