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U.S. NUCLEAR REGULATORY COMMISSION

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

June 11, 1981

80-055-034 ✓

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:

BELLEFONTE NUCLEAR PLANT UNIT 2 - NAVCO SPOOL PIECE RADIOGRAPHIC DEFICIENCY
- NCR 1291 - FINAL REPORT

The subject nonconformance was initially reported to NRC-OIE Inspector R. W. Wright on November 14, 1980, in accordance with 10 CFR 50.55(e). This was followed by our interim reports dated December 15, 1980, and February 25, 1981. A change in the submittal date for the final report was coordinated with R. C. Lewis by telephone on May 5, 1981. Enclosed is our final report. We consider 10 CFR Part 21 to be applicable to this nonconformance.

If you have any questions concerning this matter, please get in touch with D. L. Lambert at FTS 857-2581.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills
L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosure

cc: Mr. Victor Stello, Jr., Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNIT 2
NAVCO SPOOL PIECE RADIOGRAPHIC DEFICIENCY
NCR 1291
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

During installation of Spent Fuel System piping in the unit 2 reactor building, a vendor weld was noticed to exhibit possible excess root reinforcement. The vendor (NAVCO) was requested to supply radiographs of the weld to assess the problem. TVA's review of the vendor radiographs indicated possible excess root reinforcement of the weld and indicated as well that the vendor's radiograph/technique was not in keeping with TVA's interpretation of the Winter 1975 Addenda to Article 2 of ASME Section V. Additional vendor radiographs (sent to though not requested by TVA) were also found to be suspect. This renders the adequacy of the welds (as well as radiographs) questionable.

Safety Implications

TVA's concern was the indication that the NAVCO radiograph/technique may have been deficient. In order to preserve TVA's safety bias, the welds which were radiographed would have been considered deficient if the radiographs could not verify otherwise. Had the welds on these spool pieces proved to be inadequate, piping in which the spool pieces were used could have failed to properly maintain designated pressure boundaries.

Corrective Action

In order to determine any general implications, as well as to conduct a review of NAVCO's radiographic technique, TVA sent inspectors to NAVCO shops on March 2, 1981. These inspectors reviewed radiographic film previously reviewed by other TVA inspectors and the authorized nuclear inspector on various dates in the years 1976, 1977, 1978, and 1979. A random sampling review of radiographic film was performed which included about 75 percent of the welded pipe joint connections found on 100 pipe weld joints. TVA's review of these radiographs did not disclose an obvious example of excessive root reinforcement. The inspectors reviewed to ensure that the density limitation of radiographs was compatible with Section V of the ASME Code. The vendors's representatives explained that because of the variation of the thickness and geometries of certain welds (and weld pieces), a double loaded film pack must be used. These radiographs must be single and/or double viewed in order to obtain the optimum density. TVA's inspectors noted that several of the radiographs exceeded 4.0 maximum density when the film was double viewed. These radiographs, when viewed singly, however, were found to be acceptable in terms of the Code. The vendor's technique of film overlapping was also reviewed. Overlapping is used in order to obtain complete coverage of the entire weld circumference. The inspectors observed that the 1.3 minimum density for

each radiograph and the 2.6 total minimum density for a composite set, that cannot be met because of overlapping, can readily be interpreted on the next or preceeding radiograph for that portion of the film in which this condition exists. This process of interpretation of overlapping radiographs represents an industrywide practice.

TVA's visual inspection of the initially identified suspect weld (weld No. 437) has revealed that it is, in fact excessively reinforced. As a result of the investigation, TVA concludes that the subject deficient radiograph represented an isolated case of improper density coupled with incorrect interpretation of overlapping. Weld No. 437 has been repaired.

The remaining radiographs of the subject deficiency have been reviewed in light of NAVCO's technique and were found to be within the ASME Code requirements. Therefore, these radiographs, as well as the welds they represent, are no longer considered questionable by TVA.