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SUBJECT: Deficiency rept re longitudinal butt weld on A500 structural tubing only partially fused. initially reported on 851226. Plan developed to sample material received to identify amount of defective material received.

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APR 13 1986

BLRD-50-438/86-02  
BLRD-50-439/86-01

10 CFR 50.55(e)

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
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Gentlemen:

In the Matter of the Application of )  
Tennessee Valley Authority )

Docket Nos. 50-438  
50-439

BELLEFONTE NUCLEAR PLANT (BLN) - LONGITUDINAL BUTT WELDS ON  
A500 STRUCTURAL TUBING ARE ONLY PARTIALLY FUSED -  
BLRD-50-438/86-02 AND BLRD-50-439/86-01 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector Steve Weise on  
December 26, 1985 in accordance with 10 CFR 50.55(e) as SCR 4621. The first  
interim report was submitted on January 29, 1986. Enclosed is the final report for the  
subject deficiency. No commitments are being made as a result of this report.

Should there be any questions regarding this information, please telephone  
G. M. Morrison, BLN Acting Site Licensing Manager, at (205) 574-8057.

  
H. Fred McCluskey

Enclosure  
cc: See page 2

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U.S. Nuclear Regulatory Commission

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## **ENCLOSURE**

### **BELLEFONTE NUCLEAR PLANT - UNITS 1 AND 2 LONGITUDINAL BUTT WELDS ON A500 STRUCTURAL TUBING ARE ONLY PARTIALLY FUSED BLRD-50-438/86-02 AND BLRD-50-439/86-01 SCR BLN 4621**

## **FINAL REPORT**

### **Description of Deficiency**

The subject deficiency was initially reported to NRC on December 26, 1985 as SCR 4621 with an interim report being submitted on January 29, 1986. Approximately 1200 linear feet (LF) of ASTM A500 Grade B 3x3x1/4 structural tubing exhibit partially fused longitudinal butt weld joints. This condition was noted during the fabrication of a support and resulted in SCAR BLN 4621 being written on December 2, 1985. The apparent cause was improperly cut material (insufficient width) that did not allow the fusion weld to be completely formed.

### **Safety Implications**

The structural tubing material is used to fabricate various miscellaneous steel features, including but not limited to, pipe supports, conduit supports, cable tray supports, instrument tube supports, and platforms. A failure could develop from the use of this material. This condition could have adversely affected the safe operation of the plant. However, all 1200 LF of the defective tube steel (TS) has been accounted for. Based on the sampling of installed supports as part of the corrective action, none of this defective TS was found to have been used in any Category 1 structures. Generic reviews have concluded that none of this defective TS was transferred to any other TVA nuclear plants.

### **Corrective Action**

Identification of a heat number allows the traceability of the material to a CMTR and contract number which would identify the amount of material ordered and received. However, the heat number on the 1200 LF of 3x3x1/4 TS with partial fusion on the longitudinal butt weld located at BLN site was obliterated due to rust or sandblasting as noted on the original SCAR BLN 4621. Therefore, a plan was developed to sample material received in order to identify the amount of defective material received at the site. Material received both before and after the defective batch was evaluated to determine the chemical composition. A chemical analysis report for the defective TS and pieces of TS from heat numbers 37990 (TS located at BLN site and stacked next to the defective TS) and 42647 (TS transferred from BLN site to WBN site when the defective TS was found at BLN) was done by Singleton Materials Engineering Laboratory (SMEL) which concluded that the defective material was not from the batch of the above two known heat numbers.

## ENCLOSURE (Continued)

Destructive tests of 3x3x¼ TS were also done at SMEL which did not link the defective TS to the TS with heat numbers 37990 and 42647. An attempt was made to match the chemical analysis of the defective TS with TS ordered in the timeframe when TS with heat number 37990 was ordered. A total of five batches (the batch that had Ht.# 37990 plus the two batches of 3x3x¼ TS received before and after that batch) were researched. The chemical analysis for all the heat numbers on the above five batches of TS were compared with the chemical analysis of the defective TS. None of the CMTRs from the above five batches matched with that of the defective TS. In conclusion, neither the chemical analysis, destructive tests, nor the matching of chemical analysis to CMTRs could establish the heat number of the defective TS.

A sampling plan was initiated, as part of the corrective action, to evaluate if any of the nonconforming material was installed and utilized in any safety-related applications. The sampling plan specifically identified approximately 200 supports using 3x3x¼ TS and located across the Category I structures. Of these, 64 supports, representing all commodities (i.e., pipe, HVAC, duct, instrument tubing and conduit supports, and Category I structures) were examined. The above 64 supports were found to have acceptable fusion. The above sampling results in conjunction with the extent of condition evaluation further reinforces the fact that there were only two bundles (a total of 1200 LF) of TS with nonconforming fusion.

### Recurrence Control Actions

The receiving inspection procedure BNP-QCP-1.1, Rev.16 was in effect when the subject condition was documented on December 2, 1985. BNP-QCP-1.1 was revised to Rev. 17 on April 17, 1986 to include additional inspection requirements. This procedure remained in effect until BLN's deferral in 1988. No TS was ordered subsequent to plant deferral. SSP-10.2, Rev.0 superseded BNP-QCP-1.1 on September 1, 1992, and Attachment 3 of SSP-10.2, page 1 of 4, requires workmanship inspection for all new procurements. QC inspectors are trained for visual examination of welds as per lesson plan QCR 016.001. This lesson plan offers details to the inspector for detecting surface discontinuities, including cracks and lack of fusion.

The procurement engineer develops an Engineering Procurement Package (EPP) as per the requirements of BLN 9.0-13. In this package, the appropriate ASTM specification (A500 for TS) and TVA General Construction Specification (PF-2036, G29 Volume VI for TS) are imposed. These procedures specifically require that the manufacturer certify that all TS has been visually inspected for complete longitudinal butt weld or verify by test their continuous weld process (Ref. Spec. PF-2036, R1 dated November 2, 1993, item 6 under Technical Requirements, page 1 of 2). Upon receipt, the trained inspectors inspect material to comply with EPP requirements.

Based on the above process and procedural controls currently in place at BLN, no additional recurrence control measures are required.

## ENCLOSURE (Continued)

### Accountability of the Material

A few pieces of the defective TS were sent to SMEL (a total of 102+ LF) for testing. 120 LF of the defective TS was used in nonsafety-related applications in the turbine building at elevation 649.0' per SCAR BLN 4621. All the remaining defective TS stored in the warehouse and returned from the various buildings (total of 978 LF) was sold as scrap on contract No. 86BV6-408366-12 dated April 23, 1986. The 102 LF sent to SMEL, the 120 LF in the turbine building, and the 978 LF sold as scrap constitute the 1200 LF of material.

### Conclusion

Chemical analysis, destructive tests, and matching the chemical analysis with CMTRs did not link the defective material to a particular heat number. All the material in stock, except the two defective bundles, at the time of discovery of this nonconforming material was found to have acceptable fusion. A sampling of installed 3x3x $\frac{1}{4}$  TS for the various commodities and located in all the safety-related areas, found the fusion acceptable in all cases. The extent of condition evaluation concludes that the nonconforming material was limited to 1200 LF. The accountability analysis provides adequate disposition of the nonconforming quantity. A review of current stock material revealed no remaining stock of defective 3x3x $\frac{1}{4}$  TS. Based on this, TVA has concluded that subject nonconforming material was not used in any safety-related applications and that all the nonconforming material was limited to only two bundles with unknown heat number and that all such remaining material has been removed from BLN site.