

Cent Files

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

830 Power Building

AUG 22 1978

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

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Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - NONCONFORMING SOCKET HEAD
CAP SCREWS AND SOFT MATERIAL CONDITION IN STUDS - VENDOR NCR 26

The initial report of the subject condition was made to Inspector
L. E. Foster NRC-OIE Region II office on September 21, 1976, and
was followed by our interim reports dated October 21 and December 23,
1976; May 2, 1977; March 14 and June 26, 1978. Enclosed is our
final written report.

If you have any questions regarding this matter, please get in touch
with M. R. Wisenburg at FTS 854-2581.

Very truly yours,

J. E. Gilleland
J. E. Gilleland
Assistant Manager of Power

Enclosure

cc: Office of Inspection and Enforcement (Enclosure)
Division of Reactor Operations Inspection
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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ENCLOSURE

BELLEFONTE NUCLEAR PLANT
NONCONFORMING SOCKET HEAD CAP SCREWS AND SOFT MATERIAL
CONDITION IN STUDS
*NCR 26

FINAL REPORT

Description of Deficiency

The nonconformance consists of two parts, both parts concerning studs, nuts, washers, and cap screws supplied to TVA through a Lakeside Bridge and Steel Company contract with Southern Bolt and Fasterner Corporation of Shreveport, Louisiana. The first part concerns a soft material condition found in some fabricated pieces during a TVA inspection at the Southern Bolt Plant. This soft material condition was such that the material did not meet hardness specifications and therefore made the pieces not acceptable for use. The second condition concerns material received at the site which displayed difficulty in passing GO-NO GO thread dimensional inspections.

The soft material deficiency was originally discovered during a hardness inspection at the Southern Bolt Plant. This deficiency was present in material received by Southern Bolt in the annealed condition instead of heat treated as Southern Bolt ordered. Subsequent testing by TVA's Singleton Materials Laboratory demonstrated the soft material condition was not present in the safety-related material previously shipped to the Bellefonte site (i.e., studs, capscrews, and nuts).

Thread dimensional problems were caused by various errors including lack of control of fastener diameter and thread lead error. These problems were compounded by thread damage in several cases.

Safety Implications

Tests have shown that a soft material condition does not exist in safety-related material (i.e., studs, cap screws, and nuts). Fifty percent of the pressurizer base anchorage nuts and fifty percent of the steam generator hold-down nuts for unit 1 were embedded in concrete before this nonconformance was issued. Therefore these nuts were not accessible for hardness testing. Calculations were performed assuming the nuts were in the soft annealed condition and the calculations demonstrated that these nuts would satisfy design requirements. All washers were examined and a portion were found to have the soft material condition. However, the washers are used only to prevent galling of material during bolt tightening processes and do not serve a safety function. Therefore, there are no implications to safety with respect to the soft material concern.

Because of the extent of the thread dimensional deficiency, the implications to safety cannot be fully analyzed. Some of the material was to be used in safety applications in the plant. The deficiency was such that failure of the material in a safety system could be postulated under certain design conditions. The particular failure would depend on the application of the material. Thus the deficiency could adversely affect safe operation of the plant at some time.

Corrective Action

The soft material condition was found during an examination of material at Southern Bolt by a TVA field inspector. Shipment was stopped on this material and Southern Bolt was required to perform 100 percent hardness testing on all subsequent shipments to TVA. Except for embedded nuts all material that had been received at the site has been examined and all studs, capscrews, and nuts were found to be within acceptable hardness range. The nonsafety-related washers were accepted for use as is.

TVA performed GO and NO GO gage inspection of fastener material which had been shipped to the site before NCR 26 was issued. Fasteners which did not pass this inspection were rejected and returned to Southern Bolt for repair or replacement. Because of slight thread nicks, burrs, etc. some fasteners failed to accept the GO gage. These fasteners were not rejected but were chased to remove the obstruction and were subsequently accepted for use.

Material which was returned to Southern Bolt by TVA was 100 percent inspected by a third party. Nonconforming material was reworked where possible and subjected to 100 percent dimensional inspection. Material which could not be reworked was rejected. Nonconformance reports were submitted to TVA on those fasteners which the manufacturer felt would be acceptable yet did not meet specified thread dimensions. These fasteners were dispositioned by TVA and accepted or rejected based upon design requirements of the individual fasteners.

All fasteners with diameters larger than 1 inch supplied on this contract after this nonconformance was issued have been dimensionally inspected 100 percent before shipment.

Southern Bolt instituted changes in their quality assurance program and issued a new quality assurance manual as a result of this deficiency. They currently hold an ASME certification for their activities. Before the award of any future contracts involving Southern Bolt as a TVA contractor or subcontractor, TVA will assure, by inspection and/or audit of Southern Bolt's activities, that Southern Bolt meets the QA/QC requirements specified in any future contracts.