

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

February 3, 1984

BLRD-50-438/83-17

BLRD-50-439/83-13

U.S. Nuclear Regulatory Commission

Region II

Attn: Mr. James P. O'Reilly, Regional Administrator

101 Marietta Street, NW, Suite 2900

Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - CANNOT IDENTIFY GRADE OF NUTS
BECAUSE OF ORIENTATION - BLRD-50-438/83-17, BLRD-50-439/83-13 - FINAL
REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
P. E. Fredrickson on January 26, 1983 in accordance with 10 CFR 50.55(e) as
NCR 2182. This was followed by our interim reports dated February 24,
June 14 and September 26, 1983. Enclosed is our final report.

If you have any questions, please get in touch with R. H. Shell at
FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Licensing

Enclosure

cc (Enclosure):

Mr. Richard C. DeYoung, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

8402140071 840203
PDR ADOCK 05000438
S PDR

OFFICIAL COPY

1627



ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
CANNOT IDENTIFY GRADE OF NUTS BECAUSE OF ORIENTATION
BLRD-50-438/83-17, BLRD-50-439/83-13
NCR 2182
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

The grade of nut on approximately 50 percent of all high strength bolted connections installed in the plant cannot be identified since the nuts were installed with the grade markings faced against the structural member. Nuts were installed by craft personnel without any attempt being made to place markings outward for easy identification. The procedures do not specifically state that the nuts are to be turned outward for identification, although this must be done in order to verify the grade of material. The high strength nuts in question are very similar to a heavy-hex low strength nut which has no identifying markings and is in use at the project. Because of a lack of segregation in the field, the possibility exists that low strength nuts have been installed in place of high strength nuts. The cause of this deficiency has been determined to be the lack of procedural guidance for the installation of high strength nuts.

Safety Implications

Since the nuts which have been installed cannot be positively identified as high strength due to their orientation, the possibility exists that some are low strength. The possible use of low-strength nuts renders the integrity of safety-related connections questionable. Failure of these connections during a seismic event would adversely affect safe plant operations.

Corrective Action

TVA's Division of Construction (CONST) and Singleton Materials Laboratory have completed a random sampling of over 600 high-strength connections in Category I structures. The sampling indicated that less than 10 percent (a total of 60) of the high-strength nuts were turned with their grade markings inward rather than the 50 percent originally estimated. Further investigation of the unidentifiable nuts found only one of the nuts rejectable based on it not being of the specified material. The nut was a 7/8 inch A325 bolted connection. This nut was tested and found to fail at a value of 143 KSI, only slightly less than the 144 KSI minimum required. The minimum tensile strength of a 7/8 inch A325 bolt is 120 KSI. Therefore, the A325 bolted connection from which the rejected nut was taken was not unsafe since failure would have, by design values, taken place in the body of the bolt and not the nut. Based on this information, the nonconformance report (NCR) was revised and resubmitted to TVA's Division of Engineering Design (EN DES) for disposition. EN DES resolved the revised NCR as follows:

1. The random sampling results indicate with a 95-percent confidence level that the as-specified high-strength nuts have been installed.
2. All remaining unmarked nuts are acceptable as installed.
3. No further sampling is required.

NCR 2182 has been closed. To prevent recurrence of this deficiency, BNP-QCP-2.15, "Structural Steel Installation," has been revised to clearly state that the grade of nut must be identifiable when installed.