TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

November 23, 1982

U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2 - WATER FOUND IN ROCK ANCHOR TENDON HEAD PROTECTIVE GREASE CANS - NCR 1005 - FINAL REPORT

On May 23, 1979, R. W. Wright, NRC-OIE Region II, was informed that the subject nonconformance was determined to be reportable in accordance with 10 CFR 50.55(e). This was followed by our interim reports dated June 22 and November 23, 1979; March 21 and September 24, 1980; August 24, 1981; and January 21 and May 10, 1982. As discussed with R. V. Crlenjak by telephone on November 22, 1982, the response to this deficiency was delayed. Enclosed is our final report.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

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

ENCLOSURE
BELLEFONTE NUCLEAR PLANT UNITS 1 AND 2
WATER FOUND IN ROCK ANCHOR TENDON HEAD PROTECTIVE GREASE CANS
NCR 1005
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

Inspection of approximately 20 (10 randomly chosen on each unit) rock anchor tendon head protective grease cans indicates ground water is infiltrating up along the grouted tendon through the grout hole in the shim stack and into the grease cans. The grease cans are filled with grease to protect the tendons and anchorheads from corrosion. Any water entering the grease cans has the potential for causing corrosion problems.

Safety Implications

TVA's original concern with this deficiency was that the groundwater intrusion into the grease cans could result in corrosion of the rock anchor tendons and tendon heads. This could have adversely impacted the posttensioned containment vessel.

However, as a result of the investigations detailed in this report, it is evident that corrosion of the tendons and tendon heads is not a significant concern. Consequently, there is no condition adverse to the safety of operations of the plant.

Corrective Action

Because of the potential corrosion problem associated with ground water in the grease cans, TVA initiated and performed a testing program to determine the effect of ground water on the rock anchor components.

Based on results of this testing program, TVA has concluded that infiltrating ground water will not prevent the prestressing system from performing its intended function for the life of the plant.

TVA bases this on the following facts obtained from the testing program:

1. The general corrosion rate of steels depends largely on the amount of dissolved oxygen in the ground water. Investigations have shown that the dissolved oxygen content of the ground water near the rocks anchors is essentially zero.

2. Although ground water in the vicinity of the rock anchor tendons has a pH of approximately 7.2, the grout and grease will increase the long term stabilized pH of the ground water in the grease cans to approximately 11.5 where tests have shown that little or no corrosion will occur.

3. Grease provided superior protection on all tendon steels allowing immeasurable corrosion on all samples tested.

The rock anchor components will be inspected for corrosion in accordance with Babcock and Wilcox Standard Technical Specifications, section 4.6.1.7.

No physical corrective action is required and the tendons will be used as-is. Therefore, the 23 dewatering holes will not be drilled in unit 2, and the existing unit 1 pumps will be removed.

TVA has no other nuclear plants with a prestressed containment. Therefore, no other TVA plants are affected.