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

January 19, 1982

BLRD-50-438/81-60

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 1 - POSSIBLE FLOW OVERSTRESS
BLRD-50-438/81-60 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector R. V. Crlenjak on September 18, 1981 in accordance with 10 CFR 50.55(e) as NCR 1586. This was followed by our first interim report dated October 19, 1981. Enclosed is our final report. We consider 10 CFR Part 21 applicable to this deficiency.

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 Regulation and Safety

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

IE 22
5/1

ENCLOSURE

BELLEFONTE NUCLEAR PLANT UNIT 1
POSSIBLE TENDON OVERSTRESS
10 CFR 50.55(e)
BLRD-50-438/81-60
FINAL REPORT

Description of Deficiency

Inryco, Incorporated, Bedford Park, Illinois, is contracted (contract 75C53-85380) to design, supply, install, and stress the posttensioning system for the primary containment structures at the Bellefonte Nuclear Plant (BLNP). A requirement of the contract is for Inryco to calibrate the stressing jacks before and after the stressing of each unit. For jack 9366, TVA noted that the calibration after stressing unit 1 exhibited a substantial variation from the calibration supplied before stressing unit 1. The ram area of jack 9366 was calibrated to be 201.05 square inches use at BLNP. This number was used in determining the force applied to stress several tendons. Apparently, this number was incorrect. The ram area is now calibrated to be 214.75 square inches. This indicates, if the latest calibration is correct, that the tendons stressed with jack 9366 have been overstressed. The tendons affected are unit 1 vertical numbered V1 through V31 and unit 1 dome tendons numbered D1-1 through D1-32. A substantial percentage of tendons stressed by jack 9366 have exhibited excessive deviations between predicted and measured elongations. This indicates jack 9366 may have overstressed the tendons.

Safety Implications

Each of the 63 tendons that were stressed with jack 9366 had its stressing history thoroughly reviewed to determine if any had ever been overstressed because of the error in calibration. It was concluded that, in the worst case, an individual wire had been stressed no greater than 88 percent of the Guaranteed Ultimate Tensile Strength (GUTS). Nominal yield strength of the wire is 89-percent GUTS while the lowest actual yield strength of any of the wires in the tendons affected was greater than 92-percent GUTS. Thus no wires were stressed to or above their yield point. Therefore, the subject deficiency results in no degradation of the safety of the prestressed containment; and the 63 tendons will be used as is.

Corrective Action

Jack 9366 was returned to Inryco's facilities. With representatives of TVA present as witnesses, Inryco performed two calibrations of jack 9366. The jack was then disassembled and the ram area was physically measured. Subsequently the jack was reassembled and two more calibrations were performed. No unusual conditions were noted during the examination of the jack internals and the calibrations of the jack produced results which indicated a ram area of 214.75 square inches is an acceptable value. Each of the four calibrations yielded ram areas very close to this value. It has been concluded that the calibration of jack 9366 showing a ram area of 201.05 square inches was in error for an unknown reason. Jack 9366 has now been approved for use in stressing unit 2.

A further study was made of the excessive deviations between predicted and measured elongations that were noted on several of the 63 tendons stressed with jack 9366. Since the ram area was actually greater than noted on the stressing cards, greater stress was imparted to the tendon than anticipated. Therefore, the elongation was greater. When the actual stressing data is revised to accommodate this, the deviations between predicted and measured elongations were reduced to acceptable levels.

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