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

February 12, 1982

BLRD-50-438/81-40

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 UNIT 1 - INTERNAL LACK OF FUSION ON NAVCO SPOOL PIECE - BLRD-50-438/81-40 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector R. V. Crlenjak on May 20, 1981, in accordance with 10 CFR 50.55(e) as NCR 1467. This was followed by our interim reports dated June 19, August 26, September 29, November 12, and December 28, 1981. 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 Regulation and Safety

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

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ENCLOSURE
BELLEFONTE NUCLEAR PLANT UNIT 1
INTERNAL LACK OF FUSION ON NAVCO SPOOL PIECE
BLRD-50-438/81-40
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

An apparent lack of fusion, approximately 1/8-inch wide and 21 inches long was discovered during the installation of a spool piece supplied by NAVCO, manufactured by Swepco Tubular Products Company. This indication was found during the radiography of a circumferential butt weld. The radiograph overlapped an adjacent longitudinal weld of the spool piece and exhibited the subject indication. The spool piece, 12-inch diameter by 21 inches long, standard schedule wall thickness (0.357"), type SA-312 TP 304 stainless steel, nonfiller metal added, longitudinally seam welded pipe, was located in the Spent Fuel Cooling System. The spool piece was removed and sent to TVA's Singleton Materials Laboratory for evaluation. A longitudinal section 8 inches wide by 21 inches long containing the longitudinal weld was removed from the pipe, sectioned, metallographically prepared, etched, and microscopically evaluated for internal voids and lack of fusion in the longitudinal weld.

Visual inspection of the section id disclosed varying degrees of a condition defined as undercut. Five macro sections, selectively taken transverse to the weld, were cut, ground through 600 grit, and macroetched electrolytically in 10 percent oxalic acid to reveal the grain structure and discontinuities existing as voids, lack of fusion, etc. Visual and stereo microscopic examination failed to reveal any internal defects of the lack of fusion type. An almost continuous undercut type of condition existed on the id surface, 0.010 inch to 0.016 inch in depth and from 0.100 inch to 0.180 inch in width, was more pronounced in some regions of the weld than in others. This undercut is not the same as an undercut resulting from adding filler metal in a regular fusion welding process. The condition is located on the inside diameter of the pipe, does not significantly reduce the wall thickness of the pipe, and contains no sharp notches. Therefore, the subject spool piece could have been used without adverse effects on safety.

Based on the results of this investigation, we consider this undercut condition to be the source of the reported radiographic indications. There is a correlation between the localized depth and width of the undercut and the indications as seen on the radiographs. The most severe region of undercut has the same shape and position and appearance as the radiograph indications.

We do not consider the indication as detected by radiography and evaluated by visual and macroscopic examination to be the same as the problem identified in NRC OIE Bulletin 79-03A.

Safety Implication

Had this condition gone uncorrected, it would have had no adverse safety implications.

Corrective Action

The subject spool piece was removed from the assembly for evaluation and was replaced.

The condition does not appear to be a generic problem, and therefore no action to prevent recurrence is planned.