

October 12, 1982

SBN- 340
T.F. Q2.2.2

United States Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, PA 19406

Attention: Mr. Richard W. Starostecki, Director
Division of Resident and Project Inspection

References: (a) Construction Permit CPPR-135 and CPPR-136, Docket
Nos. 50-443 and 50-444
(b) Telecon of September 10, 1982, A. L. Legendre (YAEC) to
Eldon Brunner (NRC Region I)

Subject: Final 10CFR50.55(e) Report; Cracked Welds in Containment
Annular Steel End Connections

Dear Sir:

On September 10, 1982, a potentially reportable 10CFR50.55(e) item was reported [Reference (b)] regarding cracked welds in the Unit 1 containment annular steel end connections.

It has been determined that this item is reportable under 10CFR50.55(e). The following information is provided per 10CFR50.55(e)(3) and is considered to be the final report on this item.

Description of the Deficiency

As reported in NCR 59/2731, field welded framing connections for several radial beams of the annulus steel frame of the containment structure were found to exhibit surface cracks at the toes of the full and partial penetration welds connecting vertical plates to attachment plates on the secondary shield walls. The vertical plates are located on both sides of each radial beam web and are bolted to it, forming the beam end connections.

Analysis of the Safety Implications

A failure of these welds could result in the loss of the structural integrity of the annular steel frame, thus possibly affecting the functional capability of the safety-related systems supported by this frame.

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Corrective Action Taken

1. A metallurgical examination of a section from connection #3G1220A which exhibited a crack on the outside of the partial penetration joint was undertaken. The metallurgical investigation indicated that the defects were the result of lamellar tears in the ASTM A36 attachment (filler) plate caused by welding strains associated with the use of a restrained tee joint. A second connection #3G1226A was also removed and sectioned in the field. Similar defects were observed in the inside and outside surfaces of the full penetration and partial penetration joints respectively.
2. All thirty-one (31) similarly detailed connections which had been installed up to the date of the NCR were reinspected for defects. The uninstalled connections were put on hold.
3. On the basis of the findings of the metallurgical investigation, the following changes have been initiated:
 - a. The use of "clean" ASTM A516 Gr 70 (Lukens Fineline) steel in lieu of ASTM A36 for the filler plate.
 - b. Revised welding procedure which requires weld bead deposition favoring the filler plate and a 200°F preheat.
 - c. Revised installation sequence to make the vertical welds to filler plate prior to welding the filler plate to the shield wall.
4. All previously installed connections have been rejected. A procedure for the removal of the existing connection and reinstallation of the new connection is included in the disposition of the NCR #59/2731.
5. For all new connections, the affected design drawings have been revised by ECA 01/3793A to change the 1" thick filler plate from ASTM A36 to ASTM A516-Grade 70 steel. The detailed procedures for shop and field welding for the affected connections have been included in the ECA.
6. The detailed welding procedure, material and installation changes for these connections were reviewed and concurred with by Dr. R. S. Stout of Lehigh University, Bethlehem, Pennsylvania.
7. Two mock-ups using the ASTM A516 Gr 70 material were welded per the revised procedure. The mock-ups were cross sectioned, ground and etched for macroscopic examination. No evidence of lamellar tearing or other cracks was observed.

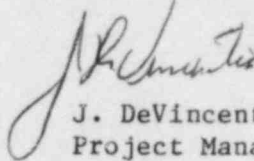
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The revised welding and installation procedure and material changes for these connections will eliminate the problem of lamellar tearing in the 1" thick filler plate. Since the previously installed connections have been isolated and are being removed and replaced with new connections, a sound installation is fully assured.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY



J. DeVincentis
Project Manager

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