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April 25, 1984

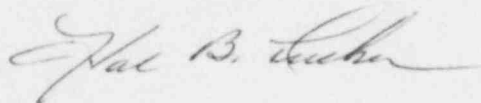
Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

Re: Catawba Nuclear Station
Units 1 and 2
Docket Nos. 50-413 and 50-414

Dear Mr. O'Reilly:

Pursuant to 10 CFR 50.55e, please find attached Significant Deficiency Report
No. SD 413-414/84-04.

Very truly yours,



Hal B. Tucker

LTP/php

Attachment

cc: Director
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC Resident Inspector
Catawba Nuclear Station

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REPORT NUMBER: SD 413-414/84-04

REPORT DATE: April 25, 1984

FACILITY: Catawba Nuclear Station
Units 1 and 2

IDENTIFICATION OF DEFICIENCY:

Prior to May 5, 1983, the Welding Program did not provide the additional 1/8" preparation for effective throat partial penetration welds as required in paragraph 2.3.1.3 of AWS D1.1 and ASME Section III, Subsection NA, Appendix XVII - 2454(c). This discrepancy was identified by Nonconforming Item 16627.

INITIAL REPORT:

On March 26, 1984, Virgil Brownlee, NRC Region II, Atlanta, Georgia was notified of the deficiency by C L Ray, R D Carroll, L M Coggins, and T L Utterback of Duke Power Company, Charlotte, North Carolina.

COMPONENT AND/OR SUPPLIER:

Fabricated by Duke Power Company, Catawba Nuclear Station

DESCRIPTION OF DEFICIENCY:

Prior to 5/5/83, the Welding Program did not provide the additional 1/8" preparation for effective throat partial penetration welds required as specified in paragraph 2.3.1.3 of AWS D1.1 and ASME Section III, Subsection NA Appendix XVII-2454(c).

NF Subsection, ASME Code Welds

Ref: 1977 Edition ASME B&PVC, Section III, Division 1 - Appendices XVII-2454(c).

The effective throat thickness of single and double partial penetration groove welds shall be the depth of the groove, except that the effective throat thickness of a bevel joint made by manual shielded metal arc welding shall be 1/8" less than the depth of the groove.

Non-ASME Code Welds

Ref: AWS D1.1 - Revision 2 - 77, paragraph 2.3.1.3:

The effective throat of a partial joint penetration groove weld shall be the depth of chamfer, less 1/8 inch for grooves having an included

angle less than 60 degrees, but not less than 45 degrees at the root of the groove, when deposited by shielded metal arc or submerged arc welding, or when deposited in the vertical or overhead welding positions by gas metal arc or flux cored arc welding.

The effective throat of a partial joint penetration groove weld shall be the depth of chamfer for grooves:

- (1) Having an included angle of 60 degrees or greater at the root of the groove when deposited by any of the following welding processes: shielded metal arc, submerged arc, gas metal arc, flux cored arc, or electrogas welding; or
- (2) Having an included angle not less than 45 degrees at the root of the groove when deposited in flat or horizontal positions by gas metal arc or flux cored arc welding.

Prior to May 5, 1983, Duke Power Company's Welding Program did not contain provisions to ensure these requirements were met. This problem was discovered by the ANI during an audit of Duke's Support/Restraint Design Specification.

The scope includes all partial penetration welds specifying the required effective throat except the following:

ASME Code Welds

1. Welds completed on or after May 5, 1983.
2. Welds made in tube steel radii.
3. Welds made in skewed joints where the angle of intersection between the two members is greater than 105°.
4. Welds made with the GTAW and FCAW processes.
5. Welds made to pressure boundaries.
6. Partial penetration welds with the depth of preparation specified on Design drawings originated after 4/21/80.

Non-ASME Code Welds

1. Welds completed on or after May 5, 1983.
2. Welds made in tube steel radii.
3. Welds made in skewed joints where the angle of intersection between the two members exceeds 105°.
4. Welds made with the GTAW process in all positions and welds made with the FCAW process in the flat and horizontal positions.
5. Welds to pressure boundaries.

ANALYSIS OF SAFETY IMPLICATIONS:

This deficiency was a violation of design criteria and, if subjected to accident conditions, may have resulted in the failure of some partial penetration welds on safety related systems.

CORRECTIVE ACTION:

A. Training

All Craft, QC and Technical Support personnel were trained in the AWS and ASME Code requirements on 5/5/83. All applicable welding procedures were revised to reflect the requirements.

B. ASME Code Welds

All partial penetration welds that are within the NF boundary as identified within the scope of this problem will have their effective throat verified. Verification will be performed by grinding or cutting into the weld to the extent that a cross section of the weld is visible and can be measured. If any of the welds cannot be verified by this method, they shall be evaluated on a case-by-case basis. Identification of these welds involves performing a review of all the QA-1 support/restraint hanger packages in Unit 1 and 2 and locating the applicable welds to be reviewed.

An additional review was performed on the NF fillet welds due to the Design Specification and procedural ability of the Craft to substitute effective throat partial penetration welds for fillet welds so long as the effective throat was equal to the fillet weld size specified. This review involved identification of all fillet welds within the NF Code boundary and verifying that fillet welds were actually made and not substituted.

The review of the ASME portion of this problem is being performed on a system-by-system basis.

C. Non-ASME Code Welds

It was Construction's intention to perform a statistical evaluation on all the Non-ASME Code welds on Unit 1 to prove their structural adequacy with a 95% confidence level.

These welds include the following:

- 1) Miscellaneous Civil Steel and Electrical Equipment Supports
- 2) Non-Code Hangers
- 3) Reactor Building Tunnel and
- 4) Auxiliary Support Frames.

The initial sampling verified 309 welds. Three (3) welds on "G" Auxiliary Support Frame were found to be structurally deficient. Further weld sampling and investigation determined that the concern for structurally deficient welds was limited to one particular Ironworker crew and one Auxiliary Support "G" frame in Unit 1. To resolve the problem, Construction has divided the welds into 5 groups.

- 1) Miscellaneous Civil Steel and Electrical Supports
- 2) Non-ASME Piping Supports/Restraints
- 3) Reactor Building Tunnel Frames
- 4) Reactor Building Auxiliary Support Frames (Except "G" Frame)
- 5) "G" Auxiliary Support Frame

Additional sampling was performed on the first four groups and at least a 95% confidence of structural adequacy was achieved for each group. Auxiliary Support Frame "G" received a 100% review of all the welds in question. Design Engineering has determined that 15 of the 81 welds on this frame will require rework due to structural inadequacy.

Resolution of Unit 2 for the Non-ASME Code portion involves performing a statistical sampling of welds on the Unit 2 Reactor Building Auxiliary Support Frames and Tunnel Frames. Resolution of the other groups of welds will be based upon the results from Unit 1. However, the Reactor Building frames, because of their large size welds and the Ironworker crew who performed some of the work (the same crew who was responsible for "G" frame in Unit 1), will be evaluated individually in Unit 2.

STATUS OF CORRECTIVE ACTION:

A. Unit 1

1. Currently 31 of the 43 ASME Code systems have been cleared of the weld problem and the majority of the review has been performed on the remaining 12 systems. Completion of the Mode 6 systems will be performed by 5-1-84 with the remaining systems by 6-15-84.
2. The 15 welds that are to be repaired on "G" Auxiliary Support Frame will be complete by 5-1-84.

B. Unit 2

1. The review of the Unit 2 ASME Code supports has just started and will be completed by 8-1-84.
2. The additional sampling on the Non-ASME Code welds will be completed by 8-1-84.

C. Submittal of the Complete Report of this item will be 8-15-84.