

ENCLOSURE  
HARTSVILLE NUCLEAR PLANT - UNIT A1  
USE OF INCORRECT WELD ACCEPTANCE CRITERIA  
ON REACTOR PRESSURE VESSEL PEDESTAL WELDS  
10CFR50.55(e) REPORT NO. 1 (FINAL)  
NCR HNP-A-073

On November 11, 1979, TVA notified NRC-OIE Region II, Inspector R. W. Wright, of a potentially reportable condition concerning use of incorrect weld acceptance criteria in evaluating radiographs of welds made on the Hartsville Nuclear Plant unit A1 reactor pressure vessel (RPV) pedestal. This condition and corrective actions were described in our letter from L. M. Mills to James P. O'Reilly on November 16, 1979, in response to your October 25, 1979, letter, RII: JPO-50-518 and 50-520.

This is the final report on the subject reportable condition.

Description of the Deficiency

All radiographs of RPV pedestal welds made before August 15, 1979, were evaluated to the acceptance criteria of AWS D1.1 Structural Welding Code, paragraph 8.15, which refers to welds in new buildings. The radiographs should have been evaluated to the acceptance criteria of AWS D1.1, paragraph 9.25, which refers to welds in new bridges, as required by C. F. Braun Specification 300-05. The acceptance criteria in AWS paragraph 9.25 is slightly more rigid than that of AWS paragraph 8.15.

Evaluation of the RPV welds to AWS D1.1, paragraph 8.15, rather than paragraph 9.25 resulted in 34 of 629 radiographs with indications which are unacceptable under AWS D1.1, paragraph 9.25, but no radiograph shows an indication which is unacceptable under AWS D1.1, paragraph 8.15. The unacceptable radiographs under AWS D1.1, paragraph 9.25, fall in two types:

- A. Thirty radiographs have aligned indications which do not meet the separation requirements of AWS Figure 9.25.2.1.
- B. Four indications exceeding the 1/2-inch maximum allowable length by AWS paragraph 9.25 but which are less than the 3/4-inch maximum length allowed by paragraph 8.15.

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The indications are tabulated by weld seam below:

<u>Seam No.</u>	<u>Number and Type Indications</u>		<u>Sector Location</u>
	<u>Type A</u>	<u>Type B</u>	
1	1	0	0-1
2	8	2	A-B, B-C, E-F, F-G*, G-H, H-I, M-N, N-O*, P-Q, W-X
3	1	0	19-20
6	2	1	A-B, Q-R*, V-W
7	4	0	A-B, L-M, P-Q, R-S
8	1	0	T-U
9	3	0	14-15, 17-18, 18-19
10	2	0	C-D, D-E
12	1	0	13-14
14	2	0	7-8, 18-19
15	5	0	E-F, G-H, N-O, T-U, U-V
406	0	1	1-2*
Total	30	4	

\*Type B

Cause of the Deficiency

The deficiency occurred because QC inspectors evaluating welds until August 14, 1979, did so to Quality Control Instruction (QCI) N302, Revision 0, "Radiographic Inspection of AWS Welds," which referenced the new building section of AWS D1.1 rather than the new bridge section of AWS D1.1 as required by the C. F. Braun specification.

Safety Implications

TVA does not believe that the presence of the 34 indications previously listed will jeopardize the RPV pedestal structure during an earthquake or any other anticipated occurrence. We are reporting this condition because C. F. Braun has required repair of weld seam No. 2.

Corrective Actions

All radiographs evaluated under AWS D1.1, paragraph 8.15, have been reevaluated to AWS D1.1, paragraph 9.25, with results as discussed in the "Description of Deficiency." All radiographs evaluated after August 15, 1979, on the RPV pedestal were to the proper criteria of AWS D1.1, paragraph 9.25.

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The nonconformance report has been reviewed and evaluated by GE/C. F. Braun and the recommended disposition was to accept "as-is" except for seam 2 which was repaired to meet paragraph 9.25 criteria. Seam 2 was rejected due to several concentrations of defects (a total of 10 indications) along the length of this seam. Reasons for accepting the other seams are:

1. The defects are widely scattered in various seams with a maximum of five indications in any one seam.
2. The design was based on 42 ksi yield, whereas actual material yield strength varies between 52 and 62 ksi.
3. Brinnell hardness tests made on selected welds during our investigations of your concerns expressed in your October 25, 1979, letter indicate no unacceptable or drastic changes associated with the welding.
4. The AISC-AWS Codes made the extent, type, and application or acceptance criteria for NDE the responsibility and discretion of the engineer, GE/C. F. Braun in this case. The base requirement is 10 percent radiography to the new bridge section of D1.1 with location selection by the engineer, whereas in this situation the entire 629 feet of butt welds were radiographically inspected.

#### Action Taken to Prevent Recurrence

QCI N302, Revision 1, distributed on July 19, 1979, and implemented by the Welding Quality control Unit on August 15, 1979, changed the criteria to include evaluation of radiographs of RPV pedestal welds to AWS D1.1, paragraph 9.25, as specified. Implementation of this revision should prevent recurrence of this problem.

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