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MURRAY R. EDELMAN

VICE PRESIDENT
NUCLEAR

December 15, 1983

Mr. James G. Keppler
Regional Administrator, Region III
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

RE: Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Pipe Whip Restraint Bracket Welds
for B21/B33 Systems [RDC 64(83)]

Dear Mr. Keppler:

This letter serves as the final report pursuant to 10CFR50.55(e) on the significant deficiency concerning the bracket welds for the Main Steam and Recirculation System Pipe Whip Restraints. This problem was identified to Mr. Pelke of the NRC Region III Office of Inspection and Enforcement on December 28, 1982, by Mr. E. Parker for The Cleveland Electric Illuminating Company. This deficiency was formally identified in our first report dated January 26, 1983. Our second report dated April 15, 1983, and third report dated July 1, 1983, were submitted to provide additional information on the deficiency.

This report contains a description of the deficiency, an analysis of the safety implications, and the corrective action taken.

Description of Deficiency

Visual and Magnetic Particle inspection of the completed welds connecting the pipe whip restraint brackets to the drywell structural steel noted three welds with linear indications. Subsequent investigation into the cause of the indications identified that the bracket material did not meet the requirements of the applicable welding code and the pre-qualified procedure that was followed.

The pipe whip restraint brackets were supplied by the General Electric Company, San Jose (GE NEBO) with the applicable welding code (AWS) specified in their Installation Specification 22A2598. The brackets were installed by General Electric Apparatus and Engineering Services (GE A&ES) in accordance with their welding procedure, WPS 1.1.8.1, Rev. 3. This procedure is a pre-qualified AWS procedure, however, it was not acceptable for use on the welding of the brackets due to the difference in the thickness of the bracket material and the thickness of material that the procedure was qualified for. Additionally, material verification of the bracket identified that the material is ASTM-A105 which is not a pre-approved material by the AWS Code.

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All forty-eight Recirculation System and thirty-six Main Steam System Pipe Whip Restraint Brackets for a total of eighty-four were installed prior to the identification of this deficiency. Installation of the eight remaining Main Steam brackets was stopped pending final evaluation.

Analysis of Safety Implications

When piping integrity is lost as a result of the occurrence of a postulated circumferential break, the pipe whip restraints act to limit the movement of the broken pipe to an acceptable distance. Unrestrained movement of the pipe could result in damage to other safety-related components or structures located near the pipe break.

Corrective Action

Nonconformance report's P038-1347, P038-1346, and P038-1103 were initiated to track the problems identified with the bracket welds. GE NEBO addressed the welding problems on Field Deviation Disposition Requests KLI-125, KLI-257, and KLI-294.

GE NEBO and GE A&ES performed extensive metallographic testing on the bracket welds. The testing concentrated on the brackets from heat J-02159, as all failures identified prior to testing related to brackets from this heat. In addition, CEI contracted a local testing lab to perform independent metallographic tests to determine the cause of the weld problem and substantiate the results obtained by GE. The results of the various tests revealed the presence of underbead cracking in the weld heat affected zones of the brackets from heat J-02159.

Brackets which were not from heat J-02159 were also evaluated using a UT procedure developed by GE NEBO to detect the presence of underbead cracking. Most of the welds for these brackets exhibited UT results similar to those from heat J-02159. Further metallographic testing was performed on the welds to confirm the UT reports and to determine the corrective action necessary for the non-J-02159 heat brackets. The results of this testing indicated the presence of underbead cracking in most of the welds made on the brackets.

None of the installed brackets were considered acceptable due to the confirmed existence of weld defects or the likelihood that defects exist. All brackets installed were removed and the structural steel they were welded to reworked to its original condition.

Brackets have now been installed as follows:

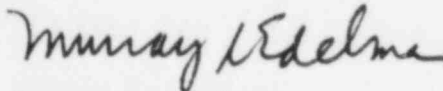
The eight brackets not previously installed and two new replacement brackets were welded using approved welding procedure WPS 1.1.4.2. The material was qualified for this procedure using an elevated preheat. The results obtained using the procedure were acceptable. The procedure eliminated the underbead cracking, but the logistics involved in preheating such a large mass of base material to a high temperature were prohibitive. For this reason, a new procedure was qualified.

Eighty-two new brackets were installed at their respective locations using an approved welding procedure, WPS 1.1.9.4, which also eliminated the underbead cracking. WPS 1.1.9.4 was qualified for ASTM-A105 with preheating of the brackets and base material required. Additionally, the brackets received two layers of weld material to decrease the hardness properties in the heat affected zone.

Testing of the completed welds was performed in accordance with the original MT requirements for acceptance. Nondestructive testing of all welds was completed with no rejectable welds encountered. Review of the associated installation documentation will be completed by February 1, 1984.

Additional corrective action taken by GE included a 100% review of their AWS Welding Program in response to Corrective Action Request 82-28. GE A&ES revised all AWS welding procedures for clarity and simplicity to prevent the use of unapproved weld material. The AWS General Welding Procedure GWP-1005 and Nuclear Quality Assurance Manual used by GE A&ES were also revised to address AWS welding in any identified problem areas. In addition, GE reviewed all AWS welds that were previously completed. These actions were taken to insure that no problems similar to those identified in this deficiency existed and to prevent the recurrence of these problems.

Sincerely,



Murray R. Edelman
Vice President
Nuclear Group

MRE:pab

cc: Mr. M. L. Gildner
NRC Site Office

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