DMB/50.55(e)

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Dalwyn R. Davidson
VICE PRESIDENT
SYSTEM ENGINEERING AND CONSTRUCTION

June 29, 1981

Mr. James G. Keppler
Director, 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
Final Report on Fuel Pool
Penetration Piping
ASME Welds (G-41 System)
[RDC 22(80)]

Dear Mr. Keppler:

This letter constitutes the Final Report as required by 10CFR50.55(e) on the degradation of fuel pool penetration piping by the welds for attaching the piping to the fuel pool liner and leak chase. This nonconforming condition, which was caused by the misapplication of a welding procedure, was reported as a significant deficiency to Mr. J. Konklin of the NRC Region III Office of Inspection and Enforcement on November 3, 1980, by Mr. W. J. Kacer of The Cleveland Electric Illuminating Company (CEI).

Description of Deficiency

During the process of making the attachment welds between the fuel pool liner and leak chase to the G-41 System (fuel pool cooling and clean-up), there was an apparent misapplication of the welding procedure. This resulted in an excessive heat input to the pipe material (SA 312-304 stainless steel) causing an oxidation and expulsion of base material from the inside diameter of the pipe. This resulted in a thinning of the pipe wall to varying degrees. In one identified area, there was a cavity approximately .125 inches deep in a pipe with a nominal wall of .165 inches, leaving an estimated .040 inches of pressure retaining material. This deficiency was detected during an additional inspection performed to provide the basis for a use-as-is disposition on two Nonconformance Reports (NR) which documented software problems.

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Statement of Possible Safety Implications

This piping system is designated ASME Section III, Class 3. This deficiency, documented on NR CQA-178, is limited to the penetration piping to the lower pools located in the fuel handling area of the Intermediate Building. This system has a design pressure of 150 psig and operating temperature of 127°F (below 150°F when larger than average amounts of spent fuel are stored in the pool). The affected piping had been hydrostatically tested at 187.5 psig and accepted. The material specifications for SA 312 material require minimum wall at any point shall not be more than 12.5 percent under the nominal wall thickness specified. Since the minimum wall was reduced in local areas to .040 inches or approximately 25% of nominal wall thickness, the possibility of a failure of the penetration during service life had to be considered. The repaired penetrations have eliminated our concerns for any safety implications.

Corrective Action Taken

To correct the existing problem, an inspection was performed on the internal surface of all the G-41 fuel pool penetrations in the areas where the attachments were welded on. A visual inspection was first performed with the area being marked to the extent of the damage to the pipe. The areas that showed heavy oxidation (sugaring) were ground using an air grinder with burr tips, until the areas appeared sound, bright, and free of defects. Liquid penetrant inspection was performed to determine if the base metal was sound. Any penetration that could be cleaned up to sound metal without grinding through the pipe wall thickness was determined to be repairable by welding. Of the twenty-four penetrations, all but three were determined to be repairable by welding. These three were removed and replaced according to the requirements of the specification and applicable ASME III Codes.

The welder used for internal repair was required to pass a welder performance test to qualify per ASME IX and limited accessibility in accordance with Reg. Guide 1.71 by making an internal groove weld on the inside diameter of a section of four-inch pipe that represents the worst condition in production. The weld repair was accomplished using the GTAW process per the requirement of Pullman Power WPS-29. After surface grinding and blending the repair to the pipe contour, liquid penetrant inspection was performed per Pullman Power Procedure IX-PT-1 to determine acceptability. All repaired penetrations were found to be acceptable.

The system (all penetrations) was pressure decay tested at 1.25 times the system design pressure of 150 psi and held for one hour with no drop in pressure allowed. This test [reference ASME Code Case N-32-3 (1541-3)] was required because a standard hydrostatic test could not be performed due to the inaccessibility of the pool liner attachment weld to the leak chase. All penetrations have been found acceptable except one ten-inch penetration, No. 22 (NNIC Weld Nos. 1-942 and 1-1727), located at the top of the spent fuel pool on the northeast wall. The pressure drop was greater than allowed.

Work is in process to locate the leak. One of two methods of repair will be employed depending on the location of the leak. 1) If the leak is in the weld repaired area, the weld will be repaired until acceptable or the penetration will be removed and replaced. 2) If the leak is found in the section of the line embedded in concrete, the line will be re-routed and retested. The completion of the repair or replacement of this penetration will result in all penetrations of the G-41 system being in compliance with ASME Section III of the Code. It is presently expected that all activities required to close-out NR CQA-178 will be completed by December, 1981.

Very truly yours,

Dalwyn R. Davidson

Dalwyn R. Davidson
Vice President
System Engineering and Construction

DRD:pab

cc: J. Hughes
U.S. NRC -- Site

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