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MURRAY R. EDELMAN
SR. VICE PRESIDENT
NUCLEAR

April 22, 1987
PY-CEI/OIE-0272 L

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois, 60137

Perry Nuclear Power Plant
Docket No. 50-440
Design Deficiency in
Pipe Rupture Analysis

Dear Sir:

Attached is the final report pursuant to 10CFR Part 21 concerning a design deficiency associated with the Residual Heat Removal System (E12) identified at the Perry Nuclear Power Plant Unit 1. This condition was evaluated per Deviation Analysis Report 278.

This report is being filed to satisfy 10CFR21 requirement 21.21(b) in total. Please feel free to call me if you have any questions.

Very truly yours,

Murray R. Edelman
Senior Vice President
Nuclear Group

APR 27 1987

MRE:njc

Attachment

IEI 9

cc: Mr. K. A. Connaughton
USNRC, Site Office

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Mr. W. F. Sailer, Vice President & Manager
Quality Assurance Division
Gilbert/Commonwealth Inc.
P.O. Box 1498
Reading, Pennsylvania 19603

April 22, 1987
PERRY NUCLEAR POWER PLANT
10CFR21 REPORT
Docket No. 50-440

1. The name and address of the individual or individuals informing the NRC.

Mr. A. Kaplan, Vice President
Nuclear Operations Division
The Cleveland Electric Illuminating Company
10 Center Road
Perry, Ohio 44081

2. Identification of the activity or the basic component supplied which fails to comply or contains a defect.

The full effects of postulated piping ruptures in the high energy RCIC/RHR steamline, specifically jet impingement, were not accounted for.

3. Identification of the firm supplying the basic component which fails to comply or contains a defect.

Gilbert/Commonwealth Inc.
P.O. Box 1498
Reading, Pennsylvania 19603

4. The nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

During a design modification to change the Reactor Core Isolation Cooling (RCIC) containment inboard steam isolation valve from normally closed to normally open, the full effects of postulated piping ruptures in the high energy steamline, specifically jet impingement, were not accounted for. The jet impingement loadings due to the postulated steamline break would result in the loss of a single loop of Residual Heat Removal (RHR) shutdown cooling and low pressure coolant injection. Assuming a worst case single active failure in the redundant RHR loop, the result would be loss of all RHR shutdown cooling capability. However, the number of operable loops/systems of Emergency Core Cooling Systems (ECCS) would still meet the minimum requirements as defined in the Perry FSAR, Section 6.3.1.1.2.e.

The plant will be able to obtain a scrammed hot shutdown condition; however, with reliance solely upon the utilization of safety systems and the assumptions noted above, sufficient decay heat removal capacity is not available to maintain cold shutdown conditions. Therefore, this deficiency is considered reportable under the provisions of 10CFR21.

It should be noted that the above sequence of events has a very low probability of occurring. The corresponding high probability of non-safety system availability offers alternate decay heat removal methods (i.e., RWCU, suppression pool cleanup) that will allow the plant to maintain a cold shutdown condition. In such case, this condition would not constitute a substantial safety hazard.

In addition, current power history does not require CEI to use both loops of the RHR shutdown cooling system to maintain cold shutdown, and this position is provided for in the plant technical specifications.

5. The date of receipt of information reasonably indicating that a condition reportable under 10CFR21 has been identified at PNPP.

April 20, 1987

6. The number and location of all such components obtained for Perry Plant.

This noncompliance involved pipe rupture/jet impingement criteria as they related to the system design basis. Component defect or failure is not identified in this noncompliance

7. The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

A review for all aspects of pipe rupture associated with the design modification noted above has identified the need for the following corrective action:

- a) one pipe rupture restraint in each RHR room to limit the movement of the RHR piping when it is subjected to the postulated jet impingement such that there will be no piping failure in the RHR shutdown cooling or low pressure coolant injection pressure boundary.
- b) one jet impingement bumper in each RHR room to limit the deflection of non-safety flush piping connected to the RHR system so that excessive loads will not be transmitted to the RHR piping.
- c) modification of four pipe supports in the RHR A room to withstand the postulated jet impingement forces.

The Cleveland Electric Illuminating Company (CEI) has issued Design Change Packages for the modifications identified above. All required modifications will be completed prior to declaring the RCIC system operable.

CEI considers this design oversight to be an isolated case. ✓
However, CEI is evaluating the need to review similar design changes, and the program under which these changes are reviewed and implemented. The results of this evaluation will be presented in the Licensee Event Report associated with this event.

8. Any advice that has been, is being, or will be given to other purchasers or licensees.

CEI considers this to be an isolated occurrence, and therefore, has no advice for other licensees or purchasers.