50-341

Edward Hines

Detroit Edison

January 7, 1981
EF2-49,876

Mr. James C. Keppler, Director
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Subject: Final Report of 10CFR50.55(e) Item on Inadequate Pipe Clearance. (#35)

Dear Mr. Keppler:

On December 10, 1980, Detroit Edison's Mr. H.A. Walker, Supervisor - Construction Quality Assurance, telephoned Mr. Richard Knop of NRC - Region III to report on a problem with Inadequate Pipe Clearance in the drywell at the Fermi 2 site.

In reviewing drywell piping clearances for installation of insulation it was noted that inadequate clearance was provided in many instances for installation of the required insulation. In reviewing the actual clearances, it was noted that in many cases adequate clearance may not have been provided for pipe expansion due to heating. This could cause physical damage to Quality Assurance Level I piping, as well as possible damage to other Quality Assurance Level I equipment in the drywell.

A preliminary analysis indicates that the probable cause of the problem was the failure to specify minimum piping clearances on engineering drawings and/or construction specifications. Detroit Edison Engineering has completed their investigation of the problem and the final report is attached.

Very truly yours,

Edward Hines

EH/HAW/cp

Attachment

cc: Mr. Victor Stello, Jr., Director
Office of Inspection and Enforcement
Division of Reactor Inspection Programs
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Bruce Little, Resident Inspector
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ENRICO FERMI POWER PLANT - UNIT 2

DEFICIENCY REPORT

INADEQUATE CLEARANCE ADJACENT TO DRYWELL PIPING SYSTEMS TO ACCOMMODATE PREDICTED THERMAL EXPANSION AND VIBRATION-INDUCED MOVEMENTS

INTRODUCTION

In order to insure that damaging contact will not occur between adjacent piping systems or between piping and other adjacent plant features due to movement caused by thermal expansion, seismically induced vibration and operationally induced vibration, it is necessary to maintain minimum clearances between all closely spaced plant features. This clearance requirement was provided for during the design phase of Fermi 2's Piping Systems by application of a "Design Objective" which provided a minimum of three (3) inches of clearance between the outer surface of each pipe (or its insulation) and any adjacent plant features. While this objective was generally adhered to in design, it was not formally established as a design requirement, nor was it adopted as a criterion to be maintained during construction.

Supplementing the minimum clearance objectives stated above, is the planned Preoperational Vibration and Dynamic Effects Testing Program which is described, in detail, in Sections 3.9 and 14.1 of the Fermi 2 FSAR. This program has been developed to verify the overall validity of the various Piping Systems Thermal Expansion and Vibration Analytical Studies, conducted during the plant design phase. This program was not formulated, however, to cover all piping systems nor was it intended to provide assurance of adequate clearance between plant piping systems and adjacent features prior to initial system heat-up/pre-operational testing.

DESCRIPTION OF THE POTENTIAL DEFICIENCY

Field observations of installed piping systems in the drywell revealed cases where QA Level I Piping Systems pass questionably close to adjacent pipes or other adjacent plant features. Based upon these observations, a detailed survey was made of all installed piping systems in the drywell to determine those cases where the potential for contact, during plant operation, existed. The criteria applied during the survey, required the identification of all cases where a minimum of three inches of clearance was not available for a non-insulated pipe or six inches for an insulated pipe.

Once the cases of clearance less than the specified amount were identified, a sample of the more apparently serious problems was investigated by comparison of the actual available clearance to the movement predicted by the Piping System Stress Analysis. Based upon the results of the survey, cases where potential contact between the installed QA Level I Piping and adjacent plant features were identified, and it was concluded that in accordance with the rules of 10CFR50.55(e)(1)(iii), a potential reportable deficiency existed.

NUCLEAR REGULATORY COMMISSION NOTIFICATION

In accordance with the rules of 10CFR50.55(e), Item 2, verbal notification of the above described potential deficiency was provided to the NRC Region III Staff, by the Fermi 2 Project Quality Assurance Director, on December 10, 1980.

CORRECTIVE ACTION

For each identified location where the pipe to pipe or pipe to other adjacent feature clearance is less than three inches for non-insulated piping, or six inches for insulated piping, the piping drawings are being marked-up with the magnitude and direction of the predicted maximum thermal plus seismic deflection, as provided by the Piping Stress Analysis; plus a margin of 20% to account for uncertainties in that analysis. These marked drawings are then used to perform a field walk-down of each potential problem location to see whether contact could occur during operation. If it is determined, based upon the walk-down, that contact will not occur, no further action is taken. If, during the walk-down it is determined that contact will occur, appropriate modifications to the piping and/or the other object, are initiated to solve the problem on a case-unique basis.

In addition, a field construction criteria document will be prepared and issued which will provide for minimum spacings to be maintained between adjacent plant features, and/or to alert the field forces to seek specific engineering assistance in cases where minimum spacings cannot be maintained.

SAFETY IMPLICATIONS OF THE DEFICIENCY

If Piping Systems thermal expansion is hampered due to contact with other adjacent plant features, there is a probability that damagingly high loads can be developed in the pipe, its supports, the restraining feature or the building structure. Such loads may cause permanent deformations in the piping and its supports and could result, in the worst case, in structural failures. Similarly, if piping which is vibrating due to seismically induced or operationally induced loadings, is permitted to contact adjacent plant features during that vibratory excitation period, there is a possibility that impactive damage and/or premature fatigue failures may result.

The Piping Systems involved are in the final phases of construction; however, none of them have been hydrostatically tested, N-stamed or turned over to the owner for final acceptance or preoperational testing. The walk-down program described above is part of the routine pre-hydrostatic test check out, and is

intended to identify any apparent discrepancies in the finally constructed systems. This activity will continue thoughout the systems completion and turnover sequence.

Conduct of the walk-down program, coupled with the analytical verification activities of the Preoperational Vibration and Dynamic Effects Test Program, provide a very high degree of confidence that these systems will not experience significant service loadings which were not accounted for in the original design. As a result of this confidence, it is concluded that situations which could result in piping system damage, to a degree that could compromise the health and safety of the public, will not occur during the preoperational test or commercial phases of plant operation.

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J. H. Casiglia
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Approved by: T. H. Dickson
T. H. Dickson, Director
Project Design

JHC/bp