

THE CINCINNATI GAS & ELECTRIC COMPANY



June 6, 1979

E. A. BORGMANN
VICE PRESIDENT-ENGINEERING

U.S. Regulatory Commission
Office of Inspection and Enforcement
Region III
7999 Roosevelt Road
Glen Ellyn, Illinois 60137

ATTN: Mr. James G. Keppler
Regional Director

RE: WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1
IE BULLETIN 79-07, DOCKET 50-358
W.O. 57300, JOB E-5590, FILE # 91

Gentlemen:

By our letter to your office dated May 25, 1979 we provided a response concerning IE Bulletin 79-07 which was complete insofar as the Balance of Plant Piping is concerned. We subsequently have received a letter from the General Electric Company covering the seismic stress analysis for the NSSS Systems. Therefore, by information contained herein, we are supplementing our letter of May 25, 1979.

In response to Items 1, 2, and 4 of the referenced IE bulletin G.E. has responded as follows.

"None of the computer codes used for the seismic analysis of GE piping systems, important to safety, employed the techniques identified in Item 1 of the subject bulletin."

The General Electric response to Item 3 of the referenced IE Bulletin, as it applies to the Main Steam Analysis, dated 12-29-76, and the Recirculation System Analysis, dated 12-4-74, is provided in Attachment "A" to this letter. G.E. has indicated that the due date for submittal of the five (5) benchmark problems has been extended to July 31, 1979 in accordance with Mr. W.T. Russell (NRC Staff) by teleconference on May 25, 1979. Submittal of the five NRC benchmark problems will conclude CG&E's response to IE Bulletin NO. 79-07.

Very truly yours,
THE CINCINNATI GAS & ELECTRIC COMPANY

E.A. BORGMANN, SENIOR VICE PRESIDENT

DJF/kjd
ENCLOSURE

cc: W.D. Waymire
J.D. Flynn
W.W. Schwiers
S.G. Salay
J.R. Schott

R.F. Scheibel
H.C. Brinkmann
W.E. Smith
NRC Office of Inspection and Enforcement
Division of Reactor Inspection Programs
Washington, D.C. 20555

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The SAP/PISYS computer programs were used for seismic piping analysis performed by GE. A description of these programs and the verification procedure is presented below.

SAP4G Verification

Program Description

SAP4G, a version of SAP, was originally developed for General Electric by F. A. Peterson and K. J. Bathe of the Engineering Analysis Corporation at Berkeley. The SAP program is a general purpose structure program used to perform static and dynamic analysis of mechanical and piping components by the finite element method.

Verification

All GE production versions of SAP are verified using a special benchmark problem that exercises all the important features of the program. The benchmark problem has been analyzed for the effects of constraint of free end, distributed forces, and is dynamically analyzed to determine mode shapes and natural frequencies using Swanson System's ANSYS program. ANSYS was also used to predict dynamic response of the benchmark problem using the response spectra and time history integration methods. The predicted frequencies, mode shapes, and loads were compared to the corresponding SAP predictions. The SAP program prediction had to be consistent with those of ANSYS before SAP was qualified for production use. In order to test unique features of SAP that cannot be compared to the results of another program, a special problem is devised which has an equivalent computer or manually calculated solution. Before any new version of SAP is verified, for production application, the benchmark problem is reanalyzed to verify that the program changes have not changed predictions or reduced their accuracy.

PISYS Verification

Program Description

PISYS is a computer program specializing to analyze piping systems. The PISYS program provides a highly flexible user oriented input format for piping system modeling. The analysis modules of PISYS are taken directly from the SAP4G program.

Verification

Since PISYS analysis modules are identical to SAP4G, a SAP analysis of a typical BWR steam piping system is used as a benchmark problem for PISYS verification. The steam line is analyzed for thermal expansion, dead weight, and a variety of dynamic loads in order to exercise all the features of PISYS. PISYS was not verified as a production program until the predictions of SAP and PISYS were shown to be identical for practical purposes.

Before any new version of PISYS is verified for production application, the benchmark problem is reanalyzed to verify that the program changes have not changed the predictions or reduced their accuracy.

Five NRC benchmark problems will also be analyzed as a further verification of the PISYS code. This analysis is expected to be completed and submitted to the Commission for review by July 13, 1979.