

DEBA 7-7-79
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May 21, 1979

Mr. James P. O'Reilly, Director
United States Nuclear Regulatory Commission
Region II, Suite 1217
230 Peachtree Street, N. W.
Atlanta, Georgia 30303

Subject: Virgil C. Summer Nuclear Station
Inspection & Enforcement Bulletin
79-07 - Docket No. 50-395
NE File 2.8950

Dear Mr. O'Reilly:

NRC I&E Bulletin No. 79-07 regarding seismic stress analysis of safety related piping required action by South Carolina Electric and Gas Company within forty-five (45) days. This letter provides information in response to this bulletin as it applies to the Virgil C. Summer Nuclear Station.

PIPDYN II (Gilbert/Commonwelath version) is the computer program used in the seismic stress analysis of BOP safety-related piping for the Virgil C. Summer nuclear project. Algebraic summation (considering sign) of either the codirectional spatial components or inter-modal responses for a response spectrum analysis was not used with this program. Time history analysis was not used in seismic stress analysis of piping.

PIPDYN II is a recognized program developed by Franklin Institute Research Laboratory and has had sufficient history of use to justify its applicability and validity. The theory, assumptions, computational techniques and results have been examined and found to be acceptable. Independent comparisons of results have been made to classical problems, recognized bench-mark calculations, and piping systems analyzed by other computer programs with acceptable results. This includes the ASME Sample Problem #1 in the ASME publication "Pressure Vessel and Piping 1972, Computer Programs Verification", as well as frequency and mode shape comparisons to ANSYS, PIPESD, and Biggs example in his book "Introduction to Structural Dynamics". The combination of modal responses and the combination of responses from spatial component earthquakes were verified by hand calculations to be in compliance with Regulatory Guide 1.92.

Westinghouse (W) scope was limited to the Reactor Coolant Loop and Class 1 lines. This piping was analyzed by W using spectrum modal analysis. Two perpendicular horizontal and one vertical earthquake components were combined simultaneously with the intramodal responses combined using the square-root-sum-of-the-squares (SRSS). The intermodal response was then calculated using

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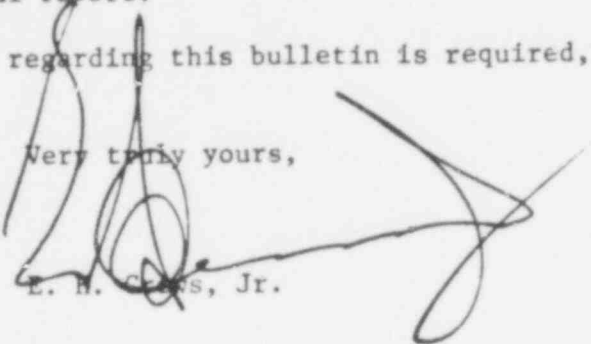
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SRSS summation of the individual modes. In no instance was an algebraic technique used to combine the responses. The computer code utilized by W is WESTDYN, which is documented in WCAP-8252, Revision 1, "Documentation of Selected Westinghouse Structural Analysis Computer Codes," May, 1977. Comparisons of this computer code with benchmark problems are also contained in the subject topical report.

If further information regarding this bulletin is required, please let us know.

Very truly yours,


E. H. Cross, Jr.

RBC:OWD:EHCJr:msd

CC: Office of Inspection and Enforcement
Washington, D. C.

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