CENTRAL FILES

POWER AUTHORITY OF THE STATE OF NEW YORK
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August 22, 1979
IPN-79-62

Mr. Boyce H. Grier, Director
Office of Inspection and Enforcement
Region I
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
I. E. Bulletin No. 79-07

Dear Sir:

In letters IPN-79-26 (dated May 23, 1979) and IPN-79-42 (dated June 29, 1979), the Authority provided data for the Containment Spray System in response to the subject item. The Containment Spray System is identified as Problem No. 425 and contains Line Nos. 824, 825, 826, 827 and portions of Line Nos. 15, 51, 93 and 94. The Containment Spray System as shown on that problem represents an analytical problem of such size that it exceeded the capacity of the UE&C ADLPIPE-2 Program. This problem was, therefore, subcontracted to the Franklin Institute Research Laboratory for analysis using their PIPDYN-II Program. The initial analysis of this problem in 1972, utilizing the PIPDYN-II Program, produced a result based on the algebraic summation technique questioned in I.E. Bulletin 79-07. In response to the subject item, the Containment Spray System has been re-analyzed by the PIPDYN-II Program using an SRSS summation technique.

The Authority is submitting herewith the following material:

1. Program listing of the appropriate portion of the PIPDYN-II Program

2. Verification statement

3. Affidavit of the Franklin Institute Research Laboratory in conformance with 10 CFR §2.790(b).

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Since the enclosed computer code listing is Franklin Institute Research Laboratory proprietary information, the Authority hereby requests that under the provisions of 10 CFR §2.790 the listing be withheld from public disclosure.

Very truly yours,

Paul J. Early
Assistant Chief Engineer-Projects

cc: U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Division of Reactor Operations Inspection
Washington, D. C. 20555

Without Attachments

Verification of PIPDYN II® Computer Program

The accuracy and correctness of the computational results generated by the PIPDYN II® computer program [ref. 1] employed for the analysis of piping systems, was verified by either direct comparison with analytical results or with the published results obtained from other computer codes. Verifications for several types of analyses are summarized here.

1. Piping System Subject to Deadweight, Thermal Loadings and Anchor Movement.

   The model presented in Problem No. 6 of reference 2 was analyzed. PIPDYN II® results are in excellent agreement with that obtained by the ANSYS [3] computer code.

2. Natural Frequency Analysis of Three-Dimensional Structure.

   Problem No. 1 of reference 2 is used as a benchmark. The mathematical model of the frame structure with lumped masses located as shown in the sketch of page 1 of solution no. 4 was made for the PIPDYN II® program. The results are in good agreement with the measured quantities and in exact agreement with that obtained from ANSYS [3] computer code.

3. Combined SRSS Modal Response of a Simple Structural System to Ground Shock Represented with Response Spectrum.

   A lumped mass cantilever system subjected to a ground shock as described in reference 4 was analyzed with PIPDYN II®. The mode shapes, natural frequencies and the SRSS response quantities of interest such as deformation and base bending moment were found to agree with the analytic results obtained by Young.

References

1. PIPDYN II® - A Computer Program for the Complete Analysis and Evaluation of Piping Systems and Three-Dimensional Frame Structures.

2. Pressure Vessel and Piping - 1972 Computer Programs Verification, American Society of Mechanical Engineers.

3. ANSYS, Swanson Analysis Systems, Inc.

4. Young, D., "Response of Structural Systems to Ground Shock", Shock and Structural Response, edited by M. V. Barton, ASME Publication, 1960.