

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23209

March 30, 1979

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Serial No.: 198  
L&QA/EAB:pwc  
Docket Nos.: 50-280  
50-281

Attn: Mr. Victor Stello, Jr., Director  
Division of Operating Reactors

License Nos.: DPR-32  
DPR-37

Dear Mr. Denton:

In response to the Show Cause Order of March 13, 1979, concerning reanalysis of certain piping systems associated with Surry Power Station Units 1 and 2, Vepco and Stone & Webster Engineering Corporation are proceeding as expeditiously as possible to complete the necessary reanalysis work as required by this Order.

As you are aware, a meeting was held with your staff in Vepco offices at the Surry Power Station site on Monday, March 26, 1979. A detailed status report was given by Vepco and Stone & Webster Engineering Corporation, and drawings and documents requested by the NRC were presented. We also met with your staff and Dr. Mattson in Bethesda on March 28 to discuss the material which is included in this letter. The purpose of this letter is to highlight key areas of those meetings and to identify areas where NRC concurrence is required.

The general approach to the analysis effort was described in some detail at both meetings. All piping systems which were originally dynamically analyzed, as defined by the Show Cause Order, have been identified. There are about 48 separate analytical computer runs.

The dynamic analysis of the affected piping systems is divided into two phases:

1. The piping systems will be analyzed with the original amplified response spectra to provide a comparison basis against the original code allowables.
2. Then, if any piping systems exhibit overstress they will be analyzed utilizing a new amplified response spectra which incorporates soil structure interaction.

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In the first case where the original amplified response spectra is used, the "NUPIPE" program will perform modal combinations using techniques compatible with the original analysis and in accordance with the provisions of the Order to Show Cause. In the second case where the soil structure interaction amplified response spectra is used, the "NUPIPE" program will use modal combinations which are compatible with present-day practices.

It is our intent to use practices currently acceptable to the NRC to the maximum extent possible in order to expedite your review. We believe the use of soil structure interaction amplified response spectra similar to that used in the licensing of Surry Power Station Units 3 and 4 is compatible with our approach. The use of "NUPIPE" represents the current practice in piping system design for many nuclear power plants across the country and is also compatible with our desire to use currently acceptable practices.

This approach, as well as those described in the attached position statements, and other details communicated to your staff at the meetings on March 26 and 28, is being expedited by Vepco. If you believe any of the above is contrary to the intent of the Show Cause Order, or the proposed methodology is unacceptable, we would like to meet and discuss this with you promptly. Our plan is to submit the results of each reanalysis to you as they are completed to enable staff review to begin and continue concurrently while the remaining analyses are completed. The first review meeting is now tentatively scheduled for April 4 in Boston.

In addition to the analysis being performed by Stone & Webster, some system packages will be analyzed by the Nuclear Services Corporation on the "NUPIPE" analysis programs.

A timely review of our requests is urgently needed and your full cooperation will be greatly appreciated.

Very truly yours,



W. C. Spencer  
Vice President  
Power Station Engineering  
and Construction Services

Attachments

POSITION  
FOR  
RESOLUTION OF NRC ORDER-TO-SHOW-CAUSE  
OF  
MARCH 13, 1979  
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An amplified response spectra (ARS) which incorporates a time history soil structure interaction and an acceptable set of damping values was submitted on the docket for Surry Units 3 and 4 for the seismic design of Category I structures and piping. The NRC approved the use of soil structure interaction, as referenced in the Safety Evaluation Report, for the Surry sites.

It is Veeco's position that the use of soil structure interaction techniques be permitted for the calculation of the amplified response spectra for Surry Units 1 and 2. This is currently being accomplished using subgrade stiffness derived from analytic and/or numerical solutions (called the Elastic Half-Space Method) which will be compared to two dimensional finite element solutions.

Upon completion of work which shows a reasonable correlation between the two methods for the Surry containment structures, it is preferred that production of ARS be performed by one method; namely, the Elastic Half-Space Method.

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The NUPIPE program will utilize two different methods of modal combination for the analyses of the affected systems, depending on the amplified response spectrum (ARS) which is used. In those cases where the original ARS is used, the NUPIPE code will produce modal response combinations as follows:

- Intermodal - SRSS for reaction combination
- Intramodal - SRSS for modal combination
- $|y| + \sqrt{x^2 + z^2}$  for direction combination

In those cases where a new ARS is used which incorporates a time history soil structure interaction and revised damping value, the NUPIPE code will produce modal response combinations as follows:

- Intermodal - SRSS for reaction combination
- Intramodal - Grouping for modal combination  
(where closely-spaced modes are combined by absolute sum)
- SRSS for direction combination

It is Vepco's position that in those cases where the original ARS is utilized in the analyses, the stated version of NUPIPE will provide results which are sufficiently in agreement with original licensing criteria. In those cases where a new soil structure interaction (SSI) ARS is utilized in the analysis, the NUPIPE code version consistent with use of SSI ARS will be used, thereby reflecting current-day practices.

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The nuclear safety-related systems affected by the Order-to-Show-Cause have been identified. The schedule for analysis is based on the following priorities:

Priority No. 1  
(37)

Systems which were required for a safe shutdown which were analyzed by SHOCK II or were affected by valve weight change. They are:

- Reactor coolant pressure boundary
- Engineered safeguards systems (2 trains)
- Low Head Safety Injection lines which were affected by Westinghouse valve weight change

Portions of the following systems:

- Main Steam
- Residual Heat Removal
- Feedwater
- Auxiliary Feedwater
- Service Water

Priority No. 2

Balance of systems which utilized SHOCK II in original analysis but are not required for safe shutdown. The only two systems included in this priority are:

- Component Cooling Water and Fire Protection