Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

June 18, 1984

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

Subject: Byron Generating Station Units 1 and 2
Braidwood Generating Station Units 1 and 2
Piping Design Criteria
NRC Docket Nos. 50-454, 50-455, 50-456, and 50-457

Dear Mr. Denton:

This letter is to request NRC concurrence in the use of higher damping values in the analysis of piping for Byron and Braidwood stations. Prompt review of this matter could result in substantial cost and time savings in the construction of these four units.

In January of 1984, the Pressure Vessel Research Council (PVRC) Technical Committee on Nuclear Piping Systems approved an interim technical position on damping values. The PVRC position recommends damping for the analysis of piping systems that is greater than the damping currently specified in Regulatory Guide 1.61. Specifically, the PVRC position recommends the use of 5% of critical for frequencies from 0 to 10 HZ, and a linear decrease from 5% of critical to 2% of critical between 10 HZ and 20 HZ, and 2% of critical for frequencies above 20 HZ. Their recommendation is shown graphically in attachment 2 to this letter. The PVRC recommendation is based on a wide spectrum of sources including laboratory and in-plant tests of piping of different sizes, a variety of support types and several different methods of excitation. Both foreign and domestic data were used. Much of this data was not available at the time the Regulatory Guide 1.61 damping values were established, thus the PVRC recommendation provides more realistic and well founded data. A detailed description of the PVRC damping values is presented in "Pressure Vessel Research Council Technical Position on Damping Values for Piping, Interim Summary Report", dated December, 1983.

Lawrence Livermore National Laboratory has done considerable work to determine the impact of the PVRC damping recommendations on the seismic response of piping systems. Their report ("Impact of Changes in Damping and Spectrum Peak Broadening on the Seismic Response of Piping Systems," NUREG/CR-3526, UCRL-53491) concludes that substantial decreases in calculated response can be achieved without a significant reduction in the margin of the overall system design.

B001
1/0

We have also completed some comparison studies for Byron/Braidwood piping using the PVRC recommended damping values and have arrived at the same conclusion. Attachment 1 to this letter is a summary of our study.

We would like approval to use the PVRC recommended damping values for piping and equipment dynamic analysis for the Byron and Briadwood projects. These damping values would be used for the seismic events, both OBE and DBE, and for LOCA related loads in which the excitation transmitted to the system under analysis is due to dynamic displacements imposed by attachments to the reactor coolant system. However, for impulse loads such as feedwater pump trip, main steam valve closure and relief valve discharge, the damping outlined in Regulatory Guide 1.61 will continue to be used.

The design of the piping and its analysis on the Byron and Braidwood projects is essentially complete. The primary benefit of using the PVRC damping values would be in reconciling piping support deviations due to modifications. It would be our intent to use the PVRC damping values wherever reanalysis is required to reconcile pipe support deviations due to changes. Potentially, the PVRC damping could be applied to all sizes and classes of safety-related piping (ASME SEction III, Class I, Class 2 and Class 3).

We believe that there are no adverse consequences on the total design of the piping system resulting from the use of higher PVRC recommended damping values. The damping values recommended result from factors such as energy loss due to friction within support compoments, energy loss due to friction effects between insulation and piping components, and other energy dissipation mechanisms within the piping system. The excitation levels experienced in the test data were not sufficient to cause material nonlinear effects to be a factor. Use of these damping values are therefore not expected to result in significant additional material plasticity from the actual loading condition.

We would like to discuss this matter in further detail at your convenience.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

bs

8816N