



**Wisconsin Electric** POWER COMPANY

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May 13, 1986

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U. S. NUCLEAR REGULATORY COMMISSION  
Washington, D. C. 20555

Attention: Mr. George Lear, Project Director  
PWR Project Directorate No. 1

Gentlemen:

DOCKETS 50-266 AND 50-301  
ENERGY ABSORBERS AS REPLACEMENT OF SNUBBERS  
FOR SEISMIC SUPPORT OF NUCLEAR PIPING SYSTEMS  
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

In supporting nuclear piping systems from the effects of earthquakes and other dynamic-type loads, hydraulic or mechanical snubbers are used at locations where thermal expansion considerations preclude the use of rigid-type supports. Because of the complex nature of snubber mechanisms, extensive in-service inspections, functional testing, and maintenance programs have become necessary to provide reliable snubber performance and system response. These programs are resulting in increased levels of personnel radiation exposure and increased operating cost. The nuclear industry has, therefore, begun to develop ways to lessen its dependence on snubbers. Energy absorbers are a newly developed support concept, which virtually eliminates the need for snubbers.

Wisconsin Electric Power Company intends to install energy absorbers in place of snubbers in selected locations at the Point Beach Nuclear Plant. Enclosure 1 describes the results of an analysis of a sample application of energy absorbers for the Main Steam Line Outside Containment, Piping Isometric P-107.

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11

Mr. Harold R. Denton  
May 13, 1986  
Page 2

Energy absorbers, as proposed in this application, are based on proprietary development work by Bechtel Power Corporation (Bechtel). An informal presentation facilitated by Mr. R. J. Bosnak on the development of energy absorbers was made by Bechtel to members of the NRC staff on April 3, 1984. The ASME Section III Code Case N-420 provides construction rules for energy absorbers.

Energy absorbers are simple, flexible supports made of ductile steel plates which are specially shaped to attain desired energy absorption characteristics. They contain no activation or trigger mechanisms. Use of energy absorbers as supports of piping systems for earthquakes or other dynamic loads introduces significant additional damping. Their operating principle is that they act as a flexible-type support with a finite stiffness under thermal expansion and control dynamic displacement by imparting large amounts of damping to the piping system as they undergo controlled yielding. The specific shape of the energy absorbing plates results in a well-defined yielding action and hysteretic characteristics. These well-defined characteristics stem from established, proven fundamental physical laws. Thus, the performance of energy absorbers can be accurately predicted and is repeatable. Their utilization is, therefore, expected to result in increased piping systems' reliability and flexibility.

Experimental testing, including results from shaker table tests of basic energy absorber concepts, is summarized in the report entitled, "Technical Basis for Energy Absorbers as Supports of Nuclear Power Plant Piping Systems." These initial tests were performed at the Richmond Earthquake Engineering Research Facility of the University of California, Berkeley, under various U. S. Department of Energy and Electric Power Research Institute programs, with close participation and consultation by Bechtel. These experimental tests have shown the feasibility of energy absorbers for piping systems for seismic conditions. Based on the initial success of these experiments, Bechtel has undertaken an extensive energy absorber development program, which includes theoretical and analytical studies, energy absorber design, fatigue testing, and other design and application evaluations. These results are also summarized in the above-referenced report. The report, which is proprietary to Bechtel, was submitted to the NRC on July 25, 1985 by Philadelphia Electric Company in Dockets 50-277 and 50-278 for Peach Bottom Atomic Power Station, Units 2 and 3. A non-proprietary version of the report consisting of Sections 1-3 and 9 of the proprietary version is being provided herewith for your information as Enclosure 2.

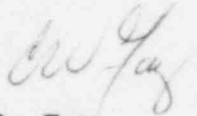
Mr. Harold R. Denton  
May 13, 1986  
Page 3

Wisconsin Electric intends to utilize energy absorbers at Point Beach Nuclear Plant wherever it is deemed prudent to eliminate snubbers. When they are used, unique modal damping ratios will be calculated and used in the piping analysis. The analytical basis of these damping ratios and their correlations to test results are provided in the referenced report. Since these damping ratios, in some cases, may exceed the generic system damping ratio used in the original design of the plant, we will amend the PBNP FSAR to include the use of energy absorbers at the time of installation of the equipment.

Replacement of safety-related snubbers with energy absorbers will be subject to the provisions of 10 CFR 50.59. It is anticipated that our evaluations and analysis will demonstrate that installation of these devices does not involve an unreviewed safety question.

Should you or your staff require additional information, please advise us.

Very truly yours,



C. W. Fay  
Vice President  
Nuclear Power

Copy to Resident Inspector