

DUKE POWER COMPANY

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August 1, 1984

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

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Subject: McGuire Nuclear Station
Docket Nos. 50-369 and 50-370
Piping Seismic Analysis Changes

Dear Mr. Denton:

Please find attached a description and justification for proposed piping seismic analysis changes for the McGuire Nuclear Station to adopt damping values and spectra shifting methods for piping systems recommended by the task group of the Pressure Vessel Research Committee (PVRC) of the Welding Research Council. The proposed changes reduce the excessive conservatism in current seismic design requirements and would allow use of fewer snubbers and other seismic restraints on modified piping at McGuire and would allow removal of some existing snubbers and seismic restraints to reduce inservice inspection, maintenance, and access/interference problems.

Although the proposed changes do not involve a change in the technical specifications or an unreviewed safety question and therefore are permitted pursuant to 10 CFR 50.59, it is requested that the NRC review and approve these changes prior to implementation. Similar changes have previously been submitted and approved by the NRC as evidenced by your February 8, 1984 letter to Southern California Edison containing a safety evaluation report on the San Onofre Unit 1 Seismic Reevaluation Program. In addition, the NRC is familiar with and generally supports these changes through participation in the PVRC Technical Committee, and forthcoming recommendations in the committee's draft NUREG-1061 indicate NRC support for the changes.

It is requested that the review/approval be processed in a timely manner, in order that elimination of unnecessary supports on existing or modified piping systems can be performed as various modifications are processed, and in view of the attendant lead time necessary for engineering support work to take advantage of the upcoming refueling outages on Units 1 and 2 (currently scheduled for March 24, 1985 and January 10, 1985 respectively). Once approved, these changes will be incorporated into the next applicable annual update to the McGuire FSAR.

If there are any questions concerning this request, please advise.

Very truly yours,

H.B. Tucker
Hal B. Tucker

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Attachment

cc: Mr. J. P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
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Mr. Ralph Birkel
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Mr. W. T. Orders
Senior Resident Inspector
McGuire Nuclear Station

DUKE POWER COMPANY
MCGUIRE NUCLEAR STATION, UNITS 1 AND 2
PROPOSED PIPING SEISMIC ANALYSIS CHANGES

Damping Values for Dynamic Analysis of Piping

As an option to the damping values currently given in FSAR Section 3.7.1.3, damping may be taken as 5% for frequencies below 10 hz, linearly decreasing to 2% at 20 hz and 2% for frequencies above 20 hz. These values for damping apply to all pipe sizes for both Safe Shutdown Earthquake (SSE) and Operating Basis Earthquake (OBE) loadings.

Justification:

These damping values have been recommended by the PVRC Task Group on Damping Values based on extensive review of available data. There is still conservatism included due to the use of response spectra instead of time history analysis which can be considered as additional justification for use of increased damping values. Use of the increased damping values for time history analysis will be justified on a case-by-case basis. These damping values reduce excessive conservatism in current requirements and will result in significant reduction in predicted pipe response. This will allow elimination of snubbers on existing piping and use of fewer snubbers and other seismic supports on piping added or modified by plant modifications. This will result in reduced cost and radiation exposure for Inservice Inspection of snubbers and increased overall reliability of the piping due to reduced probability of snubber failure and reduced thermal stress in new and modified piping due to fewer seismic supports (Ref. NUREG/CR 3718).

Response Spectra Shifting

As an alternative to the method of spectra broadening described in FSAR Section 3.7.2.8 for piping analysis, an envelop of the response of the piping system to shifted floor response spectra may be used. The method to be used is described in the Code Case N-397 and the Summer 1984 addendum to Section III, Appendix N of the ASME Boiler and Pressure Vessel Code.

Justification:

The floor response spectra for McGuire structures are characterized by a single dominant peak; therefore, the application of this method is straight forward.

The proposed change reduces the excessive conservatism in the current response spectra analysis and will result in fewer snubbers and other seismic supports. The response of the piping using this method has been compared with the response calculated using time history analysis for typical piping models by both Duke Power and Lawrence Livermore National Lab (reference NUREG/CR-3428). Both studies conclude that the proposed method is conservative compared to time history analysis but reduces the conservatism of the current spectra broadening method.