



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTORS REGULATION

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER PLANT

PIPING REPLACEMENT ANALYSES - MECHANICAL ASPECTS

DOCKET NO. 50-271

1.0 Introduction

By letters dated April 22, May 14, and July 10, 1985, Vermont Yankee Nuclear Power Corporation provided information describing the scope of the Recirculation System Pipe Replacement Program at Vermont Yankee and requesting approval for the Pressure Vessel Research Committee (PVRC) recommended damping values (ASME Code Case N-411) for response spectrum seismic piping analyses of the Recirculation and portions of the Residual Heat Removal (RHR) Systems at the plant. The staff review and evaluation of the mechanical aspects of the above stated submittals follows.

2.0 Evaluation

Code Case N-411, "Alternative Damping Values for Seismic Analysis of Piping Section III, Division 1, Class 1, 2 and 3 Construction" is a conditionally acceptable Code Case and is approved by the staff for specific plant applications pending revision of Regulatory Guide 1.61. Utilities wishing to use this Code Case shall submit in their request the following information or commitments:

- (a) Commit to use the case for piping systems analyzed by response spectrum methods and not those using time-history analysis methods.
- (b) Indicate if the case is to be used for new analyses or for reconciliation work and for support optimization.
- (c) Due to the increased flexibility of the system, commit to check all system predicted maximum displacements for adequate clearance with adjacent structures, components and equipment, and that the mounted equipment can withstand the increased motion.
- (d) When the alternate damping criteria of this Code Case are used, they will be used in their entirety in a given analysis and shall not be a mixture of Regulatory Guide 1.61 criteria and the alternate criteria of this Code Case.

The licensee in the above referenced letters has stated that the Recirculation and portions of the RHR Systems will be analyzed by response spectrum methods. Therefore, item (a) above is satisfied. The licensee

has stated the analyses performed are new (for the replacement piping) and, therefore, item (b) is satisfied. In the above referenced letters the licensee has stated that systems will be free of interferences to restrict free motion during a seismic event and that acceptance criteria have been developed and implemented to ensure that adequate clearance exists to allow for all piping replacements and that mounted equipment can withstand the increased motion that would be present with a more flexible piping system. Therefore, we find that item (c) has been satisfied. The licensee has stated that PVRC damping would be used for the replacement program piping system analyses and, therefore, item (d) above is satisfied. Based on the previous discussion, we find the use of PVRC damping (ASME Code Case N-411) is acceptable for the Recirculation and portions of RHR Systems. Further, the licensee's use of ASME Code Case N-411 should be documented in a future Amendment to the FSAR.

In addition the licensee has stated that for the replacement piping system analyses, the following will be utilized:

- (a) the B 31.1 Power Piping Code which was also used for the original piping system analyses.
- (b) the replacement system analyses will be performed with a three directional earthquake and a cutoff frequency of 33 Hz as compared to the original analyses which used a two directional earthquake and a cutoff frequency of 20 Hz.

The use of the Power Piping Code is consistent with the original design criteria for the plant and is thus acceptable. The use of the three dimensional earthquake and the 33 Hz cutoff frequency is consistent with design methodology being accepted by the staff for plants currently undergoing licensing review and is thus acceptable.

### 3.0 Conclusion

The staff has completed the mechanical engineering aspects of the Vermont Yankee Recirculation System Pipe Replacement Program and find the program as described by the licensee is acceptable.

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Dated: July 22, 1985