



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO USE OF ASME CODE CASE N-411

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2

DOCKET NOS. 50-325 AND 50-324

1.0 INTRODUCTION

By letter dated May 22, 1985, the Carolina Power & Light Company (CP&L, the licensee), pursuant to the Code of Federal Regulations, Title 10 Part 50.55a paragraph (a)(3), requested approval to utilize the damping curve developed by the Pressure Vessel Research Council (PVRC) in ASME Code Case N-411. It further stated that damping values extracted from the curve will be incorporated into seismic analyses for Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE) events; that the new damping values could be used for current piping modifications and future piping stress analyses as an option to the original damping values presented in the Final Safety Analysis Report (FSAR); that the PVRC damping values will be used only for seismic response spectra analyses; and that they will not be applicable to time-history analyses.

2.0 EVALUATION

We have completed our review of the CP&L request for authorization to use the damping values in ASME Code Case N-411 for application in the response spectrum seismic analysis for current modifications and future stress analyses of piping systems at the Brunswick Steam Electric Plant, Unit 1 and 2 as discussed in the licensee's letter NLS-85-106 dated May 22, 1985. The damping values in Code Case N-411 could be used as an option to the original damping values presented in the FSAR.

Code Case N-411, "Alternate 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.

CP&L has complied with these commitments in the letter of May 22, 1985. Therefore, since the commitments with respect to the Code Case N-411 are documented in the referenced letter, the staff finds the licensee's request to use Code Case N-411 acceptable for use at the Brunswick Steam Electric Plant, Units 1 and 2 in the response spectrum seismic analysis of piping systems.

In an attachment to the letter of May 22, 1985, the licensee has included marked up copies of the affected FSAR Tables 3.7.1-1 and 3.7.3-1, page 3.9.2-6 and figure 3.7.1.5 which will be included in the next FSAR revision. The staff finds this material acceptable.

In addition, the licensee has stated that the following upgrades will also be incorporated when applying the damping values of Code Case N-411:

- (1) A three-dimensional square root of the sum of the squares (SRSS) earthquake combination will be used in lieu of a two-dimensional SRSS combination.
- (2) Regulatory Guide 1.92 modal combinations accounting for closely-spaced modes will be used in lieu of a straight SRSS of all modes.
- (3) A rigid cutoff value of 33 Hz will be used in lieu of 20 Hz.

The use of these upgrades for use at the Brunswick Plant, Units 1 and 2 are consistent with design methodology being accepted by the staff for plants currently undergoing licensing review and is thus acceptable.

3.0 CONCLUSION

Based on our review and the above discussion, we find that the CP&L request to use the damping curve in ASME Code Case N-411 is approved as requested.

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Dated: August 28, 1985