

SAFETY EVALUATION OF MIXED CORES OF WESTINGHOUSE STANDARD
AND OPTIMIZED FUEL SUBJECTED TO SEISMIC AND LOCA LOADING

Structural Evaluation

The earlier NRC Safety Evaluation Reports (Refs. 1 and 2) for WCAP-9500, "Reference Core Report - 17x17 Optimized Fuel Assembly," and WCAP-9401, "Verification Testing and Analyses of the 17x17 Optimized Fuel Assembly," concluded that the Optimized Fuel Assembly (OFA) meets all the requirements of the Appendix A to SRP Section 4.2 with respect to fuel assembly structural response to Seismic-and-LOCA forces. It was also concluded that for each individual plant it must be demonstrated that the applied forces considered in WCAP-9401 bound the plant in question. These SERs in addition to approving the OFA subjected to Seismic-and-LOCA forces, pointed out that mixed cores of Westinghouse standard assembly and OFA will be evaluated on a case-by-case basis.

In order to take care of mixed cores, Westinghouse, however, has submitted the results of a generic study (Ref. 3). In this study Westinghouse has analyzed five cases of mixed cores subjected to Seismic-and-LOCA loading given in WCAP-9401. These cases, as shown in Figure 1 of the submittal, are: (1) homogeneous standard fuel assembly, (2) 2/3 standard and 1/3 OFA, (3) a different row of 2/3 standard and 1/3 OFA, (4) 1/3 standard and 2/3 OFA, and (5) homogeneous OFA. These cases cover a broad spectrum of the mixed cores and, therefore, are representative of mixed cores of standard and OFA. The response of these cases has been characterized by the grid impact forces which are the most critical response elements. Results of these analyses have been summarized in a table in the submittal. The maximum grid impact force on any grid from these analyses is only 75 percent of the allowable grid impact strength. The mixed cores of standard and OFA, subjected to Seismic-and-LOCA forces given in WCAP-9401 are, therefore, acceptable with respect to meeting the requirements of Appendix A to SRP Section 4.2. For each individual plant, however, it must be shown that the applied forces considered in WCAP-9401 bound the plant in question or else additional analysis will be required.

References:

1. Memorandum for L. S. Rubenstein, USNRC, to R. L. Tedesco, "Safety Evaluation Report on WCAP-9500," dated May 15, 1981.
2. Letter from R. L. Tedesco, USNRC, to T. M. Anderson, Westinghouse, "Acceptance for Referencing of Licensing Topical Report WCAP-9500," dated May 22, 1981.
3. Letter from E. P. Rahe, Westinghouse, to J. R. Miller, USNRC, "WCAP-9500 and WCAP-9401/9402 NRC Safety Evaluation Report (SER) Mixed Core Compatibility Items," dated March 19, 1982.