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EXXON NUCLEAR COMPANY, Inc.

2101 Horn Rapids Road
P. O. Box 130, Richland, Washington 99352
Phone: (509) 943-8100 Telex: 32-6353

Send to P. Tedesco

October 30, 1978

Dr. Derwood F. Ross, Jr.,
Assistant Director for Reactor Safety
Division of Systems Safety
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Dr. Ross:

In your letter to W. S. Nechodom dated November 18, 1977, you advised us about your concern of a potentially strong dependence of input motion frequency on fuel grid impact loads. You specifically requested that we perform sensitivity calculations to quantify this dependence. In response, we provided appropriate results of our calculations to you with my letter dated February 22, 1978. In a February 1978 phone conversation, S. B. Kim requested that we expand the effects of input motion amplitude. These results were provided to you informally in May 1978. Mr. Kim requested in a telecon on October 17, 1978 that the information provided in May be transmitted formally. The attachment to this letter is provided in response to Mr. Kim's request. For clarification purposes, minor changes have been made in the text from the information supplied to you in May.

The information contained in the attachment provided for the general information of the Staff is considered proprietary by the Exxon Nuclear Company. We therefore request that it be withheld from public disclosure. In the event any of this information is used as part of or in support of future licensing applications, it will be resubmitted in accordance with the provisions of the Commission's Regulation 10CFR2.790.

If you have further comments or questions concerning this matter, please contact me on 509-943-8241.

Sincerely,

Gerald Owsley

G. F. Owsley, Manager
Reload Licensing

GFO:gf
Attachment
As noted

CC: S. B. Kim (NRC)

ATTACHMENT A - FUEL ASSEMBLY

COMBINED SEISMIC-LOCA RESPONSE AS A

FUNCTION OF INPUT FREQUENCY AND AMPLITUDE

The fuel assembly response to seismic-LOCA core plate displacements was examined as a function of input frequency and input amplitude. The model used consists of the 15 assembly core model (Figure A.1) used by ENC for the evaluation of 15x15 fuel in Westinghouse type plants.(1) The core plate displacement input used was a segment(2) of the combined seismic-LOCA history(1) which produced the highest grid spacer impact displacements.

The time scale of the displacement input was divided by factors of 1.1 and 0.90 to get a variation in input frequency of ± 10 percent. The amplitude of the displacement history input was also varied by factors of 1.1 and 0.90. Lowering of the core plate frequency caused higherspacer deflections while raising the core plate frequency caused lower spacer deflections. These results indicate that the natural response frequencies of the ENC core modeled are generally below that of the combined seismic-LOCA input. Also, the changes in the amplitude of the core plate displacement gave slightly amplified changes in the spacer deflections.

(1) XN-NF-74 (P), "Combined Seismic-LOCA Mechanical Evaluation for Exxon Nuclear 15x15 Reload Fuel for Westinghouse PWR's", 4-8-77.

(2) Letter G. F. Owsley (ENC) to D. F. Ross (NRC), dated February 22, 1978.

The sensitivity study results for the most highly deflected peripheral midplane spacer are summarized in Table A.1. The variation in spacer deflection ranged from +13% to -17% for the cases analyzed. Other spacers at different elevations in the core and in other fuel assemblies could undergo greater proportional deflection changes, however, they do not reach the deflection level of the maximum deflection spacer considered in Table A.1.

The earlier ENC sensitivity calculation results, presented in Reference (2), contain a discrepancy in the reference interassembly gap between the different analyses and therefore do not give a valid comparison.

In summary, a variation in the amplitude and frequency of the input for a combined seismic-LOCA analysis may be expected to cause changes in the grid spacer deflections. For the most highly loaded spacer in an ENC core, the changes in calculated deflection will be approximately proportional to the change in input. Greater proportional changes in results could be expected for very lightly loaded spacers, or for core systems with dynamic characteristics which make them specifically sensitive to changes in input characteristics.

TABLE A.1 COMBINED SEISMIC-LOCA INPUT SENSITIVITY STUDY

Input Amplitude (% Nominal)	Input Frequency (% Nominal)	Spacer Deflection (% Nominal)
100	100	100
100	90	106
100	110	83
90	100	83
110	100	113

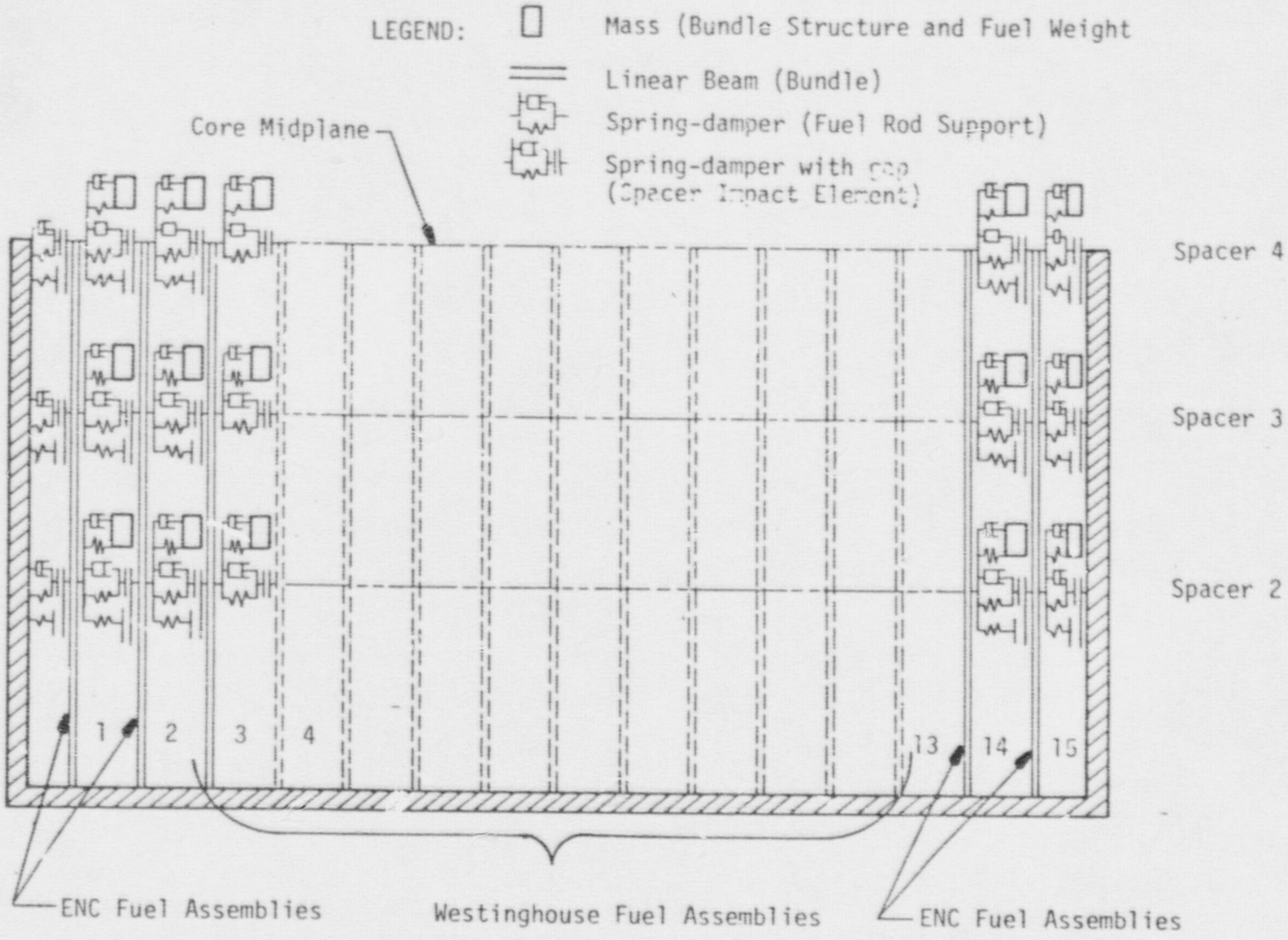

FIGURE A-1 COMPUTER MODEL FOR REACTOR CORE DYNAMIC RESPONSE