

NORTHEAST UTILITIES



THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

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November 25, 1985

Docket No. 50-336
BT1889

Director of Nuclear Reactor Regulation
Attn: Mr. Edward J. Butcher, Chief
Operating Nuclear Reactors Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Followup to Request for Additional Information on Spent Fuel Storage Capacity

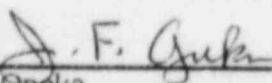
During the review process of the Northeast Nuclear Energy Company (NNECO) response⁽¹⁾ to a Request for Additional Information sent by the Staff in October⁽²⁾, five followup questions were posed by the Staff and resolved during a series of telephone conference calls.

The purpose of this letter is to document the resolution established during those calls and to provide the Staff with written answers to each of the questions discussed.

Attachment A contains a summary of the questions and responses. We trust that this information is satisfactory to the Staff.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY



J. F. Opeka
Senior Vice President

- (1) J. F. Opeka letter to E. J. Butcher, "Millstone Nuclear Power Station, Unit No. 2 Reply to Request for Additional Information on Spent Fuel Storage Capacity," dated October 28, 1985.
- (2) E. J. Butcher letter to J. F. Opeka, "Request for Additional Information on Spent Fuel Storage Capacity for Millstone Unit No. 2," dated October 3, 1985.

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Attachment A

Summary of Question Responses Provided Verbally in
Connection with the Review of Millstone Unit No. 2
Application for Increased Spent Fuel Storage Capacity

November, 1985

- Question 1: Were non-symmetric fuel loadings in the racks considered?
- Answer: Non-symmetric fuel loadings were considered by analyzing partially loaded modules. The most severe cases considered were those modules with a single row of cells along an edge of the module loaded with fuel.
- Question 2: Describe what constitutes the worst case for tipping.
- Answer: The worst case for tipping was a Region II 7x8 module, partially loaded with fuel, excited by the East-West seismic component (7 cell direction). The worst case for shear load was a Region II 7x9 module fully loaded with fuel, excited by the North-South seismic component (9 cell direction).
- Question 3: Describe the analyses done to show that adjacent modules do not contact during a seismic event.
- Answer: The maximum horizontal displacement of the top of a module, including tipping, is determined from a non-linear time history analysis of an individual module. Separate analyses are made for a number of different modules with varying degrees of fuel loading, including empty, partially loaded, and fully loaded modules. In these individual module time history analyses, all the modules in the pool are assumed to move in-phase when determining the rack-to-pool hydrodynamic characteristics.
- Question 4: How is the tipping calculated by the CESHOCK non-linear analysis accounted for in the three dimensional stress analysis?
- Answer: The horizontal non-linear CESHOCK analyses determine the tipping associated with fully and partially loaded fuel racks. Load factors are used to transfer the vertical and horizontal base loadings from the two dimensional CESHOCK non-linear analyses to the linear three-dimensional model which has been modified to represent the tipped condition. A separate load factor is calculated to represent the base movement developed during tipping of the racks.
- The vertical tipping displacement from the horizontal non-linear analysis is used as the input to a separate vertical non-linear CESHOCK model that is used to calculate vertical impact loads. These loads are used to determine the adequacy of the foot/rack design.
- Question 5: Was the normal loading stress of the rack on the concrete of the pool floor considered?
- Answer: The local loading under the rack feet and the total pool load due to the rack loads were considered in the evaluation of the concrete spent fuel pool structure. The concrete stresses due to the rack loads were compared to the allowable concrete stresses set forth in the American Concrete Institute's "Code Requirements for Nuclear Safety Related Concrete Structures (ACI 349-80) and found to be within code allowables. The detailed procedure which discusses the application of the rack loads when investigating the concrete was presented in the response to question 11c.