NORTHEAST UTILITIES

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

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

January 27, 1994

Docket No. 50-336
B14724

Re: Spent Fuel Pool Modification

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Gentlemen:

Millstone Nuclear Power Station, Unit No. 2
Response to Request for Additional Information (TAC No. M86361)

In a letter dated May 14, 1993,[1] Northeast Nuclear Energy Company (NNECO), on behalf of Millstone Unit No. 2, submitted a license amendment request to maintain full core reserve capacity by regaining the use of previously blocked spent fuel pool Region C storage locations. In letters dated June 10, 1993,[2] and July 16, 1993,[3] NNECO submitted responses to NRC Staff requests for additional information. In a letter dated October 26, 1993,[4] the NRC Staff requested additional seismic and structural information from NNECO regarding this license amendment request. In a letter dated

---

(1) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2--Proposed Revision to Technical Specifications--Spent Fuel Pool Modifications," dated May 14, 1993.

(2) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2--Response to Request for Additional Information (TAC No. M86361)," dated June 10, 1993.

(3) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2 Response to Request for Additional Information (TAC No. M86361)," dated July 16, 1993.

(4) G. S. Vissing letter to J. F. Opeka, "Request for Additional Information Concerning Technical Specifications for Spent Fuel Pool Modifications - Millstone 2 (TAC No. M86361)," dated October 26, 1993.

A001
Ltr. Encl.
1 1NP
Change - NRC RDR

November 30, 1993,[5] NNECO provided a response to that request which contained technical information considered proprietary to our contractor, ASEA Brown Boveri/Combustion Engineering (CE), pursuant to the provisions of 10CFR2.790. Subsequently, in a facsimile transmitted on December 20, 1993, the NRC Staff requested additional information. The purpose of this letter is to submit the information requested on December 20, 1993.

Specifically, the NRC Staff asked three questions relating to the additional detailed seismic and structural information which had been previously provided in the November 30, 1993 response. The extent of detail previously requested required NNECO to contract the services of CE to extract information from seismic and structural calculations performed to support the Millstone Unit No. 2 spent fuel pool rerack and fuel consolidation. Since CE considers this additional information proprietary, we are providing the information requested pursuant to the provisions of 10CFR2.790.

Attachment 1 to this letter provides a nonproprietary response to the Staff's questions which may be placed in the public domain. Attachment 2 contains the seismic and structural information owned by CE which they consider proprietary. Because Attachment 2 contains information proprietary to CE, an affidavit signed by CE, the owner of the information, has been provided as Attachment 3. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses, with specificity, the considerations listed in paragraph (b)(4) of Section 2.790 of the Commission's regulations.

Accordingly, it is respectfully requested that Attachment 2, which contains information proprietary to CE, be withheld from public disclosure pursuant to the provisions of 10CFR2.790 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of Attachment 2, discussed above, or the supporting CE affidavit, should reference letter number B14724 and/or NOMP-94-N-0011 and should be addressed to Mr. S. A. Toelle, Manager, Nuclear Licensing, Combustion Engineering Nuclear Services, 1000 Prospect Hill Road, P.O. Box 500, Windsor, CT 06095-0500.

As previously discussed, the timing of the license amendment issuance must be coordinated with the rodlet delivery and implementation schedule. Our current schedule indicates that the license amendment will be required during the first week of March 1994. As always, we will continue to keep the NRC Staff informed of this schedule.

---

(5) J. F. Opeka letter to U.S. Nuclear Regulatory Commission, "Millstone Nuclear Power Station, Unit No. 2--Response to Request for Additional Information (TAC No. M86361)," dated November 30, 1993.

Should the NRC Staff require any additional information to process the license amendment request, we remain available to promptly provide such information.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Executive Vice President

cc: w/o Attachment 2 T. T. Martin, Region I Administrator
w/o Attachment 2 G. S. Vissing, NRC Project Manager, Millstone Unit No. 2
w/o Attachment 2 P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3

w/o Attachment 2 Mr. Kevin McCarthy, Director
Monitoring and Radiation Division
Department of Environmental Protection
79 Elm Street
P.O. Box 5066
Hartford, CT 06102-5066

Mr. S. A. Toelle, Manager Nuclear Licensing
Combustion Engineering Nuclear Services
1000 Prospect Hill Road
P.O. Box 500
Windsor, CT 06095-0500

Docket No. 50-336
B14724

Attachment 1

Millstone Nuclear Power Station, Unit No. 2

Response to Request for Additional Information (TAC No. M86361)

Detailed Seismic and Structural Information
Non-Proprietary

January 1994

Millstone Nuclear Power Station, Unit No. 2
Response to Request for Additional Information (TAC No. M86361)
Detailed Seismic and Structural Information

NRC

Question 1: Only one of the nine load cases analyzed considered the possibility of rack sliding (Case No. 6 — Empty 7x8 module). This load case resulted in the largest displacement. There were no cases of sliding racks loaded with fuel assemblies or CFCs. Explain why a fully loaded or partially loaded rack could not experience larger displacements than an empty rack resulting in greater potential for rack impact.

NNECO

Response: The nine load cases presented in the initial response to questions were not the entire set of load cases analyzed. The nine cases presented were the final nine cases run with what was considered to be consistent spent pool floor and wall motions. Prior to the analysis of these nine load cases, eight other load cases were analyzed; however, numerical results from these eight initial load cases were not presented. Millstone Unit No. 2 spent fuel pool floor and wall seismic acceleration time histories were provided by Northeast Utilities when the seismic analyses were being performed in 1984. The initial eight load cases were performed using these time histories. Sometime during the evaluation of these eight analyses it was discovered that the pool floor and pool wall acceleration time histories had not been derived from a consistent model. This resulted in large pool rotations which produced excessive rocking response in several of the nonlinear time history analyses performed using these input motions. It was then decided to use a set of consistent spent fuel pool floor and wall seismic acceleration time histories which were still available from the initial 1976 Millstone Unit No. 2 spent fuel rack seismic analysis. These original time histories, which were used as input for the final nine load cases, were discussed in the initial responses.

Among the initial eight load cases were two sliding base models - one fully loaded with consolidated fuel canisters (CFCs) and one with no fuel. Because it is generally not possible to predict which degree of fuel loading will provide the maximum module sliding response in a nonlinear time history analyses using a slip-stick type friction element, the extreme cases of an empty (lightest system) and a module fully loaded with CFCs (heaviest system) were considered to be limiting. Of these two cases, the empty module case provided the much greater racktop lateral displacement.

This was due to the fact that the fully loaded module did not slide (i.e., the friction force never exceeded the critical value of the coefficient of static friction times the normal force). This comparative result was used when the final load cases were being formulated and thus only the empty module sliding case was run using the consistent model time histories.

The racktop displacements presented in the initial responses showed the empty module as [ ]. This value, however, contains a factor of 1.414 which was applied to the one direction lateral input motions to account for the coupling of sliding motions in the two lateral directions. For a direct comparison of the racktop lateral displacements in the East-West (EW) direction, [ ] / 1.414 = [ ]. This displacement value is then less than both the non-sliding partially loaded Cases 1 and 2.

NRC
Question 2: The seismic report states that impacts between adjacent racks will not occur because the maximum relative displacement between adjacent modules is 1.776 inches which is less than the two inch nominal spacing between modules. This displacement does not correspond to any of the values or combinations of values reported for the nine load cases analyzed. Explain how the 1.776 inch maximum relative displacement was determined. If additional analyses were performed, describe the cases that were considered.

NNECO
Response: The maximum relative displacement between adjacent modules of 1.776 inches was obtained by considering the time-phased motions of two adjacent modules. The peak racktop displacements presented in the initial responses are the unsigned peak values for a single module. Combining the absolute peak displacements for any two single modules would provide an overly conservative estimate of the peak relative displacement of adjacent modules. In determining the peak intermodule displacement, five combination of individual cases were considered. The five combination cases are listed below:

1. Case 3 and Case 5 — Empty and full loaded
2. Case 3 and Case 1 — Empty and partially loaded
3. Case 3 and Case 2 — Empty and reversed partially loaded
4. Case 5 and Case 1 — Fully loaded and partially loaded

5. Case 5 and Case 2 — Fully loaded and reversed partially loaded

Analysis of these five combinations of adjacent modules yielded the peak intermodule relative displacement of 1.776 inches for tipping combination Case 4 (Case 5 and Case 1).

NRC
Question 3: The summary results for the nine load cases include the maximum impact loads between the fuel assemblies and the rack storage cells. Appendix D to Standard Review Plan 3.8.4 requires licensees to demonstrate that these impact loads do not result in fuel damage. What is the maximum allowable impact load on fuel assemblies?

NNECO
Response: Of the nine cases analyzed, only Case 7 was a model containing fuel assemblies. The other cases were either empty (no fuel) or contained various degrees CFC loading. The maximum allowable impact load on a fuel assembly 14x14 spacer grid is in excess of [ ]. The peak spacer grid impact load of [ ] from Case 7 is substantially below that value.