JULY 11 1978

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Docket No. 50-305

Wisconsin Public Service Corporation
ATTN: Mr. E. W. James
Senior Vice President
Post Office Box 1200
Green Bay, Wisconsin 54305

Gentlemen:

RE: Kewaunee Spent Fuel Pool Expansion

In the course of our continuing review of your application to increase the spent fuel storage capacity of the Kewaunee Spent Fuel Storage Pool, we find that we require additional information as indicated in the enclosure to this letter. The need for some of this information arises from our review of your previous response to our request for information dated March 13, 1978. Please respond to the enclosed request within 14 days of the date of this letter. A copy of the enclosure was telecopied to you on June 30, 1978.

Sincerely,

Original signed by

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosure:
Request for Additional
Information

cc w/encl:
See next page

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OFFICE	DOR:ORB#1	DOR:ORB#1				
SURNAME	TVWambach:lb	ASchwencer				
DATE	7/10/78	7/11/78				

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

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See next page

cc: Steven E. Keane, Esquire
Foley, Sammond & Lardner
777 East Wisconsin Avenue
Milwaukee, Wisconsin 53202

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Washington, D. C. 20036

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314 Milwaukee Street
Kewaunee, Wisconsin 54216

JULY 11 1978

KEWAUNEE
REVIEW OF SPENT FUEL POOL MODIFICATION
REQUEST FOR ADDITIONAL INFORMATION

1. The analytical model used to represent the fuel racks and base frame for the seismic analysis is not acceptable for the following reasons:

   (a) Since the rack assemblies are not physically connected to one another at the top they should not be modeled as being so. If adjacent racks can impact when moving toward each other, this should be accounted for in the analyses.

   (b) A linear spring attaching one end of the base structure to the wall does not represent conditions that will actually exist. These members act in compression only on both ends of the base structure and any gaps between the restraints and walls should be considered in the analyses.

   (c) Base frame leveling legs should be included in the model. Again these structural members would act only in compression. If the analyses indicate that the base frame can lift off the pool floor, then impacting of the legs on the pool floor should be considered in the loading and stress calculations for both the legs and pool floor itself, considering sizing of bearing plates on legs and possible damage to the liner plate.

   Provide a detailed technical discussion for modifying the current analytical model to reflect the above comments.

2. Describe the properties and methods of calculation for the stick models used to represent the three rack assemblies not modeled in detail in Figure 5-1.

3. If it is assumed in the seismic analyses that all cans in all racks contain fuel assemblies, then provide justification showing this assumption to be conservative relative to other possible combinations of filled, empty, and partially filled racks. Frequencies, mode shapes, deflection magnitudes, base frame response and other pertinent parameters should be addressed.

4. It is stated in response to question No. 2 that 88% of the total weight in the X_1 direction is accounted for in the total model effective weight from the first three modes and, therefore, only the first three modes need be considered. However, the staff does not consider this to be sufficient. Provide further justification or consider the following in order to qualify the racks seismically:

   (a) In accordance with Regulatory Guide 1.92, the three orthogonal spatial components of the earthquake shall be considered simultaneously. The responses to earthquakes applied in all three directions, X_1, X_2, and X_3, should be combined by the SRSS method. Additionally, the requirements concerning combining responses of closely spaced modes should be considered.

   (b) All modes with frequencies up to 33 Hz in each of the three directions should be included in the analyses.

   (c) Discuss the boundary conditions assumed in the model when the X_2 and X_3 earthquakes are imposed on the racks and base.

   Following modification of the model, as discussed in comment No. 1, and considering the above comments, resubmit the results of the seismic analyses.

5. A qualitative treatment of the effects of a dropped fuel assembly is not acceptable. Quantitative analyses should be made considering the three cases outlined in question No. 9. The case of a straight drop through a can should be examined at a can directly over, or as close as possible, one of the leveling legs on the base frame, and at a can location in a more flexible area of the rack assembly. Provide the gross stresses calculated, discuss the local deformations that would occur and the ductility ratios assumed, and verify that the gross stresses will be less than 1.5S.

6. Verify that the loading combination with a stuck fuel assembly meets a stress allowable of 1.5S.

7. Indicate whether or not the 17-4 ph stainless steel components will be heat treated to at least 1100°F, each piece hardness tested, and either pickled or grit blasted in order to remove the surface film resulting from the heat treatment.

8. Verify that the permissible stresses for the stainless steel welds are no greater than those specified in Table NF-3292.1-1 of the ASME B&PV Code Section III.

9. Indicate whether a fuel assembly is the heaviest object and will develop the highest kinetic energy of all objects that could possibly be dropped into the spent fuel pools. If not, provide an analysis demonstrating that the pool and racks will maintain their structural integrity and meet the required stress allowable for the heaviest object.

10. Indicate the values of the section strengths, S, for all materials used in the racks and base frame and where they are taken from.

11. Indicate whether the impact loading and resultant stresses from the non-linear dynamic analysis of the fuel/can assemblies is added to the other stresses and loads present. Discuss the local effects where the assembly impacts the can and the structural integrity of the fuel assembly itself.

12. Provide details of the interface in the East-West direction between base frames and between base frames and pool walls. Also, provide details of the interface between the top portions of all rack assemblies. Provide details of the interfaces around the equipment laydown area. Enough details should be provided so that a correlation between the assumed boundary conditions in the seismic analyses and the actual conditions can be made.