GPU Nuclear

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July 31, 1984

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Crutchfield:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Spent Fuel Pool Expansion - Additional Information

Enclosed are responses to questions forwarded to me by your letter of July 27, 1984 concerning GPU Nuclear's request to expand the capacity of the spent fuel pool.

Very truly yours,

Peter B. Fiedler
Vice President & Director
Oyster Creek

PBF:SD:dam
Attachment

cc: Dr. Thomas E. Murley, Administrator
Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

NRC Resident Inspector
Oyster Creek Nuclear Generating Station
Forked River, NJ 08731

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RESPONSE TO NRC MEMO OF JULY 27, 1984

ATTACHMENT 1

1. Convergence of the Solution

The seismic response of rack F (Fig. 2.1 of the Licensing Report) has been studied using a series of time increments. As summarized in the FRC report (by R. C. Herrick, FRC Project C5506), the computed peak displacement of .843" (coefficient of friction .8, horizontal acceleration aligned with the narrow direction) .00002 sec. time increment solution could not be further refined due to round-off errors. To obtain the converged value and to demonstrate convergence, Oat ran the problem on a 14 degree-of-freedom model. The results are summarized below.

Cat File No.	Time Step (sec)	Maximum Displacement (inch)
DGPT60	.0003	.6631
DGPT61	.0002	.6631
DGPT62	.0001	.6631

The successful convergence of the 14 D.O.F. model results is attributed to the elimination of rotary inertia terms from the equations of motion. The equations of motion are derived in the published paper, "Seismic Response of Free Standing Fuel Rack Construction to 3-D Floor Motion", by A. I. Soler and K. P. Singh, Nuclear Engineering and Design, American Nuclear Society (c. 1984).

The displacements reported in the foregoing are upper bound solutions in view of the fact that several simplifying assumptions, which render the analysis conservative, have been employed in obtaining the results. Lower than permitted values of system damping, no credit for additional damping in the fuel assemblies, and synchronized impact of all fuel assemblies in a module, are among the many assumptions which make the computed values quite conservative.

2. Equivalent Cap

The licensee defers to the M&C position on the subject of the use of the minimum gap, instead of the equivalent gap, in assessing the potential of inter-rack impact. It is noted that the Commission's own guidelines provide for an SRSS combination of the computer peak responses. Therefore, the peak displacements of proximate modules should be combined by the SRSS method and the resulting quantity compared with the available minimum gap.

3. <u>Coupling Mass</u>

The fuel assembly is modelled as a blunt square body inside a square cross section container. The hydrodynamic coupling mass utilizes Fritz's well known correlations for infinitesimal motions. Inclusion of finite amplitude motions (which is the case for a rattling fuel assembly) is known to significantly reduce the peak rack seismic response (vide, "Dynamic Coupling in a Closely Spaced Two Body System Vibrating in a Liquid Medium", by A. I. Soler and K. F. Singh, Proc. of the Third International Conference on Vibration in Nuclear Plant, Keswick, D.K. 1982). Therefore, Fritz's equation used in the analysis lead to an upper bound on the solution.