GPU Nuclear

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June 4, 1984

Mr. 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 - Request for Additional Information

Enclosed please find the additional information requested by your letter of April 24, 1984.

Very truly yours,

Peter B. Fiedler
Vice President and Director
Oyster Creek

PBF:SD:dam
Encls.

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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Question No. 1

The licensee's submittal fails to indicate the calculated decay heat loads following the proposed pool expansion or sufficient information for us to calculate the loads independently. Therefore, provide the following information in tabuler form: (a) all past and anticipated future discharges as a function of decay time; and (2) the decay heat load for each discharge for both the maximum normal and maximum abnormal conditions, i.e., the maximum normal heat load is the heat load reached assuming the pool is filled with successive normal refueling discharges, and the maximum abnormal heat load is the value assuming the pool is filled with the full core discharge and successive normal refueling discharges.

Response

Table 1.1 of GPU Nuclear Licensing Report on High-Density Spent Fuel Racks for Oyster Creek Nuclear Generating Station, NRC Docket No. 50-219, gives Cycle 15 as the time when full core discharge capability is lost and Cycle 17 as the time when normal batch discharge capability is lost. Decay heat rates for these cycles are as follows:

Cycle 15
Decay Heat Rates

Abnormal Discharge (Full Core)
Spent Fuel Assemblies in Pool - 2732

Item	Days After Shutdown					
	10	15	30	50	100	125
Full Core Offload (10^6 BTU/Hr	17.135	15.138	11.170	8.185	5.373	4.533
Prior Discharge Fuel (10^6 BTU/Hr)	0.710	0.698	0.689	0.680	0.649	0.632
Total Decay Heat (10^6 BTU/Hr)	17.845	15.836	11.859	8.865	6.022	5.165

Response (Continued)

Cycle 17
Decay Heat Rates

Item	Days After Shutdown 10	11	12	15	20
Normal Discharge (10^6 BTU/Hr)	5.749	5.572	5.419	5.054	4.445
Prior Discharged Fuel (10^6 BTU/Hr)	0.643	0.642	0.642	0.640	0.637
Total Decay Heat (10^6 BTU/Hr)	6.392	6.214	6.061	5.694	5.082

Question No. 3

With the aid of a P&I diagram, describe the spent fuel pool cooling system and the assumptions made in establishing its rated heat removal capability.

Response

The spent fuel pool cooling system is described in Section 5.0 of JCP&L Amendment 78 to the Oyster Creek Nuclear Generating Station FDSAR, dated March 18, 1976, and in JCP&L response to Question No. 10 contained in Revision No. 1 to Addendum No. 2 to Supplement No. 1 to Amendment No. 78, dated February 23, 1977.

Question No. 2

Indicate the time interval between shutdown and when discharging fuel assemblies will commence as well as the time to complete a normal discharge and a full core discharge.

Response

Section 5.2 of JCP&L Amendment 78 to the Oyster Creek Nuclear Generating Station FDSAR, dated March 18, 1976, provides the answer to this question.

Question No. 4

For both the maximum normal and maximum abnormal heat load conditions provide the pool water temperature as a function of time as well as all assumptions on which the calculations are based.

Response

Assuming both the Spent Fuel Pool Cooling and the Augmented Spent Fuel Pool Cooling Systems are operable, the pool water temperature will not exceed 125°F in accordance with the Oyster Creek Technical Specification Section 5.3.1.F.

Question No. 5

For both the maximum normal and maximum abnormal heat loads indicate the time before boiling occurs, the boil off rate and the time before boil off causes the top of the storage racks to become uncovered assuming all pool cooling is lost.

Response

Heat Load (10^6 BTU/Hr)	*Time to Heat Up to 212°F (Hrs)	Boil Off Rate (Lb/Hr)	*Time Until Top of Racks Uncovered (Hr)
5.5 (Max. Normal)	52.8	5.67×10^3	303
20 (Max. Abnormal)	14.5	2.06×10^4	83.5

*Initial temperature of pool water assumed to be 90°F.

Question No. 6

Describe the pool water level monitoring system and indicate the location of the alarm.

Response

A bubbler level detection system is used to sense fuel pool water level. Level switches are set to alarm both high and low level conditions. Normal fuel pool water level is at 118' elevation. The high level switch is set at 118' 3 3/4" elevation while the low level switch is set at 117' 11 1/4" elevation. The alarms are annunciated in the Control Room while local indication is provided at the fuel pool.

Question No. 8

Identify and provide the basis for all deviations or exceptions to Regulatory Guide 1.13, Revision 2 and Standard Review Plan Sections 9.1.2 and 9.1.3 that is related to the decay heat loads, cooling of the fuel assemblies and measures available to assure that the fuel assemblies do not become uncovered.

Response

JCP&L response to Question No. 10 contained in Revision No. 1 to Addendum No. 2 to Supplement No. 1 to Amendment No. 78, dated February 23, 1977, provides the response to this question.

Question No. 7

Describe the available makeup water systems, the quantity available from each source and their seismic classification. Indicate their respective makeup rates and the time interval between their activation and when the makeup flow rate is achieved.

Response

The available makeup water systems are described in Section 5.7 of JCP&L Amendment 78 to the Oyster Creek Nuclear Generating Station FDSAR, dated March 18, 1976.

Question No. 9

Indicate the margin between local boiling and the saturation temperature at the exit of the most choked flow fuel storage all when it contains the hottest fuel assembly.

Response

The top of the racks is approximately 24' below the pool water free surface. Therefore, the local pressure at the top of the racks is 25.1 psia which corresponds to 241°F saturation temperature. Referring to Table 5.1, the maximum pool local water temperature at a location containing fuel of maximum heat emission rate is 171.4°F. Furthermore, if this storage cell is located on top of a support foot, the additional flow resistance from the support foot elevates the local water temperature by an additional 2°F. Thus, the margin between the local boiling and maximum water exit temperature is (241-171.4-2) = 67.6°F.

Question No. 10

Verify that all 2645 storage cells have coolant flow holes in the base plate.

Response

All 2645 storage cells are provided with coolant flow holes in the base plate.

Question No. 11

It is indicated that reracking of the pool will occur while stored fuel is in the pool. With the aid of drawings, describe the steps taken throughout the reracking to reduce the possibility of a load drop on or near stored spent fuel.

Response

No equipment heavier than a fuel assembly will be lifted over any other spent fuel assembly as required by plant procedures. Spent fuel in the present spent fuel racks will be moved as far as possible from the new poison rack installation area.

Question No. 12

Since reracking a spent fuel pool is not part of the normal operating load handling program, identify and discuss all deviations or exceptions that will be taken to Section 5.1.1 of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants" during the reracking operations.

Response

The special handling equipment for the new poison spent fuel racks will be designed and constructed in accordance with ANSI N14.6-1978.

The special handling equipment for the removal of the existing high-density spent fuel racks will be load tested to twice the maximum load to be lifted.

All slings utilized for the removal and installation of fuel racks will be qualified to ANSI B30.9-1971.

Question No. 13

Section 7.1.2 of your submittal which is entitled "Dropped Fuel Assembly" appears to indicate a drop height of 36 inches when the assembly impacts on the new storage rack base plate. Describe the results of such a drop if it is assumed the assembly drops the entire potential distance, i.e., 169 inches as stated in the staff's April 14, 1978 Official Technical Position on Spent Fuel Pool Expansion.

Response

The statement "36" above the storage location. . ." in Section 7.1.2 means that the fuel assembly drops for a distance of (169" + 36") before impacting the base plate. This condition bounds the 169" drop distance requirements of "OT Position Document".

Question No. 14

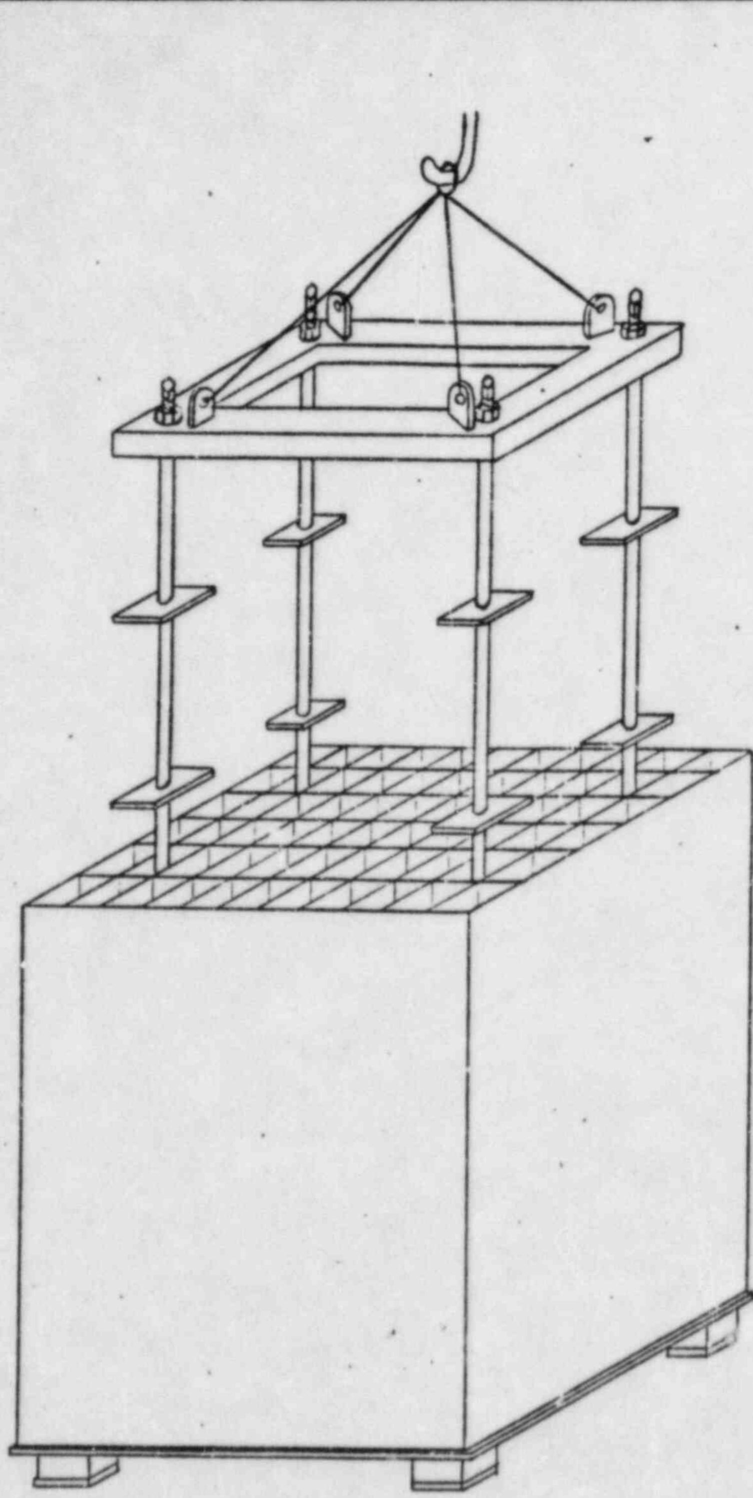
With the aid of drawings, describe and discuss the special lifting devices interposed between the new and old storage racks and the crane hook. Demonstrate that these devices meet the intent of NUREG-0512, Section 5.1.1(4) and (5).

Response

The lifting device used for the new poison fuel racks is shown on the attached Figure 1. The qualifications for this equipment are noted in the response to Question No. 12.

The lifting equipment for the presently installed fuel racks and bases have not been designed yet. However, they will be qualified in accordance with the response to Question No. 12.

Figure 1
Question No. 14



INSTALLATION OF LIFTING RIG ONTO A MODULE POSITIONED IN THE POOL

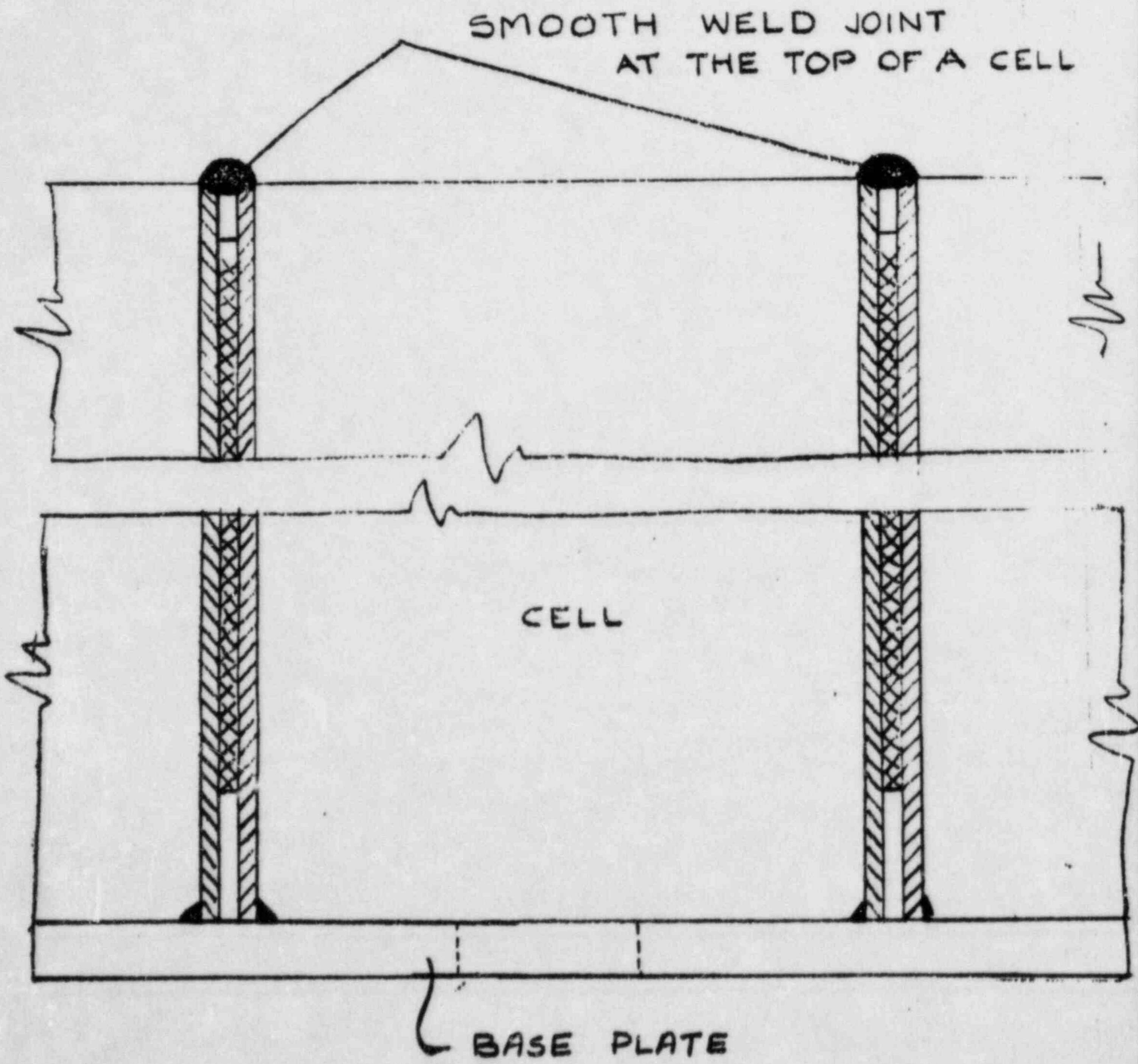
Question No. 15

Provide a discussion which demonstrates that a fuel assembly can be safely inserted and withdrawn from the new storage cells that do not have chamfered guides to help align the fuel assembly with the storage cell.

Response

The top of the storage location has a smooth edge cross section as shown in the attached sketch. This geometry provides a smooth insertion contour.

Sketch
Question No. 15



Question No. 16

Verify that the spent fuel pool cooling system consists of at least the three cooling trains discussed in the staff's 1977 pool expansion SER.

Response

The spent fuel pool cooling system consists of the cooling trains as delineated in JCP&L response to Question No. 10 contained in Revision No. 1 to Addendum No. 2 to Supplement No. 1 to Amendment No. 78, dated February 23, 1977.

Question No. 17

With the aid of a P&I diagram, describe and discuss the cross connect between the fuel pool cooling system and the shutdown cooling system "A" heat exchanger, including the heat removal capacity in this mode of operation once the connection has been made as well as the time interval and steps required to make it fully operational.

Response

The cross connect between the fuel pool cooling system and the shutdown cooling system "A" heat exchanger is discussed in JCP&L response to Question No. 10 contained in Revision No. 1 to Addendum No. 2 to Supplement No. 1 to Amendment No. 78, dated February 23, 1977.

Question No. 18

Describe and discuss the effects of the maximum temperature limit for the service water system on the discharge of fuel assemblies to the pool in order to maintain the pool water temperature with acceptable limits assuming the maximum normal and abnormal heat loads for the proposed fuel pool expansion.

Response

The effects of the maximum temperature limit for the service water system on the discharge of fuel assemblies to the pool is described in Section 5.3 and Section 5.5 of JCP&L Amendment 78 to the Oyster Creek Nuclear Generating Station FDSAR, dated March 18, 1976.