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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director
STOLZ,J.F. Operating Reactors Branch 4

SUBJECT: Forwards addl info supplementing 830624 ltr re proposed reracking to expand storage capacity of spent fuel pool to 825 spaces.Table providing results of key structural calculations & comparisons w/allowable values for shear str

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July 14, 1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket No. 50-287

Dear Sir:

A Duke Power letter dated June 24, 1983 transmitted our response to a May 23, 1983 letter from J. F. Stolz which requested additional information concerning the proposed reracking to expand the storage capacity of the Oconee Unit 3 spent fuel pool from 474 to 825 spaces. Discussions with your staff concerning our responses indicated that supplemental information is needed in order for the staff to complete their review.

Please find attached additional information, which supplements our response provided by my June 24 letter. Specifically, for Request No. 4, a table providing the results of the key structural calculations and comparisons with allowable values for the shear stresses is provided. For clarity, the response to Request No. 3 provided by the June 24 letter is superseded in its entirety by the response provided by this supplement. Please note, though, that Tables 1, 2, and 3 have not been revised by this supplement.

Very truly yours,

Hal B. Tucker

Hal B. Tucker

PFG/php

Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
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Mr. Hayward Shealey, Chief
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A001
1/1

cc: Mr. John F. Suermann
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. J. C. Bryant
NRC Resident Inspector
Oconee Nuclear Station

Additional Information to Request No. 4

The following table presents the allowable shears for the pool structure as defined by the most severe loading condition:

	Load Combination	Allowable Shear	*Safety Factor
Pool slab	1.0D + 1.0E' + 1.0 Ta	316 Kip/ft	5.0
Pool Floor Stiffening Member	1.0D + 1.0E' + 1.0 Ta	1526 Kip	1.27

$$* \text{ Safety Factor} = \frac{\text{Allowable Value}}{\text{Design Value}}$$

D = dead loads

E' = seismic loads on maximum hypothetical earthquake (SSE)

Ta = abnormal thermal load condition

Request No. 3:

Provide results of key structural calculations and comparison with allowable values for the design of the racks.

Response:

The following table lists the results of the structural calculations. The ASME Code defines the margin of safety as:

$$M.S. = \frac{\text{Allowable Stress}}{\text{Design Stress}} - 1$$

The structural analysis was conducted for both normal and upset conditions (deadweight plus OBE and deadweight plus thermal plus OBE) and faulted conditions (deadweight plus thermal plus SSE). The minimum margins of safety listed in the summary table are based on the OBE event. It is noted that the OBE stresses are limiting because the percentage increase of stress in going from OBE to SSE is less than the percentage increase of the allowable.

SUMMARY OF DESIGN STRESSES AND MINIMUM MARGINS OF SAFETY

Normal & Upset Conditions

	Design Stress (psi)	Allowable Stress (psi)	Margin of Safety
1.0 Leveling Pad Assembly			
1.1 Leveling Pad			
Shear	1423	11000	6.73
Axial and Bending	11819	16500	0.39
Bearing	10480	24750	1.36
1.2 Leveling Pad Screw			
Shear	7090	11000	0.55
1.3 Support Plate			
Shear	1928	11000	4.70
Weld Shear (Thermal)	20662	31735	0.53
1.4 Stand-off Pad (Top Plate)			
Bending	18457	20625	0.11
Shear	1392	11000	6.90
1.5 Stand-off Pad Plate to Block Welds			
Weld Shear	20855	24000	0.15
1.6 Stand-off Pad Lower Block			
Axial and Bending	*	*	0.33
1.7 Support Plate (Failed Fuel Region)			
Weld Shear	18544	24000	0.29
2.0 Cell Assembly			
2.1 Cell to Bottom Grid Weld			
Weld Shear	19572	24000	0.22
2.2 Cell to Top Grid Weld			
Weld Shear (Thermal)	21705	31735	0.46
2.3 Cell			
Axial and Bending	*	*	0.14
2.4 Cell Seam Weld			
Weld Shear	7276	24000	2.30
2.5 Cell to Wrapper Weld			
Weld Shear	7129	11000	0.54

*Reference Equation (20) of ASME XVII - 2215

		Design Stress (psi)	Allowable Stress (psi)	Margin or Safety
3.0	Grid Assembly			
3.1	Top Grid Box Member			
	Shear	5970	11000	0.84
	Axial and Bending	3384	16500	3.87
3.2	Top Grid Members Welds			
	Weld Shear	14335	24000	0.67
3.3	Top Grid Outer Member			
	Axial and Bending	3041	16500	4.42
	Shear	9071	11000	0.21
3.4	Bottom Grid Box Member			
	Shear	5587	11000	0.96
	Axial and Bending	13366	16500	0.23
3.5	Bottom Grid Members Welds			
	Weld Shear	16181	24000	0.48
3.6	Bottom Grid Base Plate Weld			
	Weld Shear	12614	24000	0.90
3.7	Bottom Grid Outer Member			
	Axial and Bending	11733	16500	0.40
	Shear	1406	11000	6.82
3.8a	Top Grid Member (Failed Fuel Region)			
	Axial and Bending	6980	16500	1.36
3.8b	Top Grid Members Welds (Failed Fuel Region)			
	Weld Shear	2671	24000	7.98
3.8c	Bottom Grid Member (Failed Fuel Region)			
	Axial and Bending	10915	16500	0.51
	Shear	10360	11000	0.06
3.8d	Bottom Grid Members Welds (Failed Fuel Region)			
	Weld Shear	10063	24000	1.38