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R. J. Kelly
Vice President and General Manager
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Georgia Power

July 27, 1979

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC DOCKETS 50-321 AND 50-366
OPERATING LICENSES DPR-57 AND NPF-5
EDWIN I. HATCH NUCLEAR PLANTS UNITS 1 AND 2
SPENT FUEL POOL STORAGE EXPANSION

Gentlemen:

Our letter dated July 9, 1979, contained the application for the expansion of the spent fuel storage capacity at Plant Hatch. Included as part of the application was the report entitled "Spent Fuel Pool Modification". As indicated in Tables 4-1 and 4-2 of the report, the stress analysis results applicable to the high density fuel storage modules were not completed at that time, and it was indicated that the results would be provided by July 31, 1979. That effort has now been completed and the results are enclosed as Amendment 1 to the report.

Very truly yours,

R. J. Kelly

TMM/HSA/mb

Enclosure: Revised page 4-4, Tables 4-1 and 4-2.

Sworn to and subscribed before me this 27th day of July, 1979.

Roberta L. Owens
Notary Public

Notary Public, Georgia, State at Large
My Commission Expires July 28, 1980

xc: Mr. Ruble A. Thomas
George F. Trowbridge, Esquire

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Edwin I. Hatch Nuclear Plant
Units 1 and 2
Spent Fuel Pool Modification

Date Issued: July 31, 1979

PAGE INSERTION GUIDE

Item	Instruction
Change Log	Insert between inside front cover page and table of contents
Page 4-4	Replace
Table 4-1	Replace
Table 4-2	Replace

Edwin I. Hatch Nuclear Plant
Units 1 and 2
Spent Fuel Pool Modification

Date Issued: July 31, 1979

CHANGE LOG

Section	Revision	Date
1.0	0	7/9/79
2.0	0	7/9/79
3.0	0	7/9/79
4.0	0	7/9/79
4.1	0	7/9/79
4.2	1	7/31/79
Table 4-1	1	7/31/79
Table 4-2	1	7/31/79
5.0	0	7/9/79
6.0	0	7/9/79
7.0	0	7/9/79
7.1	0	7/9/79
7.2	0	7/9/79
7.3	0	7/9/79
7.4	0	7/9/79
8.0	0	7/9/79
8.1	0	7/9/79
8.2	0	7/9/79
8.3	0	7/9/79
8.4	0	7/9/79
8.5	0	7/9/79
8.6	0	7/9/79
9.0	0	7/9/79
9.1	0	7/9/79
9.2	0	7/9/79
9.3	0	7/9/79
9.4	0	7/9/79
9.5	0	7/9/79
10.0	0	7/9/79
10.1	0	7/9/79
10.2	0	7/9/79
10.3	0	7/9/79
10.4	0	7/9/79
10.5	0	7/9/79
10.6	0	7/9/79
10.7	0	7/9/79
11.0	0	7/9/79
12.0	0	7/9/79
13.0	0	7/9/79

Stress analyses were done for both OBE and SSE conditions, based upon the shears and moments developed in the finite-element dynamic analysis of the seismic response. These values were compared with allowable stresses referenced in ASME Section III, Subsection NF (Table 4-1). Values given in Table 4-1 are based on the maximum stresses calculated for all module sizes. Additional analyses were then performed to determine the dynamic frequencies, earthquake loading reactions, and maximum amount of sliding. The stability of the modules against overturning was also checked and they were found to be stable. Those values are summarized in Table 4-2. 1

The force path in the module caused by a horizontal earthquake is shown schematically in Figure 4-10. This figure shows the path of the horizontally induced earthquake fuel element inertial forces from the fuel element to the module support pads. Part of the fuel bundle inertial forces induced by the motion of the module are transferred either through the water or directly to the tube walls perpendicular to the direction of motion (Point 1 in Figure 4-10). These walls then transfer the forces to the side tube walls, which carry the forces down the walls and into the fuel support plates (Point 2). The portion of the fuel bundle load which is not transferred to the fuel tube walls is transferred directly to the fuel support plate at the point where the lower end fitting of the fuel bundle is supported vertically (Point 3). The fuel support plates, acting as a relatively rigid diaphragm, transfer the in-plane shear forces to the long casting which then transfers the shear forces to the module base assembly plate (Point 4). The forces are carried in the module base assembly (Point 5) until they are ultimately transferred to the foot pad and to the support pad and the pool slab (Point 6).

The vertical forces caused by earthquake and gravity loads become axial forces in the foot pads. The critical location for the compression forces from the foot pads is in the long castings and tubes directly above the foot pads. For stress analysis purpose, these compression forces are considered to be resisted by four fuel tubes sitting directly above the support pad.

Fuel assembly drop accidents were analyzed. The results are summarized in Table 4-3. The HDFSS design does not require any different fuel handling procedures from those discussed in the Unit 1 and Unit 2 FSAR.

The loads experienced under a stuck fuel assembly condition are less than those calculated for the seismic condition and have therefore not been included as a load combination.

TABLE 4-1

Comparison of Calculated Stress vs. Allowables (psi)

	OBE Condition		SSE Condition	
Location/Type	Calc Stress	Allowables[1]	Calc Stress	Allowables[1]
Tube wall shear	5,400	11,000	6,300	22,000
Tube wall compression	6,500	14,880	7,500	29,760
Tube weld throat shear	7,600	11,000	8,900	22,000
Angle, weld throat shear	7,600	11,000	8,900	22,000
Casting wall shear	5,200	11,000	8,100	22,000
Casting wall compression	11,600	16,500	12,500	33,000
Casting base weld shear	3,500	11,000	5,400	22,000
Support plate weld throat shear	3,400	11,000	5,700	22,000
Closure plate compression	6,200	14,880	7,000	29,760
Closure plate shear	6,200	11,000	7,400	22,000
Closure plate weld shear	7,600	11,000	9,200	22,000
Corner tube local compressive - stress check for local buckling	-	-	6,900	17,224

1

[1]Allowable stresses referenced in ASME Section III, Subsection NF

TABLE 4-2

DYNAMIC FREQUENCIES, EARTHQUAKE LOADING REACTIONS, AND MAXIMUM AMOUNT OF SLIDING

Module Size	Direction	Fundamental Frequency (Hz)	Max. Reaction (Lbs)	Max. Sliding (in)
11 x 13 (Unit 1 Only)	North-South	9.6	95,000	0.62
	East-West	12.0	88,000	0.67
13 x 13 (Unit 1 Only)	North-South	10.9	98,000	0.79
	East-West	10.9	98,000	0.79
13 x 15 (Unit 1)	North-South	9.9	103,000	1.11
	East-West	11.6	110,000	0.87
13 x 15 (Unit 2)	North-South	11.3	110,000	0.87
	East-West	9.4	103,000	1.11
13 x 17 (Unit 1)	North-South	9.5	116,000	1.72
	East-West	12.1	113,000	0.88
13 x 17 (Unit 2)	North-South	11.7	113,000	0.88
	East-West	9.0	116,000	1.72
13 x 19 (Unit 2 Only)	North-South	12.1	121,000	0.91
	East-West	8.5	128,000	1.34
15 x 19 (Unit 1)	North-South	11.2	128,000	1.02
	East-West	9.6	137,000	1.42
15 x 19 (Unit 2)	North-South	11.3	128,000	1.02
	East-West	8.8	137,000	1.42