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

July 17, 1978

Docket Nos: 50-416 & 50-417

Dr. Stephen Lawroski, Chairman
Advisory Committee on Reactor
Safeguards
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Dr. Lawroski:

SUBJECT: REGULATORY STAFF SUPPORT OF ACRS ACTIVITIES ON GRAND GULF OPERATING LICENSE APPLICATION (GRAND GULF NUCLEAR STATION, UNIT NOS. 1 AND 2)

On August 21, 1974, we agreed to assist the Committee in the early identification of potential problem areas and potentially difficult novel features for each application. On October 28, 1976, we further agreed to advise the Committee whether our acceptance reviews of tendered applications revealed any features of the application that cause a particular problem relative to any of the Committee's generic items. We have completed our acceptance review of Mississippi Power & Light Company's Grand Gulf Nuclear Station, Unit Nos. 1 and 2 operating license application and provide the following information in response to these agreements.

The Grand Gulf Nuclear Station is located on the east bank of the Mississippi River in Claiborne County, Mississippi, approximately 25 miles south of Vicksburg, Mississippi. Each unit utilizes a General Electric Company BWR/6 boiling water reactor and a Mark III vapor suspression containment. Each unit is designed for rated thermal and net electrical outputs of 3833 and 1250 megawatts, respectively. Unit 1 fuel loading is scheduled for October 1980 and Unit 2 fuel loading is scheduled for July 1983. The Grand Gulf Nuclear Station is the lead BWR/6, Mark III containment plant.

The principal design characteristics of the Grand Gulf BWR/6 nuclear steam supply systems are similar to those of GESSAR-251 and GESSAR-238. A comparison of the principal design characteristics of the Grand Gulf, GESSAR-251, and GESSAR-238 nuclear steam supply systems is presented in the Enclosure.

The Grand Gulf Mark III Containment structures and suppression pools are cylindrical steel-lined, reinforced concrete structures with internal design temperatures and pressures of 185 degrees Fahrenheit and 15 pounds per square inch gauge, respectively.

The drywells are basically cylindrical reinforced concrete with flat concrete roofs and steel refueling heads, and have internal design temperatures and pressures of 330 degrees Fahrenheit and 30 pounds per square inch gauge, respectively.

The Grand Gulf turbine-generators have been supplied by Allis-Chalmers Power Systems, Inc.

The fuel design has been changed to include two-water-rod 8 x 8 fuel assemblies instead of the one-water-rod fuel assemblies reviewed for the construction permit application. However, the modified design type has been previously reviewed on other BWR applications.

We expect that a major effort will be needed on the review of the test information related to the dynamic loadings on the Mark III containment in order to verify the adequacy of the load criteria approved for the construction permit.

Our acceptance review of the Grand Gulf application did not reveal any other potential problem areas or difficult novel features.

Sincerely,

D. B. Vassallo, Assistant Director
for Light Water Reactors
Division of Project Management

Enclosure:
Comparison of Principal Design
Characteristics of Grand Gulf,
GESSAR-251, and GESSAR-238 Nuclear
Steam Supply Systems

ENCLOSURE

COMPARISON OF PRINCIPAL DESIGN CHARACTERISTICS OF GRAND GULF, GESSAR-251, AND GESSAR-238 NUCLEAR STEAM SUPPLY SYSTEMS

CHARACTERISTIC	GRAND GULF	GESSAR-251	GESSAR-238
Rated Core Thermal Power Level, megawtts	3833	3800	3579
Design Core Power Level, megawatts	4025	3876	3758
Steam Flow Rate, 10^6 pounds per hour	16.491	16.351	15.4
Core Coolant Flow Rate, 10^6 pounds per hour	112.5	122.5	102.5
Feedwater Flow Rate, 10^6 pounds per hour	16.455	16.308	15.3
Nominal System Pressure in Steam Dome, pounds per square inch absolute	1040	1040	1040
Average Power Density, kilowatts per liter	54.1	51.3	50.5
Maximum Thermal Output, Kilowatts per foot	13.4	13.4	13.4
Maximum Heat Flux, British Thermal Units per hour square foot	362,000	324,500	351,000
Maximum Fuel Temperature, degrees Fahrenheit	3430	3337	3337
Minimum Critical Power Ratio	1.07	1.07	1.07
Coolant Entnalpy at Core Inlet, British Thermal Units per pound	527.9	529.9	527.7
Core Maximum Exit Voids Within Fuel Assemblies, percent	76	75	75
Feedwater Temperature, degrees Fahrenheit	420	420	420
Number of Fuel Assemblies	800	848	732
Fuel Rod Array	8x8	8x8	8x8
Fuel Rods Per Fuel Assembly	62	63	62
Water Rods Per fuel Assembly	2	1	1
Number of Control Rods	193	205	177
Number of Fixed Incore Neutron Detectors	176	187	161
Reactor Vessel Design Pressure, pounds per square inch gauge	1250	1250	1250
Reactor Vessel Design Temperature, degrees Fahrenheit	575	575	575
Reactor Vessel Inside Diameter, inches	251	251	238
Reactor Vessel Height, feet - inches	73-0	73-0	70-1
Reactor Vessel Base Metal Thickness, inches	6.14	6.14	5.7
Reactor Vessel Minimum Cladding Thickness, inches	0.125	0.125	0.12
Number of Recirculation Loops	2	2	2
Recirculation Loop Pipe Diameter, inches	24	24	22/24
Recirculation Flow Rate, gallons per minute	44,900	47,100	35,400

CHARACTERISTIC	GRAND GULF	GESSAR 251	GESSAR 238
Number of Jet Pumps	24	24	20
Number of Main Steam Lines	4	4	4
Main Steamline Diameter, inches	28	28	26
Number of Safety-Relief Valves	20	22	19
Number of Low Pressure Core Spray System Loops	1	1	1
Low Pressure Core Spray System Flow Rate, gallons per minute	7115 at 128 lbs per sq in differential pressure	7000 at 122 lbs per sq in differential pressure	6000 at 12[illegible] lbs per sq in differential pressure
Number of High Pressure Core Spray System Loops	1	1	1
High Pressure Core Spray System Flow Rate, gallons per minute	1650 at 1147 lbs per sq in differential pressure	1650 at 1147 lbs per sq in differential pressure	1465 at 11[illegible] lbs per sq in differential pressure
	7115 at 200 lbs per sq in differential pressure	7000 at 200 lbs per sq in differential pressure	6000 at 20[illegible] lbs per sq in differential pressure
Number of Automatic Depressurization Systems	1	1	1
Number of Valves in Automatic Depressurization System	8	8	6
Number of Low Pressure Coolant Injection Systems	1	1	1
Number of Low Pressure Coolant Injection System Pumps	3	3	3
Low Pressure Coolant Injection System Pump Flow Rate, gallons per minute	7450 at 24 lbs per sq in differential pressure	7450 at 30 lbs per sq in differential pressure	7100 at 30 lbs per sq in differential pressure
Residual Heat Removal System Pumps	3	3	3
Residual Heat Removal System Pump Flow Rate, gallons per minute	7450	7450	7450
Number of Residual Heat Removal System Heat Exchangers	2	2	2
Number of Reactor Core Isolation Cooling Systems	1	1	1
Reactor Core Isolation Cooling System Pump Flow, gallons per minute	800 at 1120 lbs per sq in differential pressure	800 at 1147 lbs per sq in differential pressure	700 at 1120 lbs per sq in differential pressure