

TABLE 3-11
TABULATED REACTOR DATA

Initial Core Loading (<i>circa 1972</i>)	25 assemblies per core, 12.59 kg U-235
Present Core Loading	25 assemblies per core, 12.59 kg U-235, 5 graphite reflectors, 5 beryllium reflectors
Design Steady-State Power	1 MW _{TH}
<u>Fuel</u>	Pin type, 4% enriched pellets with Zircaloy-2 cladding
Material	UO ₂ - Sintered pellets
Enrichment	4.0 w% U-235
5×5 Core Fuel Mass	359 kg UO ₂
Density UO ₂	10.4 gm/cm ³
Pellet Diameter	0.423 inches
Diametrical Gap (Helium Filled)	0.0085 inches
Zircaloy-2 Cladding Thickness	0.0205 inches
Fuel Pin Outside Diameter	0.4725 inches
Fuel Pin Lattice	Rectangular
Center to Center Distance	0.606 inches × 0.524 inches
H ₂ O/UO ₂ Ratio	1.135
Length of Active Fuel	24 inches
Fuel Pins per Assembly	25
Fuel Pins in a 25 Assembly Core	625
<u>Box Assembly</u>	
Material	Zircaloy-2
Inside Dimensions	2.62 inches × 3.03 inches
Wall Thickness	0.060 inches
Clearance Between Boxes	0.040 inches
Clearance Between Control Rod Shroud and Box	0.060 inches
<u>Moderator</u>	
Material	H ₂ O (<i>light water</i>)
Temperature	70°F – 105°F

Reflector	Light water, Graphite, Beryllium
Primary Coolant / Flow Rate	De-Ionized Light water, 500 gpm
Secondary Coolant / Flow Rate	Light water, 700 gpm
<u>Control Rods</u>	
Number	Safety Rods – 3 Pulse – 1
Absorber Material	Ag-In-Cd (80 w% - 15 w% - 5 w%)
Guide Shroud Material	Aluminum
Shape	Rectangular
<u>Transverse Dimensions</u>	
Guide	6.34 inches × 0.44 inches
Absorber	4.85 inches × 0.18 inches
Clearance Absorber to Guide	0.0625 inches
Absorber Clad Material	Tin-Nickel
Withdrawal Speed	7.5 inches/min
Neutron Source	Pu-Be (5 Ci)

Reactor Physics and Reactivity Parameter Values:

Worth of a Single Fuel Assembly	500 pcm – 1130 pcm
Minimum Critical Mass Cold Clean	20 fresh fuel assemblies with no reflectors
Values for K_{eff} :	
5×5 Core (cold, clean, rods out)	1.0172 (at 13,600 MWD/MTU)
5×5 Core (cold, clean, rods in)	0.938 (at 13,600 MWD/MTU)
Fuel Storage Pit w/ 13 Assemblies (clean)	0.6363
β_{eff}	0.00730
Neutron Temperature	0.0509 eV
Power Coefficient (α_{power})	330 pcm/MW
Doppler Coefficient	-1.6 pcm/°F (<i>Fuel temp</i>)
Moderator Temperature Coefficient	-3.9 pcm/°F (<i>moderator temp</i>)
Void Coefficient	-1.60 pcm/cc
Control Rod Worth:	
Average Rod Worth	2770 pcm/rod
Worth of 3 Safety Rods	8310 pcm total
Xenon-135 Reactivity:	
Equilibrium @ 1MW	800 pcm
8 Hour Peak	292 pcm
Peak after Shutdown	825 pcm
Reactivity Limits for Single Experiment	1590 pcm