

FUEL ELEMENT

30. Form and composition	Fuel elements (slugs) are bundles composed of 7 cylindrical rods, 2.54 cm (1.0 in.) diam., 49.5 cm (19.5 in.) long, each containing 22 pellets of nat. UO_2 which are 2.38 cm (0.937 in.) diam. and 2.11 cm (0.832 in.) long. Spacing by 2 Zircaloy ribs on each rod, 0.127 cm (0.05 in.) high	31. Cladding	0.0635 cm (0.025 in.) of Zircaloy-2
		32. Subassemblies	Slugs are bundles of 7 rods, overall dimensions 8.13 cm (3.20 in.) diam., 49.5 cm (19.5 in.) long

CORE HEAT TRANSFER

33. Heat transfer area	Total 288 m ² (3080 ft ²)	40. Coolant mass flow rate	650 kg/sec (5.14 × 10 ⁶ lb/hr) 755 l/sec (10000 Imp. gpm)
34. Heat flux	Max. on fuel element surface: 70 W/cm ² (222000 BTU/ft ² hr)	41. Coolant temperatures	Inlet 252° C (485° F) Outlet 277° C (530° F)
35. Film temperature drop	Max. 19.3° C (34.8° F)	42. Coolant pressures	Inlet 82 kg/cm ² (1167 psig) Outlet 75 kg/cm ² (1071 psig)
36. Fuel element temperatures	Max. fuel 2250° C (4000° F) Max. cladding 287° C (547° F)	43. Hot channel factors	Ratio of power produced between innermost and outermost channels is 3:1
37. Coolant flow area	Per pressure tube 18.5 cm ² (2.87 in. ²)		
38. Channel velocity	Max. 4.8 m/sec (15.7 ft/sec)	44. Shut-down heat removal	Standby auxiliary heat exchanger (capacity: 1.0% of full power) 8 thermosyphon systems (2%)
39. Heat transfer coefficient	Max. 0.92 cal/cm ² sec °C		

CONTROL

45. Control, regulating and safety rods	1 booster rod, 90% U^{235} cross section 2.36 cm ² (0.643 in. ²) total length 4.5 m (15 ft) active length 1.5 m (5 ft) total worth 0.25% $\frac{\Delta k}{k}$ (addition) rod speed 0.001% $\frac{\Delta k}{k}$ /sec	47. Reactivity addition rate	Max. 0.029% $\frac{\Delta k}{k}$ /sec
		48. Scram time and mechanism	<0.5 sec opening of 3 dump lines by 3 pairs of pneumatically operated valves
		49. Sensitivity of auto. control	Accuracy ±2% of nominal steam pressure
		50. Temperature coefficients	Fuel — 8.4 × 10 ⁻⁴ % $\Delta k/k$ /°C Moderator — 6.8 × 10 ⁻³ % $\Delta k/k$ /°C Coolant — 4.3 × 10 ⁻⁴ % $\Delta k/k$ /°C
		51. Burnable poison	None, except at start-up
46. Other control features	Fine control is by adjustment of D ₂ O moderator level by both blanket gas pressure and control valves	52. Other shut-down provisions	Removing D ₂ O-moderator completely from reactor into dump tank

REACTOR VESSEL AND OVERALL DIMENSIONS

53. Form, material and dimensions	"Calandria", horizontal stepped cylinder, double walled, Al-alloy. Inner tank: 445 cm (14 ft 8 in.) diam. at center, 366 cm (12 ft) diam. at ends, 384 cm (12 ft 7 in.) long. Outer tank: 518 cm (17 ft) diam., 457 cm (15 ft) long. 132 Zircaloy-2 pressure tubes going through both vessels	54. Working, design & test pressures	Pressure tubes: Working pressure 82 kg/cm ² (1167 psig) Test pressure 115 kg/cm ² (1636 psig) He pressure in the two tanks approx. atmospheric
		55. Reactor with shielding	Outside dimensions of reactor vault 9.5 m (31 ft) wide, 16.8 m (55 ft) long, 9.1 m (30 ft) high

FLUID FLOW

56. Heat exchangers	1 horizontal "U-shell-and-tube" type combined with a steam drum. D ₂ O in 2069 Inconel tubes providing a surface of 577 m ² (6200 ft ²); total evaporation rate 136 000 kg/hr (300000 lb/hr)	58. Decomposition & recombination	Recombination provided
		59. Cooling system safety	Emergency water cooling, gravity fed from storage tank; fly wheels on pumps; thermosyphon system
57. Coolant losses and purification	Primary coolant leakage is collected for return to system. Purification by-pass of 3 l/sec (40 Imp. gpm) to one of two mixed-bed ion exchangers	60. Fuel failure detection	Two circular arrays of sample pots scanned by gamma scintillation counters for iodine fraction of fission products