BASIC PLUTONIUM CRITICAL PARAMETERS

Metal[2]	Full Reflection*	Bare
Minimum critical mass, kgs ^{239}Pu	5.425 ± .027 [1]	10.2
Infinite cylinder, diameter inches	1.7	2.4
Infinite slab thickness, inches	0.28	1.1
Minimum spherical volume, liters	0.28	0.51

Homogeneous Solutions[3]	Full Reflection	Bare**
Minimum critical mass, g ^{239}Pu		
$^{239}Pu - H_2O$	531	
$^{239}Pu(NO_3)_4 - H_2O$	547	905
Infinite cylinders diameter, inches		
$^{239}Pu - H_2O$	***	***
$^{239}Pu(NO_3)_4 - H_2O$	6.41	9.15
Infinite Slab thickness, inches		
$^{239}Pu - H_2O$	***	***
$^{239}Pu(NO_3)_4 - H_2O$	2.44	5.30
Minimum spherical volume, liters		
$^{239}Pu - H_2O$	***	***
$^{239}Pu(NO_3)_4 - H_2O$	8.3	16.9
Minimum critical aqueous concentration, g/l ^{239}Pu	7.8 ± 0.3	(H/Pu = 3392 ± 100)

* Reflector is water unless specified otherwise.

** 0.125 inch thick stainless steel container shell.

*** There is no minimum value for theoretical Pu - H_2O solutions unless a maximum concentration is assumed, see pages III.A.4.100-3, III.A.5.100-3 and III.A.9.100-3.

(1) W. U. Geer, D. R. Smith, Measurement of the Critical Mass of a Water - Reflected Plutonium Sphere, ANS Transactions Vol. II No. 1, 1968.

(2) H. C. Paxton, J. T. Thomas, Dixon Callihan, E. B. Johnson, Critical Dimensions of Systems Containing ^{235}U, ^{239}Pu and ^{233}U, TID-7028, 1964.

(3) C. R. Richey, Theoretical Analyses of Homogeneous Plutonium Critical Experiments, Nuclear Science and Engineering: 31, 32-39, 1968.