distribution of fast fission neutrons which decreases rapidly as one goes into the active layer.

The multiplication of fission neutrons in the slab proceeds from this essentially asymmetric source. One may describe the process by which a time-independent fast-neutron density in the active layer is established as follows:

Of the primary fission neutrons in the slab a certain fraction reproduce fission neutrons without having left the active material. The rest (a) suffer radiative capture before leaving the slab, or (b) they escape into the water on one side of the slab, or (c) they leak off the bare side never to return. Of those that enter the water, a certain fraction are returned to the slab after moderation and produce fissions. Let us indicate the number of fast neutrons per sec per cm^2 incident on the water as I. The number of fission per cm^2 per sec that slow neutrons returning from the water produce between x and x + dx in the slab we shall call $I f_s(x)\, dx$

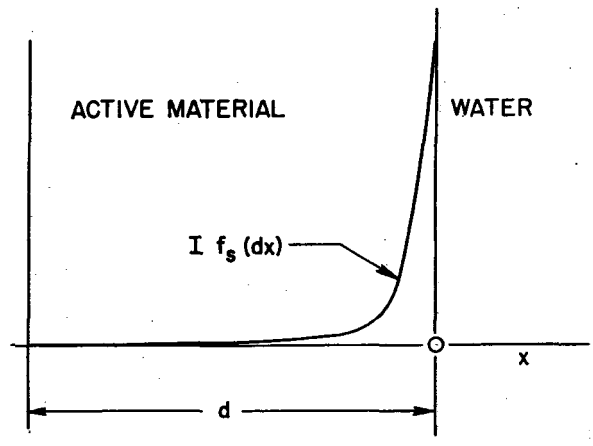

Fig. 1

The problem of calculating the critical thickness, d, is now conveniently broken up into two parts. The first is to determine the magnitude and distribution of the source fission rate per cm^3, $I f_s(x)$. The second is to compute the current of fast neutrons into the water which depends on the source strength of fission neutrons, $\nu I f_s(x)$, slab thickness, d, in units of fast neutron mean free path in the active material, and the value of f, defined in the usual manner as the excess

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