put the inhomogeneous integral equation in the form of the equivalent slab problem $\phi(x)$ must be interpreted as radial coordinate, $(a - x)$, times source per unit volume per unit time. Thus if the total number of fissions per unit current into the water is defined as F' for each group, one may determine the constants B_i from

$$F_i' = 4\pi B_i \alpha_i \int_0^a dx\,(a - x)\, e^{-\alpha_i x} \tag{55}$$

Here we allow the upper limit to approach ∞ and obtain approximately:

$$B_i = F_i'/[(4\pi a)(1 - 1/\alpha_i a)] \tag{56}$$

The values of F_i' are obtained approximately from the F_i values for the slab (Eqs. 9, 14, and 21) by taking into account the sphericity of the water-active material boundary according to a suggestion by E. Teller.

$$F_i' = F_i/(1 + l\,\sigma/a) \tag{57}$$

Thus Eq. 56 becomes

$$B_i = F_i/[(4\pi a)(1 - 1/\alpha_i a)(1 + l\,\sigma/a)] \tag{58}$$

One may solve for the current of fast neutrons leaving the sphere in a manner exactly analogous to the treatment given in section III. The integral equation to be solved is identical to Eq. 29 except that not $f(x)$ and $g(x)$ are respectively $n(x) \cdot (a - x)$, $x \geq 0$ and $n(x) \cdot (a - x)$, $x < 0$. Thus $G(o)$ is no longer the current but instead of Eq. 26 one has

$$I = 4\pi \int_{-\infty}^{0} dx(a - x)^2\, n(x) = 4\pi \int_{-\infty}^{0} dx(a - x)\, g(x) \approx 4\pi a(1 + 1/a)\, G(o) \tag{59}$$

The equations analogous to (34) and (47) are obviously

$$G(o) \doteq \frac{I}{4\pi a(1 + 1/a)} = f\, F(o) + \frac{I\,\nu}{1 + f} \sum_{i=1}^{3} B_i \tag{60}$$

and

$$f\, F(o) = \frac{I\,\nu}{1 + f} \sum_{i=1}^{3} B\, e^{\alpha_i A_i} [k_0^2 + k_0 A_i \cot(a + x_0)]\, (k_0^2 + \alpha_i^2)^{-1} \tag{61}$$

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