If the buildup factor values at 0.5 mfp from Ref. 2 were included in our fitting, the parameter values results would be slightly different for source photon energies of 0.04, 0.06, 10, and 15 MeV. The other values would remain the same. Also, it is easily determined that the predicted values ($B_c$) using our tabulated values always give deviations at 0.5 mfp less than the maximum deviations quoted in Ref. 1 except for source energies of 0.04 and 0.06 MeV, for which the deviations are slightly larger.

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## Comment on "Optimized Taylor Parameters for Concrete Buildup Factor Data"

Chilton[1] comments that the values of the parameters in Taylor's formula that Shure and Wallace[2] derive for gamma-ray buildup factor data for concrete[3] does not provide the "best" fit in the sense of minimizing percent deviation. Chilton demonstrates that better parameters in this sense can be obtained. The ranges of deviation of calculated buildup factors, $B_c$, from the original data, $B$, for both sets of parameters for the gamma-ray source energies, $E$, of Ref. 1 are given in Table I. The criterion used by Chilton should, and as seen in Table I does, provide maximum positive and negative deviations of about the same magnitude for a given energy.

The criteria used and previously identified by Shure and Wallace[2] are two-fold: The set of parameters obtained should be such that the percent deviation $|(B_c - B)/B|$ is less than ~5% (without attempting to minimize the magnitude below 5%), and, if this cannot be achieved, the percent deviation is minimized subject to the constraint that $B_c/B$ is greater than ~0.95. With this constraint, in ultimate application, calculated air kerma or dose[3] or exposure[1] rates will not be underestimated by more than ~5%. As seen in Table I, the first part of the criteria is met except for $0.1 \leq E \leq 2.0$ MeV, and in this energy range the second part of the criteria is met.

TABLE I

Range of Deviation of Calculated Exposure Buildup Factors from Original Data, Point Source in Infinite Concrete Medium

(mfp range 0 to 40)

| Source Energy (MeV) | Range of Deviation (%) | |
|---|---|---|
| | Chilton (Ref. 1) | Shure and Wallace (Ref. 2) |
| 0.04 | +4.45 to -4.47 | +6.14 to -5.11 |
| 0.06 | +5.29 to -5.30 | +5.76 to -7.32 |
| 0.08 | +4.67 to -4.74 | +4.40 to -4.91 |
| 0.10 | +6.02 to -5.94 | +9.64 to -5.03 |
| 0.20 | +20.23 to -20.24 | +37.22 to -6.10 |
| 0.5 | +22.22 to -22.24 | +41.28 to -5.66 |
| 1.00 | +15.24 to -15.22 | +25.12 to -4.90 |
| 2.00 | +7.01 to -6.98 | +8.47 to -5.02 |
| 5.00 | +1.48 to -1.48 | +2.14 to -0.91 |
| 10.00 | +2.27 to -2.26 | +0.11 to -3.41 |
| 15.00 | +2.66 to -2.66 | +1.32 to -3.55 |

Note that for a given source energy, the total width of range of deviations in Table I appears to be reasonably insensitive to the criteria used in deriving the parameters.

Whether Chilton's parameters are "better" values than those of Shure and Wallace is a decision that the user of such parameters must make for his particular application.

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[1]A. B. CHILTON, *Nucl. Sci. Eng.*, **64**, 799 (1977).
[2]K. SHURE and O. J. WALLACE, *Nucl. Sci. Eng.*, **62**, 736 (1977).
[3]C. M. EISENHAUER and G. L. SIMMONS, *Nucl. Sci. Eng.*, **56**, 263 (1975).