

# Abstract:

The conversion of dosimetric data from one phantom material to another via the mechanism of build-up factor ratios is evaluated. A self-consistent set<sup>1</sup> of EGS Monte Carlo dosimetric data for model 6711 and 6702 <sup>125</sup>I seeds and for a <sup>103</sup>Pd source provides standards for radial dose functions,  $g(r)$ , and dose-rate constants relative to water,  $\Lambda_{\text{phantom}}/\Lambda_{\text{water}}$ , in water substitute materials, PMMA (polymethylmethacrylate), WT1 (Solid Water<sup>TM</sup>), and RW-1. For each source, build-up factors are used to convert the data in water to a given phantom material. The resulting  $g(r)$  and relative dose-rate constant data are compared to the Monte Carlo results. As defined, the build-up factor assumes no significant spectral change due to capsular or phantom filtration with distance from the radiation source. In addition to the latter, a build-up factor based on average energy loss at mean free path intervals is evaluated to account for phantom filtration. A 6702 source model using the MCNP, Monte Carlo N-Particle, code provides spectrum as a function of transverse distance from the source in water and in phantom material. Material differences in spectral changes are thereby evaluated. Finally, build-up factors including spectral correction are evaluated that account both for capsular and phantom filtration.

(1) Luxton, G., Medical Physics **21**(5):631-641 (1994).