AbstractID: 1611 Title: Measurements of dose for 6 and 18 MV photon spectra in a phantom and comparison to calculations of 3-D Adjoint Monte Carlo code

This paper reports on the experimental and theoretical study of dose-distributions generated by 6 MV and 18 MV bremsstrahlung spectra in a SW phantom for a wide range of incident photon-angles. MOSFET devices were used to perform measurements. Data were obtained for eleven incident angles of photons, three depths of tissue, and five locations in the radiation field, 10X10 cm^2. The results show that for radiation treatments where incident angles vary from normal incidence, the dose can be significantly less (about 40%) than the dose at normal incidence for a shallow depth of tissue such as 3 cm, and a location near the center of the radiation field for the 6 MV spectrum. For a depth of 10 cm and a location near the edge of the field, the dose can be greater (about 24%) than that value at normal incidence. The corresponding values for the 18 MV spectrum were a 28% decrease and a 19% increase. Thus one can achieve a dose that is less than or more than the estimated value, depending on the tissue depth and location in the radiation field, if incident angles of photons are not at normal incidence but at shallow angles. Consequently, the shallow angle distributions can be also depth-dependent. The 3-D Adjoint Monte Carlo code, NOVICE, was used to simulate the experimental setup with a simple model and to calculate electron-flux-distributions as a function of incident angle. Those distributions also agreed with the experimental dependencies on depth and incident angle.

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