AbstractID: 9350 Title: Choice Of Radiation Detectors On The Quality Of Commissioning Accelerator Beam Data

With availability of wide range of radiation detectors (mini- and micro-chambers), it is important to know the effect on selection of a detector for the quality of beam data such as depth dose including buildup, profiles in- and cross-planes, and output factor during commissioning, which is a gold standard data for comparison through the life of an accelerator. Ten detectors with various type, design, and manufacturers were used with a scanning water phantom to acquire data sequentially for fields ranging from 1x1 cm^2 to 40x40cm^2. Impact of detector orientations (x, y, z; radial, axial, and vertical) were also evaluated along with the polarity effect. The results are surprising with a demand for a standard guideline in selecting a chamber for beam data acquisition. There is nearly a 10% difference among detectors in depth dose for small fields that tends to reduce to 3% for 10x10cm^2 and rises again to 10% with large fields. These differences are explainable based on signal to noise ratio of detector, dwell time, and speed of scanning. Differences in profiles represented by 20-80% width are also significant (3.5-9mm) but more pronounced in axial direction of the detector due to volume averaging. Output factor is independent of detector except for small fields. It is concluded that selection of detector for beam data acquisition is a strong function of fields size, beam energy, speed, dwell time, and polarity effects. There is a need for national protocol for proper guidance on the choice of detector for beam data commissioning.