Comparison of TomoScanner™ 2D Water Phantom versus IBA Helix for Tomotherapy Profile Measurements

Discrepancies in Tomotherapy beam profiles were observed between different water phantoms. Figures 1 and 2 display the crossline and inline profiles measured for the 2.5 cm jaws. Figure 3 shows the percent depth dose measured for the 2.5 cm jaws. The legend in the figures are described as follows: “IBA” are the measurements made with IBA Blue Water Phantom Helix, “IBA2” are the measurements performed a second time to confirm consistency and repeatability, “WI Twin” data are the Tomotherapy Twinning data from Wisconsin used in the treatment planning system, “Comm Standard Imaging” are the data collected from Tomotherapy’s Standard Imaging TomoScanner™ 2D Water tank during commissioning. The use of different ion chambers (CC04 vs. A1SL) was investigated and found to make less than 0.5% difference in data measurement. The IBA Helix has a metallic bar which guides the ion chamber in the lateral X-coordinate direction. It was determined that the bar does not interfere with the beam data measurements, contributing no more than 0.5% measurement variance. Further investigation is being performed to find the cause of the differences in profile measurements.

Figure 1: 2.5 cm Jaw Crossline Profiles

Figure 2: 2.5 cm Jaw Inline Profiles

Figure 3: 2.5 cm Jaw % depth dose