AbstractID: 13715 Title: Novalis Tx MonteCarlo based linear accelerator

Purpose: To commission a Monte Carlo model of the NovalisTX linear accelerator equipped with high definition MLC.

Method and Materials: Percent depth dose curves were calculated and compared against measured ones in water. The measurement data was collected using a PTW microLion ionization chamber with sensitive volume of 0.002cc. Various field sizes were compared for a 6.0 MV photon beam in order to validate the Monte Carlo model. BEAMNRC software was used to model the NovalisTx linear accelerator. DOSXYZNRC was used to create the geometry of a virtual water phantom in order to compute the phantom dose. In-house software using a MATLAB platform was utilized to convert the 3D dose file obtained from the Monte Carlo simulation to a file which can be read using commercially-available software for dose visualization (RIT software). In the RIT software platform, the 3D dose of the virtual phantom was compared against the commissioning data of the NovalisTX.

Results: Good agreement was observed between measured and calculated percent depth dose curves, within 2% difference with the commissioning data from the linear accelerator. Output factors were calculated within 2% when compared to the measured ones for fields sizes ranging from 2cmx2cm to 25cmx25cm. Irregular fields created with the high definition MLC were in agreement with measured ones.

Conclusion: Based on the results, the Monte Carlo based NovalisTx linear accelerator model is in good agreement with measured data. The commissioned model can be used for dose verification purposes of patient plans.