Abstract ID: 16653  Title: Percent Depth Dose Comparison between Measurements from three Varian Linear Accelerators and Varian AAA Golden Beam Data

Purpose:
To validate the use of Varian Golden Beam Data Percentage Depth Dose (PDD) information for the Eclipse AAA algorithm for newly installed Varian Linear Accelerators

Methods:
Comparison was made between measured data and Varian Golden Beam Data which is often used in AAA beam models in Eclipse treatment planning systems. Open field and wedge field data were compared for 4 x 4 cm, 10 x 10 cm, 20 x 20 cm, and 30 x 30 cm field sizes for four physical wedges and for two photon energies.

Results:
Small differences on the order of 1% are observed when comparing measured open field PDD data and PDD data from the AAA Golden Beam Data set. In contrast, larger differences were observed in wedge field percentage depth dose for these data sets with the measured data being greater than AAA data. The difference increases with increasing depth and decreasing field size. For a 4 x 4 cm field with a 15 degree wedge the average difference is 6 % at a 25 cm depth for 6 MV photons. These differences are slightly smaller for 18 MV photon data for most field size and wedge combinations.

Conclusions:
The Varian Golden Beam wedged field PDD data for photon beams is compiled from older linear accelerators and shows variations from data collected from recently installed machines. This variation could be due to increased beam hardening effect from the wedges compared to previous machines. Therefore, caution should be applied when using the AAA Golden Beam model for wedged field calculations, particularly for field sizes smaller or equal to 20 x 20 cm and depths deeper than 15cm. It is recommended that carefully collected commissioning data be used for physical wedge PDDs in Eclipse.