AbstractID: 7112 Title: Implementation of Enhanced Dynamic Wedge Using Dynamic Multileaf Collimation

Dynamic Multileaf Collimator based Enhanced Dynamic Wedge (DMLC-EDW) is implemented utilizing techniques consistent with existing EDW, which is based on dynamic motion of the primary photon collimators. This enables treatment planning and dose delivery of dynamic wedge dose distributions in the four principal directions (superior/inferior, medial/lateral) superimposed over irregularly shaped fields defined by multileaf collimator. The Varian SHAPER™ program is emulated in the planning program to generate MLC Patient Files to deliver EDW dose distributions. These distributions are defined by leaf motions using the existing Segmented Treatment Table (STT). The Ratio of Tangents technique is applied to deliver any wedge angle from zero (open field) to 60 degrees for fields up to 29 cm wide. For fields up to 15 cm wide, the primary jaws are held fixed while one bank of leaves closes according to the STT; for fields from 15 cm to 29 cm wide, the closure is done in two segments, with an intermediate movement of the primary collimator X1 or X2 to centerline. Although the leaf motion of DMLC-EDW mimics jaw motion of EDW by using the same STT, there are differences in profile intensity and shape due to the change in relative output as the jaws close in EDW not seen in DMLC-EDW. This requires normalization factors from 0.7% to 2.5% to deliver equivalent doses to central axis. After this normalization, wedge profiles are in excellent agreement, with maximum 1% deviation near the tip of the 20 cm wedge.

(Supported in part by Varian Corporation.)