AbstractID: 2849 Title: Commissioning and Clinical Implementation of Elekta MLC IMRT with Corvus Inverse Treatment Planning

Purpose: This presentation details commissioning and clinical implementation of IMRT with the Elekta MLC and Corvus inverse treatment planning system. Particular attention is paid to features unique to this hardware and software that are not addressed in general IMRT guidance literature.

Methods and Materials: An Elekta Precise accelerator, equipped with 6 and 15MV photon beams and 80 leaf MLC, was commissioned for clinical usage IMRT with Corvus version 5.0. Data required by the planning system was collected using equipment and techniques consistent with current recommendations. A series of user defined intensity shapes, were used for initial testing of both energies by comparing calculated and film measured dose distributions. Five multifield clinical plans for each energy were compared to film in axial, coronal and sagittal planes, with an additional ionization chamber measurement at the intersection point of the three film planes.

Results: When a dual off axis segment is defined by Corvus, a common occurrence in IMRT plans, the segment boundaries may be delineated by up to five different penumbra forming hardware combinations, 1) curved end MLC alone, 2) curved end MLC with backup jaw, 3) backup jaw alone, 4) divergent MLC side face alone and 5) divergent main jaw alone. This implies that both sets of jaws, in addition to the MLCs, must be calibrated to a relative accuracy of 0.2mm. When penumbra 1 and 5 were used in the Corvus pencil beam model, optimum agreement was found between plan and measurements.

Conclusions: The physicist must be aware of leaf and jaw motion constraints that are unique to the Elekta Accelerator and how they are used in IMRT segment delineation by Corvus. When these factors are considered in hardware calibration and beam modeling, dose accuracy of 3% or 2mm is achievable over a range of stringent tests and clinical plans.