Inverse planning creates tightly conforming dose distributions by modulating the intensity of each treatment beam. To deliver such dose distributions with a multi-leaf collimator [MLC], each modulated beam is decomposed into a sequence of *segments*, which are delivered in a "dynamic-sweep" or "step-and-shoot" fashion. Some beam segments are small (i.e., < 3cm on a side), and are offset from the central axis. In general, inverse planning does not account for variations in treatment head scatter with field size and off-axis position. In this work, the monitor units delivered by each beam segment are adjusted using head scatter factors calculated by a pencil beam dose algorithm that is equipped with an extrafocal source model. Pretreatment quality assurance and verification are performed by comparing measurements of the modulated beam delivery with the calculated dose distribution. Calculations have been validated for fields ranging from 1 to 10cm on a side, for 6 and 18MV x-ray beams. Dose rates [per MU] were measured and calculated relative to a $10\times10\text{cm}^2$ field, in water at a 10cm depth. At 6MV, the dose per MU varied between 0.52 and 0.61. The measured dose rate depended somewhat on the number of monitor units delivered. For one accelerator, the dose per MU varied by less than $0.8\pm0.5\%$ as the number MU delivered decreased, but increased by as much a $2.9\pm0.6\%$ for an older accelerator.

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