AbstractID: 10623 Title: Investigation of Varian's Trilogy
LINAC to Deliver Fractional MU

Purpose: To evaluate whether the Trilogy can correctly deliver the fractional MU specified by IMRT plan. **Method:** We designed a simple dynamic MLC file with 10 step-and-shoot IMRT segments to run on a Trilogy to measure dose-per-MU for each individual MLC segment. MLC leaves were open during beam-On segments. After each segment, some of the MLC leaves were programmed to move back-and-forth which forced the Trilogy to hold off the beam for about 5 seconds until next beam-On segment. During this time the dose delivered in the previous segment was recorded using a Farmer chamber and electrometer. 6 MV photon beam with a 400MU/min was used in this experiment. **Results:** The Trilogy demonstrated excellent dose linearity ($r^2 = 0.999997$), in terms of total dose vs. total MU for each beam, for both static and dynamic MLC beams. Further data analysis on dose per fractional MU in individual segments revealed that the Trilogy tends to over-shoot in the first segment before stabilizing. To compensate for the overdosing in the first segment, the last segment of a beam is always underdosing because the Trilogy monitor chamber integration circuit stops the beam when it reaches the programmed MU, regardless of the dose delivered in the individual MLC segments. Dose per MU delivered for the segments in the middle of the beam is relatively stable. **Conclusions:** Although one can not program the Trilogy from the treatment console to run a fractional MU, the Trilogy has the ability to deliver fractional MU during dynamic MLC treatment such as IMRT. It appears that Trilogy has a tendency of overdosing the first segment and underdosing the last segment. Relative error can be 20 to 30% when the segment MU is less than 3.