

**Purpose:** To develop and implement an efficient QA routine capable of verifying multi-leaf collimator position accuracy using a commercial EPID and vendor supplied portal dosimetry software. With proper implementation, this routine will provide a rapid technique for detecting minor leaf position misalignments which could result in significant deviation from planned dose distributions for Dynamic delivered IMRT.

**Method and Materials:** A common dynamic MLC leaf position verification test, the Picket Fence, was utilized. This test consists of a series of five continuous 1.0 mm strips, with a separation of 2.0 cm between strips, delivered in dynamic mode. Testing was performed on a Varian EPID aS500 (0.78mm pixel resolution) at 100 cm SSD. A baseline integrated image of the picket fence MLC file was captured. A second picket fence MLC file, with intentional single leaf discrepancies of  $\pm 0.2$ ,  $\pm 0.3$ , and  $\pm 0.5$  mm, was also imaged. Integrated EPID images were first visually inspected for deviations in absolute leaf position and then analyzed with the Varian portal dosimetry software. Within the software, a profile was taken to determine peak intensity between strips, which should have a 2.0 cm separation. Additionally, the profile tool was used to determine peak intensity changes along the length of the 1.0mm strips. These peak intensity changes along the strips can be correlated to leaf positioning errors.

**Results:** All single leaf deviations greater than  $\pm 0.3$ mm were visually recognized and profile analysis confirms that leaf errors of this magnitude produce approximately a 10% change in peak intensity along the 1.0mm strips. Profile analysis did not detect the  $\pm 0.2$ mm error.

**Conclusion:** As noted in relevant literature, leaf position accuracy is of paramount importance for dynamic MLC IMRT delivery. Once a baseline image is validated, these tests can be conducted daily and evaluated in a matter of minutes.