The dose fall off for multi-field treatment volumes, shaped by MLC, were experimentally measured and compared with those produced by alloy shaping blocks. A water filled 30-cm diameter cylindrical phantom was irradiated with 6 and 10 MV x-rays from one-, two-, four-, six- and nine-field isocentric beam arrangements. The coplanar beam geometries consisted of opposed pairs of beams in all, except the one and nine field, cases. Radiochromic film was used to measure the cumulative dose distributions in three orthogonal planes centered in the irradiated volumes. Two field sizes, 5x5 cm^2 and 10x10 cm^2, with the corners of the fields blocked to the midpoints of the sides, were used. This 45° orientation produces the worst case scenario for the MLC shaping. The MLC leaf widths at isocenter are 1 cm. The mean positions of the 30%, 50%, and 90% isodose contours defined by the two shaping alternatives, were determined to be within ±1 mm of one another, independent of field configuration, field size or beam energy. The standard deviation of the mean position was found to be typically, 1mm for MLC and 0.1 mm for alloy blocks. The 90-30% fall off distances (or "penumbral widths") for MLC compared to alloy blocks were generally found to be wider by less than 1 mm for MLC, independent of the number of fields, sizes or energy. Results of our studies and the rationale for the choice of isodoses contours for the dose fall off analysis will be presented for these multi-field configurations.