AbstractID: 5258 Title: An Alternative Calibration Method for Solid Modulator IMRT

Purpose:
Solid compensators for intensity modulation have become very popular. The purpose of this presentation is to investigate the differences, for three separate measuring tools, in calibration using open fields and calibration with an attenuating material in the beam. Doses for both open fields and attenuated fields were confirmed using farmer chamber measurements. It is crucial to understand the differences in detector response between open and attenuated beams in order to make measurements of modulator based IMRT more accurate.

Method and Materials:
Three different types of measuring devices were investigated for this analysis: GafChromic EBT film, Kodak EDR2 film, and the SunNuclear Mapcheck system, each compared against ion chamber readings. Each system was irradiated with a 4 x 4 cm^2 field size for various doses. The same dose measurements were made for each system with a 3cm brass modulator in the wedge slot. After the films were scanned, light transmission value readings were obtained. For the Sun Nuclear Mapcheck system, direct readings of the central axis diode were obtained, again using the open field and the brass modulator. Measurements were made with a Farmer chamber to confirm that the doses from open and attenuated fields were equal.

Results:
The percent error differences in measurements using open versus compensated fields for EBT, EDR2, and MapCheck are 0.63%, 2.88%, and 1.01% respectively, while the Farmer chamber was only 0.07%.

Conclusion:
The small value in the Farmer chamber indicated that our calculation was accurate. The EDR2 film showed a high difference in readings compared to that for the EBT film and the MapCheck system. Due to these differences we conclude that one should use a modulator in the beam while calibrating a system for the use of modulator based IMRT.

Conflict of Interest (only if applicable):
Chris Warner works for .decimal.