AbstractID: 5173 Title: Measurement of surface and exit dose in megavoltage x-ray beams using micro-MOSFET detectors

Purpose: Knowledge of entrance and exit dose, specifically in breast cancers, is of significant clinical importance. New micro-MOSFET (Thomson & Nielsen Electronics Ltd., Ottawa, Canada) detectors offer an efficient means to accomplish this task. In this study we investigate the use of MOSFETs to measure surface and exit dose in external photon beams.

Method and Materials: Ratios of measurements at the surface and a depth of d_{max} in a solid water phantom were correlated with Monte Carlo (BEAM) generated percentage depth dose curves to determine the water-equivalent thickness of the micro-MOSFET detectors. This was done for 6 and 18 MV x-rays in a 10x10 cm^2 field, both normally and obliquely incident. Exit dose was measured similarly and equivalent thickness determined.

Results: Correlation of the predicted depth dose and measured ratios indicates a water-equivalent thickness of 0.8-1.0 mm for the micro-MOSFET at the surface. All results indicate that the equivalent thickness is independent of angle of incidence and energy. The same detectors show an equivalent thickness that is approximately 0.4 mm and energy independent when measuring exit dose. We anticipate final results to include additional measurements at 10 MV and a field size of 40x40 cm^2.

Conclusions: This work indicates micro-MOSFET detectors are a reliable (reproducible within 3%) detector of surface dose and exit dose as they exhibit a water-equivalent thickness that is independent of energy and angle of incidence. We believe they offer a unique opportunity in their application to *in vivo* surface dose measurement.