

AbstractID: 9372 Title: Using PTW seven29 ion chamber array for HDR source acceptance and for HDR brachytherapy treatment planning system QA

Purpose: To investigate feasibility of using the PTW ion chamber array for verification of consistency of HDR sources in terms of 3D dose distribution at source exchanges, as well as for comparing dose distributions generated by a treatment planning system with measurement.

Method and Materials: A PTW seven29 ion chamber array was used to measure 2D dose distributions in a solid water phantom produced by GammaMed Plus Ir-192 source at a single dwell position. The measurements were done in the longitudinal and transverse direction to the HDR applicator and at several depths. Measured dose distributions were analyzed using the PTW VeriSoft program. A BrachyVision TPS calculations were then compared with the measured data.

Results: Comparisons of relative transverse and longitudinal profiles at the depth of 1.65 cm for a single dwell position showed a 3% agreement for all data points except for the two most proximal points, where the discrepancy was about 15%. This comparison for the depth of 2.65 cm showed a 5% agreement at all points. Dose measured with PTW array showed a linear response with dwell time.

Conclusion: These preliminary results showed that PTW 729 array can be used to measure 3D dose distributions in a solid water phantom for commercial HDR source. These dose distributions then can be used to establish a baseline for source radial and angular profiles and verified at the source exchanges to ensure consistency in the Ir-192 source manufacturing. A 3D dose distribution generated by an HDR planning system for a single dwell position may be compared with the corresponding seven29 array measurements at the time of TPS commissioning to experimentally confirm the TPS dose model.