AbstractID: 3187 Title: Evaluation of a New Calibration Method for In-vivo Diodes with Sliding Window IMRT Delivery

Purpose: To evaluate the response of in-vivo diodes for IMRT delivery under new calibration condition.

Materials and Method: In-vivo diodes (QED p-type, 6-12 MV and 15-25 MV, Sun Nuclear Inc) with model 1131 dosimeter were calibrated with actual patient IMRT (sliding window technique) treatment fields (hereafter referred to as IMRT diodes). A 6-12 MV diode was placed on top of a solid water phantom at 100 cm SSD with an ion chamber (Capintec PR-06) at d_{max}. First a 10x10 static open field was delivered to obtain the ion chamber reference reading. Then an IMRT breast patient's medial field was delivered, and the ion chamber reading was converted to dose based on the reference reading. This dose number was used to calibrate the diode. A 15-25 MV diode was calibrated the same way with an IMRT prostate's PA field delivered. Regular diodes were calibrated to d_{max} dose under standard conditions (100 cm SSD, 10x10 FS). The response of both regular and IMRT diodes under IMRT delivery were measured with a farmer chamber at d_{max} used as reference.

Results: Diodes calibrated with the new method, i.e. IMRT diodes over-responded by 2.0% for 18 MV photons and 1.0% for 6 MV photons respectively for IMRT delivery when compared with their corresponding regular diodes, indicating IMRT diodes sensitivity increased by about 2.0% for 18 MV photons and about 1.0% for 6 MV photons respectively.

Conclusion: A new method to calibrate diode for IMRT delivery was presented. The responses were compared with regular diodes. IMRT diodes over-responded when compared with regular diodes by 2.0% for 18 MV photons and 1.0% for 6 MV photons with IMRT delivery. The evaluation of field size dependence, gap dependence and SSD dependence of the diodes for IMRT delivery have also been submitted to this conference.