AbstractID: 12671 Title: Dose correction in lung for HDR breast brachytherapy

Purpose: To evaluate and compare the dose in water equivalent medium to a lung equivalent medium from HDR Ir-192. **Methods and Materials:** In a 40×40×40 cm^3 water tank, a Contura brachytherapy device, inflated to 4 cm diameter was situated directly below the center of a 30 cm×30 cm×1 cm solid water slab. In the first phase, 9 cm of solid water was stacked above the 1 cm base. A Scanditronix parallel plate ion chamber (Type NACP-02) was centered above the 1 cm of solid water base. Ionization current measurements established the central HDR source dwell position for channels 1, 2, 3, and 5 of the Contura. Additional data was acquired in the 9 cm stack at 1 cm increments. The second measurement phase was performed after replacing the 9cm solid water stack with cork slabs. The ratios of measurements in the two phantoms were calculated. The Oncentra Masterplan treatment planning system was used to compute comparable ratios based on CT studies of the two experimental setups. **Results:** Lower dose was measured in the cork within 1 cm of the cork/solid water interface due to backscatter effects. Higher dose was measured beyond 1cm from the cork/solid water interface, increasing with path length up to 15% at 9 cm depth in cork. The treatment planning computations did not predict either of these dose changes. **Conclusions:** Dose from HDR Ir-192 in a cork media has been shown to be significantly different than in unit density media. This model should represent the dose effects in the lung when the breast is treated with Ir-192 brachytherapy. Commercial brachytherapy planning systems do not consider heterogeneous media and therefore do not compute accurate lung dose. Empirical corrections based on measurements from this study may be used to correct lung dose computations associated with HDR breast brachytherapy.