

AbstractID: 11076 Title: The Neutron Dose Evaluation and Shielding at the Maze Entrance of the Varian Clinac 2300EX

**Purpose:** After the installation of a Varian Clinac 2300EX accelerator, neutron and photon doses at the outer maze entrance were measured and compared with several empirical calculations. The measurements were taken before and after borated polyethylene (BPE) boards were installed on the maze wall as neutron absorption material. **Method and Materials:** The accelerator delivered an 18 MV photon beam at 600 cGy/min dose rate. An NRC NP-2 type neutron REM-meter and a Ludlum 14C survey meter with a 44-6 type of probe were used to measure the neutron dose and photon dose, respectively. The measurements were taken at the center axis of the maze, 0.8 m above the floor, 0.3 m away from the maze door. **Results:** With the gantry head tilted close to the inner maze entrance with closed jaws, both neutron dose and photon dose reach their maximum. The measurement data were compared with empirical calculation results obtained by Kersey's method, modified Kersey's method and a newly proposed method by R.C. Falcão et al. The estimation from Kersey's method is about 2 - 4 times of the measurement (Ratio  $\approx$  2.4-3.8). Falcão's method has estimation about 22 times of the measurement (Ratio  $\approx$  21.9). The modified Kersey's method has the best prediction of the dose (Ratio  $\approx$  1.0). The McGinley's photon dose equation gives estimation about 80% of the measurement. After applying borated polyethylene boards as lining on maze wall, the neutron dose and the photon dose at maze entrance were decreased by 41% and 58%, respectively. **Conclusion:** This work indicates that Kersey's method overestimates the neutron dose by about 2 to 4 times for this study. Falcão's method largely overestimates the neutron dose. The modified Kersey's method is recommended to be used in neutron shielding calculation for the 2300EX accelerator.