

AbstractID: 10594 Title: Novel neutron dosimetry using radiochromic films for 10 MeV neutrons

The purpose of this paper is to estimate neutron doses using radiochromic XRQA films. Five radiochromic films, placed at varying distances from the neutron source and a water bottle, were exposed to a flux of 10 MeV neutrons produced via the  $d(d, n)He$  reaction using the Tandem accelerator at Triangle Universities Nuclear Laboratory at Duke University. An estimation of the neutron flux was obtained by neutron activations of two sets of aluminum and gold activation foils. One foil of each type was placed at the front and back sides of the water target. The flux calculation was based on gamma spectroscopy of the irradiated foils using HPGe detectors. A Monte Carlo (MC) simulation based on FLUKA2008 code was also used to estimate the 10 MeV neutron dose for the same geometry. The accuracy of the results from MC was verified by the comparison of dose on water target from MC with the dose calculated on the same target using flux and the ICRU data tables. Based on these results, a calibration curve was obtained for optical density of the film vs. absorbed neutron dose in the range of 0-20 Gy. We have demonstrated the potential application of radiochromic films for neutron dosimetry. This research was, in part, supported by National Institute of Allergy and Infectious Diseases Grant 5U19 AI067798-03