

AbstractID: 1510 Title: Determination of Dosimetric Characteristics of ProstaSeed[®] ¹⁰³Pd Brachytherapy Source Using Monte Carlo and TLD techniques

Recently, a new design of the ¹⁰³Pd has been introduced for interstitial implant of prostate cancer. In this project, the dosimetric characteristics of the ProstaSeed[®] ¹⁰³Pd brachytherapy source have been determined using experimental and theoretical methods. The experimental procedures were performed in Solid Water[™] using LiF TLD dosimetry technique while the theoretical methods was performed both in water and Solid Water[™] phantom materials using the MCNP Monte Carlo simulation code. Dose rate constant, radial dose function and anisotropy functions of the source have been obtained following the AAPM TG-43 recommendations. A comparison between the dosimetric characteristics of the new source and previously published data for other commercially available ¹⁰³Pd sources is presented. The results of these investigations indicate that the dose rate constant of the new source in water is 0.68 cGyh⁻¹U⁻¹. The dose rate constant, radial dose function, and anisotropy constant of the new source was found to be comparable to the ¹⁰³Pd, Model 200, source. Dosimetric information of the new source is available for clinical application. In addition, a new empirical model for total source strength and number of seeds as a function of the prostate volume and diameter has also been determined for clinical application of the new source. This Model was based on the peripheral loading scheme of the prostate implants.