

## AbstractID: 1589 Title: Radiological Characterization Of A <sup>103</sup>Pd Ocular Brachytherapy Source

A monolithic plated radiation source designed for delivery of characteristic x-rays associated with the decay of <sup>103</sup>Pd to the macula of the eye using an applicator inserted behind the orb near the optic nerve has been described previously<sup>1</sup>. Initial source design relied heavily on Monte Carlo modeling, coupled with experimental measurements for evaluation of various radiological characteristics, including isodose profiles and source strength. These preliminary tests were conducted by performing measurements using instruments with calibrations traceable to NIST. The work described here was undertaken to provide a more direct link to national standards. In preparation for the conduct of human clinical trials with the device, a protocol of tests was planned to execute parallel measurements in Theragenics Corporation<sup>®</sup> laboratories and those of the Radiation Interactions and Dosimetry Group at NIST. Tests were performed using radiochromic film, small volume ionization chambers, small scintillator detectors and various thermoluminescence dosimeters, all in water or solid phantoms, and with CZT and IGe detectors in air. The execution and results of these measurements are described, along with a comparative analysis for tests at the two facilities and values derived using MCNP4C calculations. Agreement was obtained between both sets of measurements and with modeling results. A relative comparison of results of measurements of scattering equivalence for several water-simulating solid materials for the <sup>103</sup>Pd spectrum from this source is presented briefly. This work was funded by and is the property of Theragenics Corporation<sup>®</sup>.

<sup>1</sup>Millage, et al. Med. Phys. 30 (6) June 2003