Dosimetric measurements were performed to characterize a new ^{125}I source that is a variant design of an existing source, designated as MED3631-A/S, and that has application in interstitial brachytherapy. The new source, designated as MED3631-A/M, has centralized radio-opaque markers. In the original MED3631-A/S source, the radio-opaque markers are separated. Thermoluminescent dosimeters were placed in phantom to measure transverse-axis and angular dose profiles over a range of distances from 0.5 to 7 cm. The data were analyzed in terms of parameters recommended by AAPM Task Group #43. Tabular data evaluated in liquid water are provided for the dose-rate constant, Λ, radial dose function, g(r), the anisotropy function, F(r,θ), the anisotropy factor, $\phi_{an}(r)$, the point-source approximation anisotropy constant, $\overline{\phi}_{an}$. The dose-rate constant was determined by an absolute method using a Cobalt-60 reference and by relative measurements using calibrated ^{125}I source(s). Values of the dose-rate constant are provided for both the 1985 and 1999 NIST air-kerma strength standards. The new source is comparable to both the MED3631-A/S and the model 6702 ^{125}I source designs, demonstrating equivalent radial dose function, g(r). Differences in the value of the dose-rate constant, Λ, and the anisotropy of the dose distributions in phantom are discussed in light of the improved isotropy of the new design, the MED3631-A/M source, and the uncertainty involved in the dose measurement using a Cobalt-60 reference.

Supported in part by North American Scientific, Inc.