

AbstractID: 7006 Title: Characterization of the water-equivalence of phantom materials for $^{90}\text{Sr}/^{90}\text{Y}$ beta particles using the Novoste Beta-CathTM system

Intravascular brachytherapy requires that the dose be specified within millimeters of the source. High dose gradients near brachytherapy sources require that the source-to-detector distance be accurately known for dosimetry purposes. Solid phantoms can be designed to accommodate these stringent requirements. This study reports on the relative effect of different phantom materials on beta particles from a $^{90}\text{Sr}/^{90}\text{Y}$ source, specifically a Novoste Beta-CathTM source train. Measurements were performed in water, polystyrene, A150 and in an epoxy-based water-equivalent plastic and dosimeter readings in the solid materials were compared to those in water. Measurements obtained in A150 and in the epoxy-based plastic agreed well with those obtained in water when the source contacted the dosimeter. However, the relative detector response decreased with increasing depth in the solid phantom, falling to approximately 50% of measurements made in water at a depth of 5 mm. The results obtained in polystyrene agreed more closely with those obtained in water than did the results from either of the other solid phantom materials. At all distances in polystyrene, the results agreed with those obtained in water to within 10%. Additional measurements were conducted using a single seed $^{90}\text{Sr}/^{90}\text{Y}$ Novoste source and yielded similar results.