

Numerical Response of Planar HPGe Detector for ^{241}Am Contamination of Various Shapes

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Abstract : Injection is one of the potential routes of intake in a radioactive facility. The internal dose due to this intake is monitored at the radiation emergency medical centre, IGCAR using a portable planar HPGe detector. The contaminated wound may be having different shapes. In a reprocessing potential of wound contamination with actinide is more. Efficiency is one of the input parameters for estimation of internal dose. Estimating these efficiencies experimentally would be tedious and cumbersome. Numerical estimation can be a supplement to experiment. As an initial step in this study ^{241}Am contamination of different shapes are studied. In this study portable planar HPGe detector was modeled using Monte Carlo code FLUKA and the effect of different parameters like distance of the contamination from the detector, radius of the circular contamination were studied. Efficiency values for point and surface contamination located at different distances were estimated. The effect of efficiency on the radius of the surface source was more predominant when the source is at 1 cm distance compared to when the source to detector distance is 10 cm. At 1 cm the efficiency decreased quadratically as the radius increased and at 10 cm it decreased linearly. The point source efficiency varied exponentially with source to detector distance.

Keywords : Planar HPGe, efficiency value, injection, surface source

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