

ASSESSMENT OF RADIATION EXPOSURE TO A NON-RADIATION WORKER
IN AN INDUSTRIAL RADIOGRAPHY SOURCE TRANSPORT ACCIDENT

P. Gangadharan, A.V. Lakshmipathy,
B.K.S. Murthy and Geetha Varadharajan
Division of Radiological Protection
Bhabha Atomic Research Centre, Bombay 400 085, India

ABSTRACT

A non-radiation worker got exposed to Ir-192 gamma rays from a radiography source pencil in an accident during transport of container with source pencil from one radiography site to another. Dose calculations were made taking into account the activity of the source, the duration and the geometry of exposure conditions. The problem of dose assessment was complicated by the varying distance of source from the body surface, lack of information about exact duration of exposure in different positions etc. Dose estimates were done considering the above factors. Experimental measurements simulating the exposure conditions were made to arrive at dose distributions at different depths in the thigh and to assess the dose to the bone. A thigh phantom of tissue equivalent material and Thermoluminescent dosimeters in the form of $\text{CaSO}_4:\text{Dy}$ powder were employed in the simulation studies. Appropriate correction factors were employed for the energy dependence of the dosimeters for the primary and backscattered gamma rays from Ir-192. The doses to different regions ranged from 500 - 11,500 rads. Dose estimates correlated well with the clinical findings. The sequence of events, experimental and calculation aspects are elaborated in the paper.