

EXPOSURE TO RADIOACTIVE AEROSOLS IN MINING AND MILLING  
OPERATIONS: THE IMPORTANCE OF  $^{227}\text{Ac}$  AND  $^{231}\text{Pa}$

R. Vicente; J.C. Dellamano; S.A. Bellintani

INSTITUTO DE PESQUISAS ENERGÉTICAS E NUCLEARES  
IPEN-CNEN/SP

FAX: 55 11 2123546 C.P.11049 CEP:05499

SÃO PAULO - BRASIL

$^{227}\text{Ac}$  (half-life of 21.8 y) is the daughter of  $^{231}\text{Pa}$ ; a beta-emitter and parent of a subseries with five short-lived alpha-emitters.  $^{231}\text{Pa}$  (half-life of  $3.27 \times 10^4$  y) is an alpha-emitter of the actinium series, the decay chain of  $^{235}\text{U}$ . As daughters of this uranium isotope they are thought to be unimportant as a radiological hazard, despite the fact that their ALI values for ingestion and inhalation are the lowest of any other radionuclide. Both nuclides can be considered as being in secular equilibrium with uranium in most geological media and so the mass concentration of  $^{231}\text{Pa}$  is the same of the  $^{226}\text{Ra}$  and that of  $^{227}\text{Ac}$  is the same of the  $^{210}\text{Po}$ , to mention only two radionuclides of radiological concern. It is shown in this paper that if  $^{231}\text{Pa}$  and  $^{227}\text{Ac}$  are considered in the evaluations of dose commitments incurred by inhalation of aerosols in mining and milling operations, the results can be 70% higher than those calculated by the methodology of ICRP Publication 47.