

Comparisons of Biokinetic Models for Actinide Elements with Observed Tissue Analysis Data from Occupationally-Exposed Humans of Two Counties

R.E. Filipy,¹ V.F. Khokhryakov,² K.G. Suslova,² S. A. Romanov,² and R. L. Kathren¹

(¹USTUR, Washington State University, Tri-Cities, 2710 University Drive, Richland, WA 99352; ²Branch No. 1 of the Biophysics Institute, Ozersk Road 19, Ozersk, Chelyabinsk Region, Russia 456780)

Scientists of the United States Transuranium and Uranium Registries (USTUR) and the Dosimetry Registry of the Mayak Industrial Association (DRMIA), Russian Federation, have been involved in a collaborative research program to compare data collected by each Registry and to compare those data with existing models for biokinetics of actinide elements in humans. Skeleton-to-liver plutonium and americium concentration ratios from both Registries were plotted as a function of the residence time (time between exposure and death) and regressions of those plots were compared to concentration ratios calculated using ICRP methodology. The regression lines as well as the majority of DRMIA and USTUR observed ratios were below the ICRP-predicted ratios for both actinides, suggesting that the ICRP models slightly over-predict the skeletal content, under-predict the liver content, or both. Regression lines through the data also suggested that the relative clearance rates of both actinides from the two organs were approximately equal over a 50-y residence time. The observed data indicated an approximately equal apportionment of plutonium americium content ratio of approximately 5:1.

USTUR-0048-95