

## **Preliminary Evaluation of the Distribution and Biokinetics of $^{238}\text{PuO}_2$ in a Whole Body Donor to the USTUR**

*R.L. Kathren, J.J. Russell, and A.C. James*

*(U.S. Transuranium and Uranium Registries, Washington State University, 2710 University Dr., Richland, WA 99352)*

United States Transuranium and Uranium Registries (USTUR) Case 0259 was a 54-y-old male who died from arteriosclerotic heart disease 18 years after an acute inhalation exposure to high fired  $^{238}\text{PuO}_2$ . Urinalysis data collected subsequent to the accident showed no excretion of  $^{238}\text{Pu}$  for a few months post exposure, then increasing urinary  $^{238}\text{Pu}$  output, peaking approximately 3 years post exposure. Subsequent to this death, the tissues of this volunteer whole body donor were radiochemically analyzed for  $^{238}\text{Pu}$  and  $^{239+240}\text{Pu}$  content. Total body burden of  $^{238}\text{Pu}$  at the time of death is estimated as approximately 300 Bq. Approximately half of the total body burden of  $^{238}\text{Pu}$  was in the liver, approximately 37% in the bones and teeth, and only about 10% in the respiratory tract. Initial evaluation of these and other data from this case indicate significant differences in the biokinetic behavior of  $^{238}\text{Pu}$  as compared with observations of the  $^{239+240}$  isotopes in this same case and other human cases studied by the USTUR. These observations are consistent with animal data which indicate a much more rapid dissolution of  $^{238}\text{Pu}$  oxide particles in the lungs as compared with oxides of  $^{239+240}$  isotopes.

USTUR-0028-95