

## **A Test of the NCRP Wound Model Default Retention Function Parameters Using Three U.S. Transuranium & Uranium Registries Plutonium Contaminated Wound Cases**

Liesl K. Germann<sup>1</sup>

<sup>1</sup>*Idaho State University, Department of Physics, Pocatello, ID*

The new NCRP Report No. 156 biokinetic wound model's default retention equation parameters were largely derived from animal experimental data that have been extrapolated to humans. In order to test the NCRP parameters' ability to predict the systemic uptake of plutonium in human wound cases, this study applied the model's retention coefficients for plutonium solution chemistries (particle, fragment, colloid, avid and strong retentions) to three USTUR human plutonium-contaminated wound cases, Case 0262, Case 0151 and Case 0334. The Case 0262 plutonium material was determined to be 24% soluble plutonium, composed of strongly- and avidly-retained plutonium, and 76% highly insoluble plutonium categorized as fragment. The chi-square for this optimum fit series was a statistically significant  $\chi^2 = 52.3$ ;  $p = 0.18$ . However the questionable category assignment of "fragment" indicates that slower retention parameters may be necessary for the plutonium particle category. The Case 0151 plutonium material varied from 56% to 77% strongly-retained, with the remainder being avidly-retained. A statistically significant fit was obtained with a chi-square of 25.4 ( $p = 0.33$ ). The Case 0334 plutonium material was almost entirely strongly-retained with a statistically significant optimum fit chi-square of 62.6 ( $p = 0.13$ ). These results indicate that the NCRP wound model default retention equation parameters accurately predict plutonium uptake in humans from wounds when the bioassay data are sufficient to determine the mixture of absorption categories.

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