

## **A Simple Visualization of the “LEKSKaM 2005 Model” of Systemic Plutonium Biokinetics**

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In 2005, Leggett, Eckerman, Khokhryakov, Suslova, Krahenbuhl, and Miller (LEKSKaM) published a revision to the 1993 ICRP Publication 67 systemic biokinetic model for plutonium. Using data from plutonium workers in the former Soviet Union and Russian Federation, the model added a second blood compartment to mathematically deal with recycling. The resultant model is somewhat difficult to grasp conceptually, since one blood compartment is depicted inside another, necessitating pathways crossing compartment boundaries. Also, arrows in the model go in all directions. In an effort to develop a more intuitive representation of the model, an alternative view is presented. The visualization is a 2-dimensional surface projected in 3 dimensions onto the surface of a cylinder, emphasizing the recycling nature of the model. With uptake to Blood 1 shown at the top, excretion pathways shown at the bottom, and recycling going from left to right, all arrows go down or to the right. The Intake compartment is shown explicitly. The Skeleton, “Other” Kidney, Gonads, Soft Tissue 1 and 2, and Liver take Pu up from Blood 1 and gradually return it to Blood 2. The Intake Compartment, Renal Tubules, Urinary Bladder Contents, Small Intestine Contents, and Upper Large Intestine Contents are seen to be outside of the recycling part of the model. The unusual nature of STO (rapid turnover soft tissue) is clear. While there is no new science in this visualization, the flow of plutonium in the system is more easily comprehended. In principle, such visualizations can be made of all recycling models.

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