1. THE CASE
Accidental, single acute inhalation—1956:
- Acidic solution Pu(NO₃)₄—aerosol ‘mist’.
- Chelation treatment (i.v. Ca-EDTA) started day of intake.
- Continued intermittently over 3 months.
- Several other chelating agents tried—also by ingestion.
- 3 years later—i.v. Ca-DTPA administered.
- 400 Pu-in-urine measurements—including periods of chelation—
  through 31 y after intake!
- 91 Pu-in-faeces measurements—including periods of chelation.
Donor died 38 y after intake:
- 79 y.
- Adenocarcinoma of prostate—extensive carcinomatosis.
- At autopsy all major soft tissue organs harvested.
- Bones from half of skeleton also dissected out—for radiochemistry.
- Tissue contents of ²³⁸Pu, ²³⁹+²⁴⁰Pu, ²⁴¹Am measured.

2. THE BIOASSAY DATA
Figure 1. Pu-α excretion in urine
Figure 2. Pu-α excretion in faeces

3. ANALYSIS OF INTAKE
IMBA Expert™ USDOE-Edition code used to assess intake:
- Hard-wired ‘with ICRP Publication 67 Pu biokinetic model.
- Maximum likelihood estimate of intake and absorption parameters
  constrained to fit simultaneously urinary and faecal excretion data
  (un-treated) AND total Pu lungs/LNTH activities measured at death.
- RESULT—Intake ~ 58 kBq; AMAD ~ 2 μm; ft₁ ~ 0.0005; s₁ ~ 10 d⁻¹;
  s₂ ~ 100 d⁻¹; s₃ ~ 0.02 d⁻¹; ft₂ ~ 8%; s₄ ~ 2 × 10⁴ d⁻¹.

4. BIOKINETIC MODEL SYSTEM

5. MODELING EFFECTS OF CHELATION

6. MODELED EXCRETION BEHAVIOUR

7. DERIVED EFFECTIVENESS

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