

Beaverlodge Scenario

Participated by

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Model Used

- ERICA tool
 1. Tier-3 approach
 2. 10 simulations were considered

Source of Kd Values

- In the media input sheets, Kd (L kg⁻¹) of some of the cells were missing.
- ERICA default Kd values were considered.

Pb-210	1.00E+05
Po-210	2.00E+07
Ra-226	1.52E+04
Th-230	1.84E+07
U-238	5.00E+01

Biota dose calculation

- Radionuclides were considered in which media/biota conc. in input sheets are fully/partly available.
- Th-234 and U-234 was not considered because data are missing in both media and biota input sheets.
- The site in which Water activity was not available, it was calculated from K_d & sediment activity.
- Similarly Sediment activity was calculated from K_d & water activity.

Biota Conc. prediction

Biota conc. in *Chironomus riparius*, *Pisidium* & *Nemotaulius* species was predicted using density ratio of two species.

The biological uptake for the species in same environment is assumed to be similar. In other words, out of pelagic, large benthic or small benthic fish, we have considered one species as a reference for predicting the conc. in other species in that lake system.

Mathematically it is represented as:

$$C_1 D_1 = C_2 D_2$$

Where,

C_1 = Biota concentration (Bq/kg) of a known species

D_1 = Biota density (kg/m³) of a known species

C_2 = Biota concentration (Bq/kg) of an unknown species

D_2 = Biota density (kg/m³) of an unknown species

The density considered in the above calculation is based on the geometry and wet weight of the species provided in the scenario.

Based on this assumption, the activity of the *Chironomus riparius*, *Pisidium species* & *Nemotaulius species* was estimated and used as one input parameter for the evaluation of absorbed dose.

Approach used to Estimate wholebody activity : Based on the distribution (Either Normal or Lognormal) in ERICA approach

GEOMETRY, MASS, OCCUPANCY FACTOR & DENSITY OF INDIVIDUAL SPECIES

Type of species	Geometry (cm)	Mass (g ww)	Occupancy (%)	Density (Kg/m ³)
	L x H x W		in water column/sediment-water interface/in sediment	
Pelagic (e.g. Northern pike & Lake Trout)	50 x 15 x 10	1200	75/25/0	160
Benthic Fish - Large (White sucker & Lake whitefish)	45 x 15 x 10	1191	30/70/0	176
Benthic Fish - Small (Lake chub)	6.8 x 1.5 x 1	4.5	80/20/0	441
<i>Benthic Invertebrates (Chironomus riparius)</i>	0.34 x 0.17 x 0.15	0.12	50/25/25	13841
Benthic Invertebrates (<i>Pisidium sp.</i>)	2.5 x 1.5 x 1	1.6	50/50/0	427
Benthic Invertebrates (Caddisfly, <i>Nemotaulius sp.</i>)	3.5x1.46x1.46	1.75	50/50/0	235

Dose Rate Screening

- Hazard quotient was calculated based on the ERICA Benchmark dose rate i.e 10 $\mu\text{Gy}/\text{h}$.
- However there is a scope for the working group to fix the Bench mark dose rate for Beaverlodge based on the past experience of the researchers working in that environment.



Thank You

