Introduction

To calculate dose in organisms in question for the Beaverlodge scenario it is necessary to know:

- activity concentration in organism
- activity concentration in water
- activity concenetration in sediment

Useful Formulas

The fresh weight activity concentrations of radionuclides in biota are predicted from water activity concentrations using equilibrium concentration ratios (CR)

$$CR = \frac{Activity\ concentration\ in\ biota\ (Bq\ kg^{-1}\ fresh\ weight)}{Activity\ \ concentration\ in\ water\ (Bq\ l^{-1})}$$

Useful Formulas

The weight activity concentrations of radionuclides in sediment could be predicted from water activity concentrations using distribution coefficients (K_d) given as ratio of activity concentrations in sediment and in water:

$$K_d\ (l\ kg^{-1}) = \frac{Activity\ concentration\ in\ sediment\ (Bq\ kg^{-1}\ dry\ weight)}{Activity\ concentration\ in\ water\ (Bq\ l^{-1})}$$

Useful Formulas

Calculation of the standard deviation of the concentration ratio (CR)

$$CRSD = CR * \sqrt{\left(\left(\frac{BiotaSD}{BiotaConcentration}\right)^2 + \left(\frac{WaterSD}{WaterConcentration}\right)^2\right)}$$

Useful Formulas

Calculation of the mean of the concentration ratio (CR)

$$CR_{mean} = \sum_{i}^{n} CR_i$$

Decision Procedure

If concentration in water is known then

measured value is used

else

water concentration=sediment concentration/Kd

end

Decision Procedure

If concentration in sediment is known then

measured value is used

else

sediment concentration=water concentration*Kd

end

Decision Procedure

If concentration in biota is known then

Measured value is used

else

If concentration in water is known then

biota concentration=water concentration * CR

else

biota concentration=sediment concentration/Kd * CR

end

Decision Procedure

- ➔Concentration ratios have been taken from ERICA Database
- ➔ERICA have contained no explicit data for species followed within the Beaverlodge scenario
- ➔ERICA CR`s have been adopted for taxonomically similar organisms of the scenario

Decision Procedure

Kd‘s from ERICA Database and measured concentration ratio between the water and the sediment concentrations have been compared

If they are the same order of magnitude then the ERICA data are used

else measured concentration ratios are used

Adopted Input Data

Scenario organism =>	ERICA organism
White Sucker	Benthic/Pellagic Fish
Lake Whitefish	Benthic/Pellagic Fish
Chironomus riparius	Insect Larvae
Pisidium sp.	Bivalve Mollusc

Oral Explanation

Thank for your attention