HUMAN HEALTH METHODOLOGY

Approach to Criterion Development

Instructions for the Class Problems

1. Select the approach to be used based on the data on the health effects risk.

- Noncarcinogen

$$AWQC = RfD \cdot RSC \cdot \left(\frac{BW}{DI + \sum_{i=2}^{4} \left(FI_i \cdot BAF_i \right)} \right)$$

- Carcinogen (mutagenic or unknown mode of action : linear approach

$$AWQC = RSD \cdot \left(\frac{BW}{DI + \sum_{i=2}^{4} \left(FI_i \cdot BAF_i \right)} \right)$$

- Carcinogen (nonlinear mode of action)

$$AWQC = \frac{POD}{UF} \cdot RSC \cdot \left(\frac{BW}{DI + \sum_{i=2}^{4} \left(FI_i \cdot BAF_i \right)} \right)$$

2. Select the appropriate health risk value.

- Risk Specific Dose: The risk specific dose is derived from the risk level (i.e. 1×10^{-6}) divided by the cancer slope factor.
  - Risk level
  - Cancer Slope Factor
- Reference Dose (RfD)

3. Determine the exposure parameters for the population of concern.

- Body Weight
  - Adults: 70 Kg
  - Pregnant woman: 67 Kg
  - Children:
    - Infants: 7 kg
    - Ages 1-3: 13 kg
    - Ages 1-14: 30 kg
- Drinking water intake
  - Adults and pregnant women: 2 L/day
  - Children: 1 L/day

- Fish intake (when data on actual intakes not provided). The default values for fish intakes take into consideration a mix of fish from trophic levels 2, 3, and 4.
    - Default: 17.5 g/day
    - Recreational fishers: 17.5 g/day
    - Subsistence fishers: 142.4 g/day
    - Women of childbearing age: 165.5 g/day
    - Children (ages 1-14): 156.3 g/day

3. Determine the bioaccumulations factor.

This factor is provided in all of the exercise problems. It is expressed as L/kg and applies to a combination of fish intakes and BAF values for trophic levels 2, 3, and 4.

4. Calculate the RSC if using the noncancer or nonlinear carcinogen approach.

The RSC may be either a percentage (multiplied) or an amount subtracted, depending on whether multiple criteria are relevant to the chemical. All of the problems use a percentage approach. When using the percentage approach the values should me no lower that 20% or higher than 80%. If the calculated value is less than 20% or higher than 80%, default to the 80% ceiling or 20% floor as appropriate. The data needs for determining the RSC include:

- Contaminant intake contributed by fish from the ambient water body (concentration/g fish x g fish consumed/ day)
- Contaminant intake from all other dietary components
- Contaminant intake from drinking water
- Contaminant from other sources (inhalation dermal) – the problems do not include contributions from other sources.

5. Solve the Equation; QC the calculation..

Insert the variables in the chosen equation. Make sure the units cancel providing a criterion expressed as mg/L or µg/L of the contaminant in the ambient water source.