Considerations for EMCL derivations

1) Application of exponential distributions for Kds and CRs

All kds are assumed to have an exponential distribution as are any CRs derived by extrapolation approach. With respect to kds this results in very conservative sediment-EMCL values. With respect to CRs on occasions we are ignoring some distribution information we could perhaps make better use of (e.g. where a CR is assumed for a similar organism, the mean value is assumed with an exponential distribution even if there is a pdf associated with the mean value being assumed). Suggestions:

For marine kds TRS 422 provides some comment on likely distribution = order of magnitude above or below the recommended value. Do we simply assume a value of 10x the recommended value?

For freshwater need to obtain investigate if we can obtain the database (behind TRS 472 – no pdf) so that we can derive distributions.

For CRs then consider using distribution data when based on sufficient information?

2) Use of 99th percentile rather than 95th percentile

In assessment of how well the ERICA extrapolation approaches had worked (Brown et al. in-press) the 95th percentile CR value was not always conservative against new/expanded datasets.

3) Include suspended sediment in the water concentration?

The external dose to pelagic organisms is (in theory at least) estimated from filtered water. In reality the water column activity concentration will for many radionuclides be dominated by suspended sediment. Will this lead to us underestimating any EMCL values or is it likely that benthic organism will always be limiting in circumstances where external dose is important? 'Back of envelope' estimate assuming suspended sediment loads of 1 g/L and 0.1 g/L suggests probably not ..... do we need to confirm?

4) Manipulate suspended sediment Kds to bed sediment values

Most Kd values report to be for suspended sediments. In ERICA we use Kd to estimate the BED sediment concentration from input water or vice-versus. IAEA SRS-19 suggests (but doesn't justify) that bed sediment kd is likely to be 10% of the suspended sediment kd. By assuming suspended sediment kd values we may therefore over estimate bed sediment values from input waters. Conversely, if sediment data are input then water values would be estimated to be higher using a 'bed sediment' kd rather than a suspended sediment kd (ie may currently underestimate).

5) Are default occupancies conservative

Need to review (amphibian is not).

02/12/2012

Advise - If sufficient water and sediment data – go to Tier 2 (conservative result) to avoid application of Tier 1 default kds.