

Subsurface DCGL

Effects of Thickness, Area, and Cover

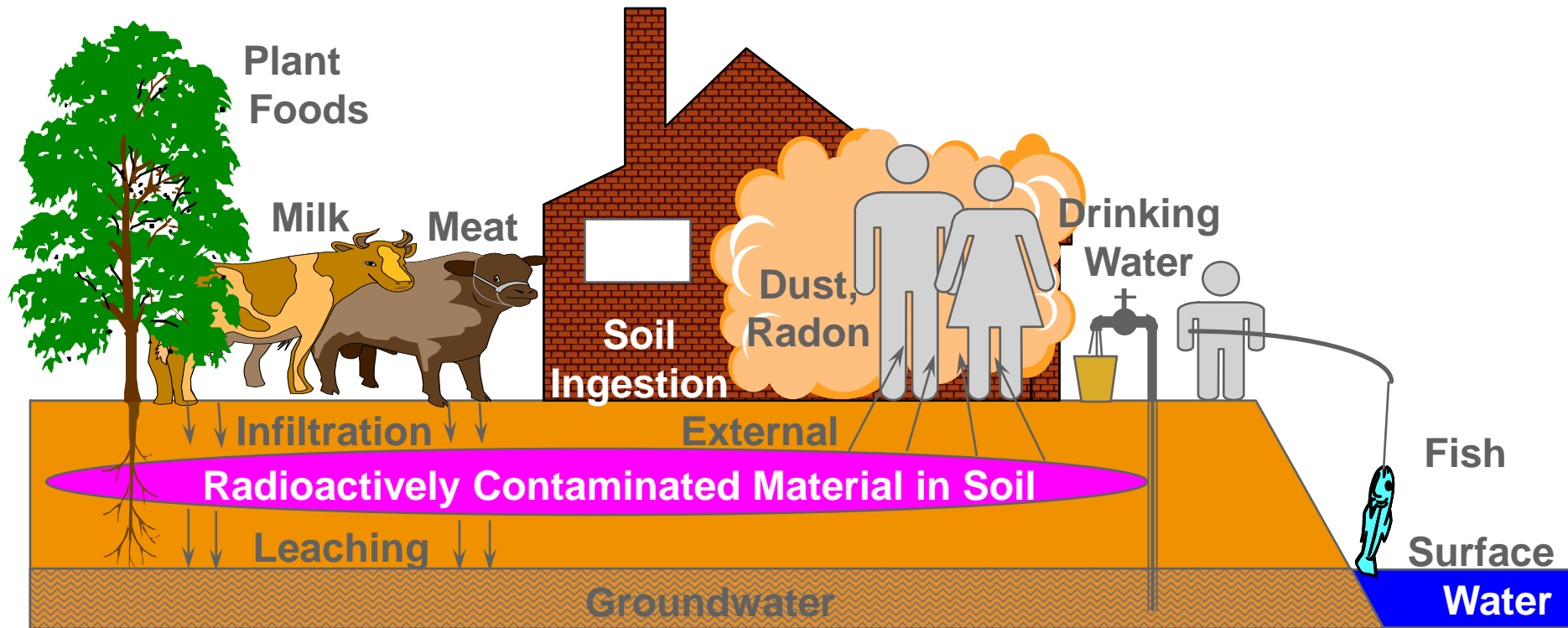
C. Yu, D. LePoire, S. Kamboj, E. Gnanapragasam

Presented at
NRC Subsurface Soil Surveys Public Workshop
July 14-15, 2021

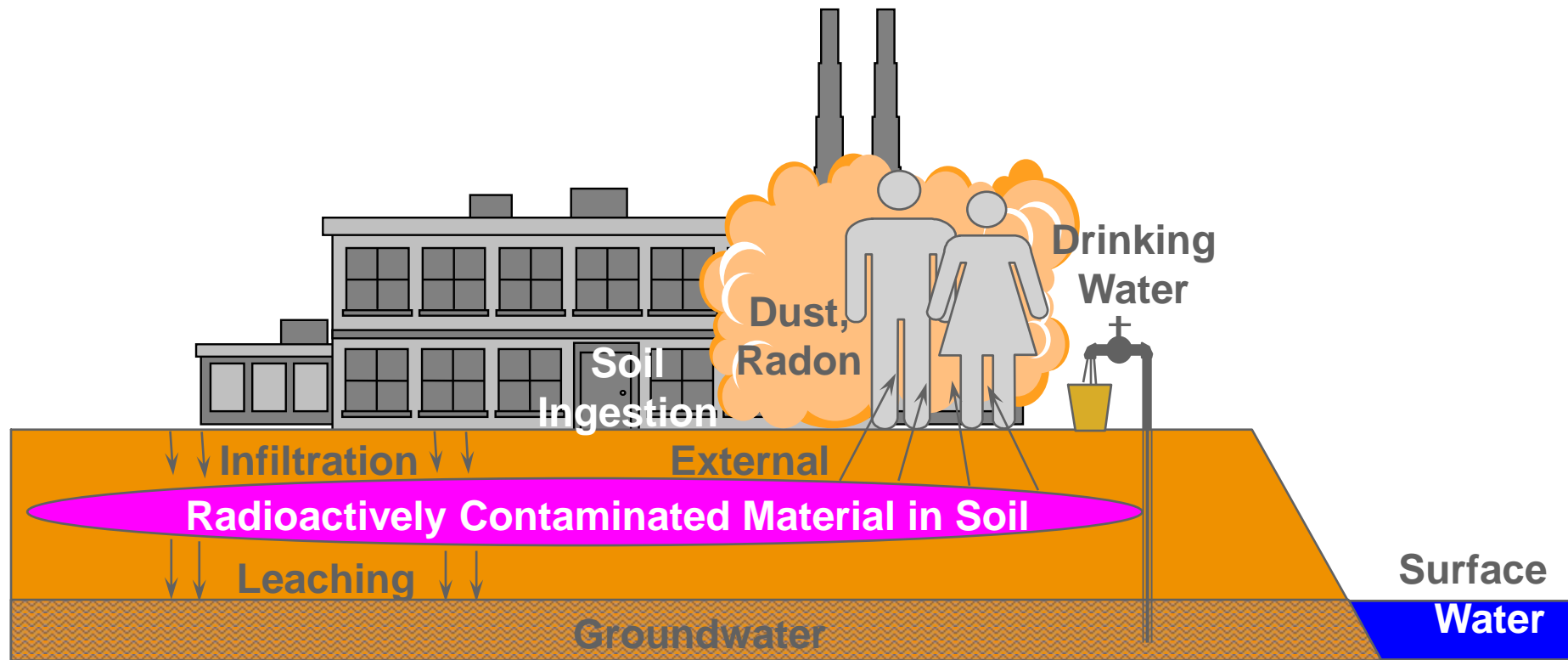
DCGL Considerations and Assumptions

- One of two ways to demonstrate compliance
- Based on regulatory dose criterion (e.g., 25 mrem/yr)
- Site-specific exposure scenarios and parameters
- Need to define contamination geometry/volume (i.e., area and thickness)
- Contamination is homogeneous (uniform) with or without a clean cover
- All pathways applicable to the exposure scenario need be included

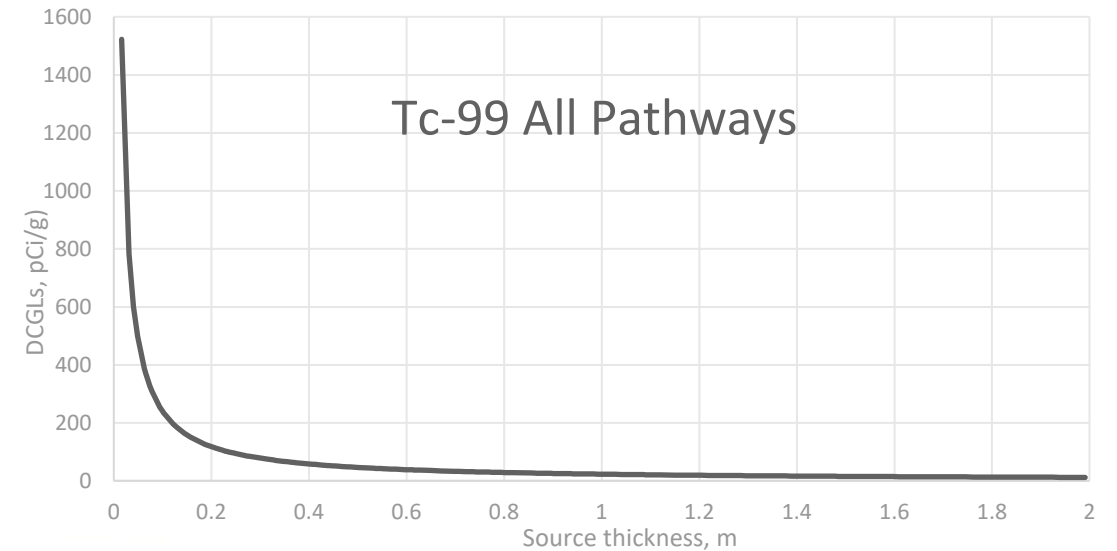
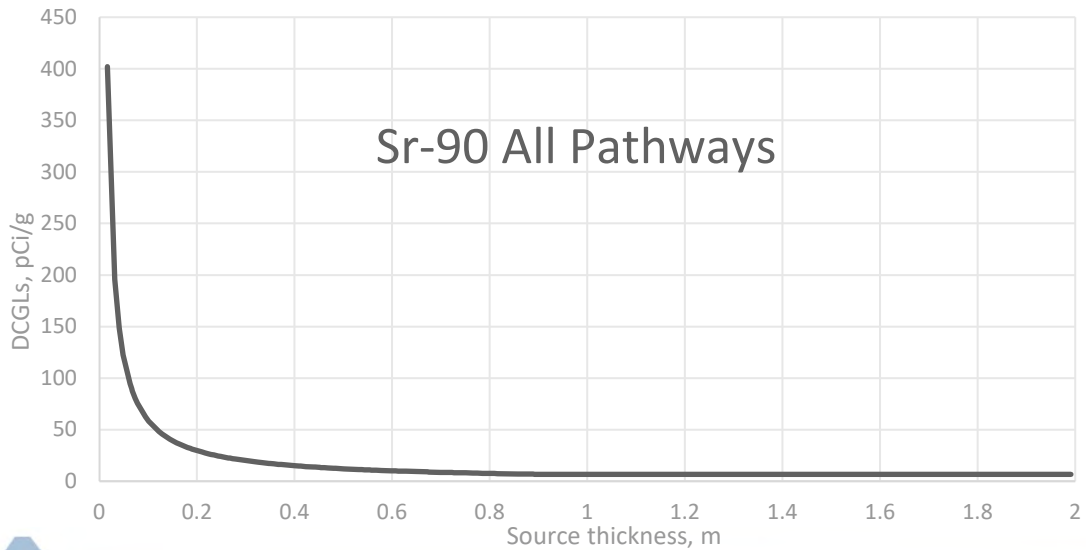
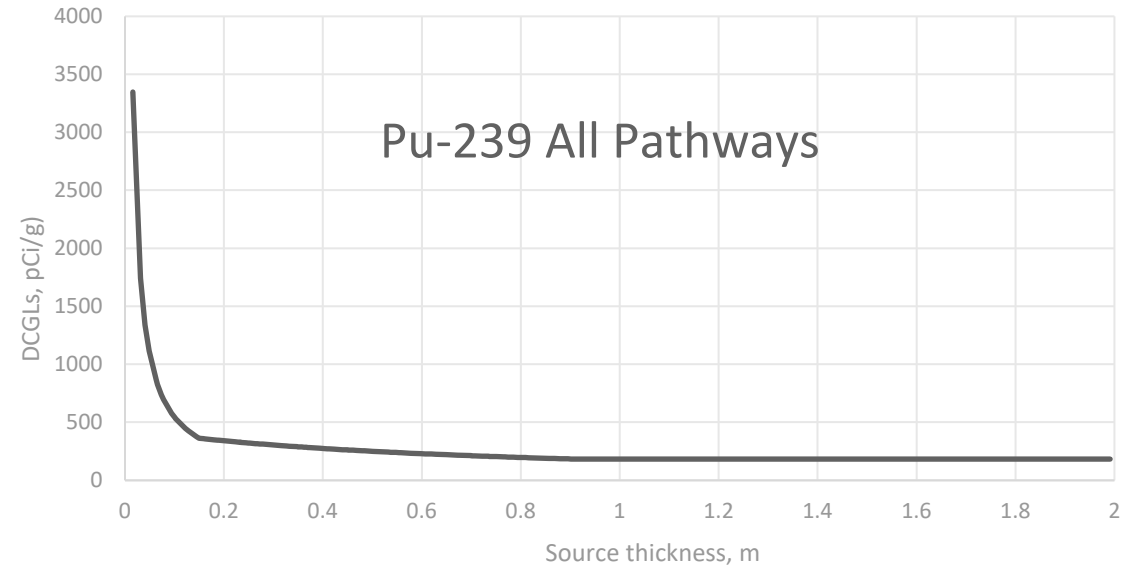
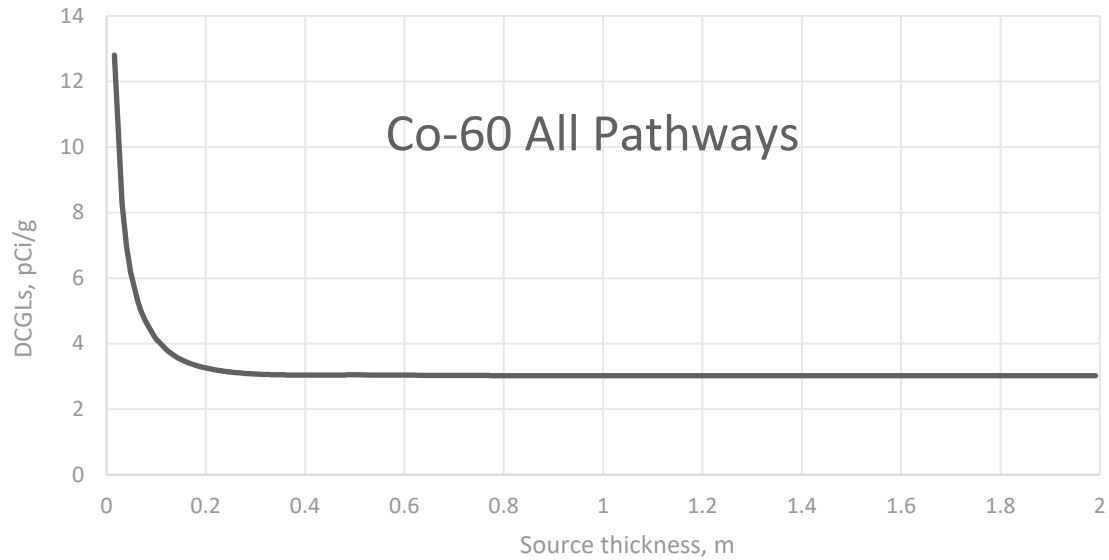
Resident Farmer Scenario



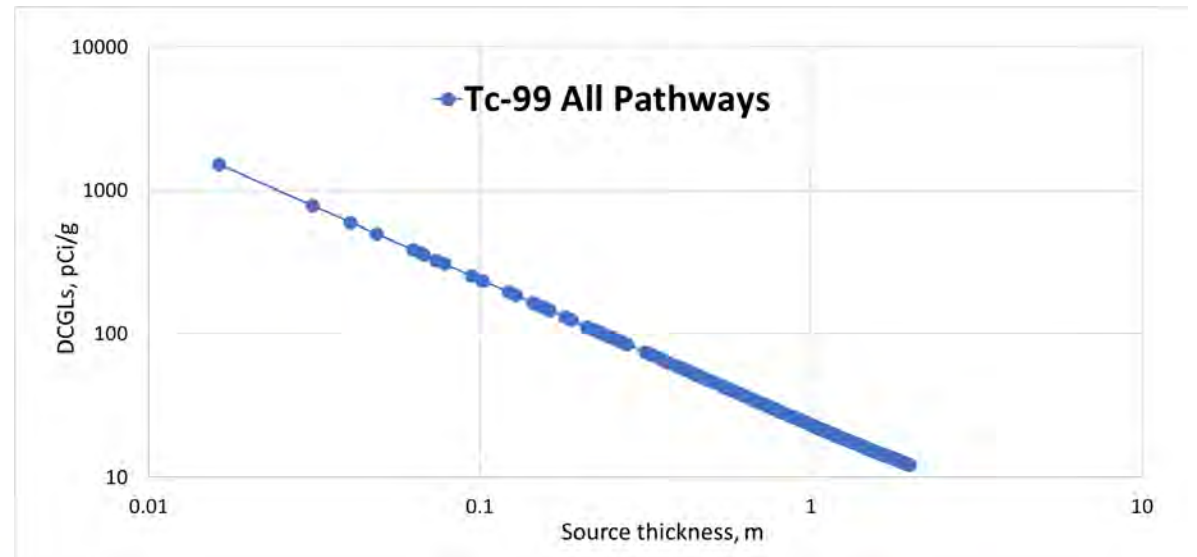
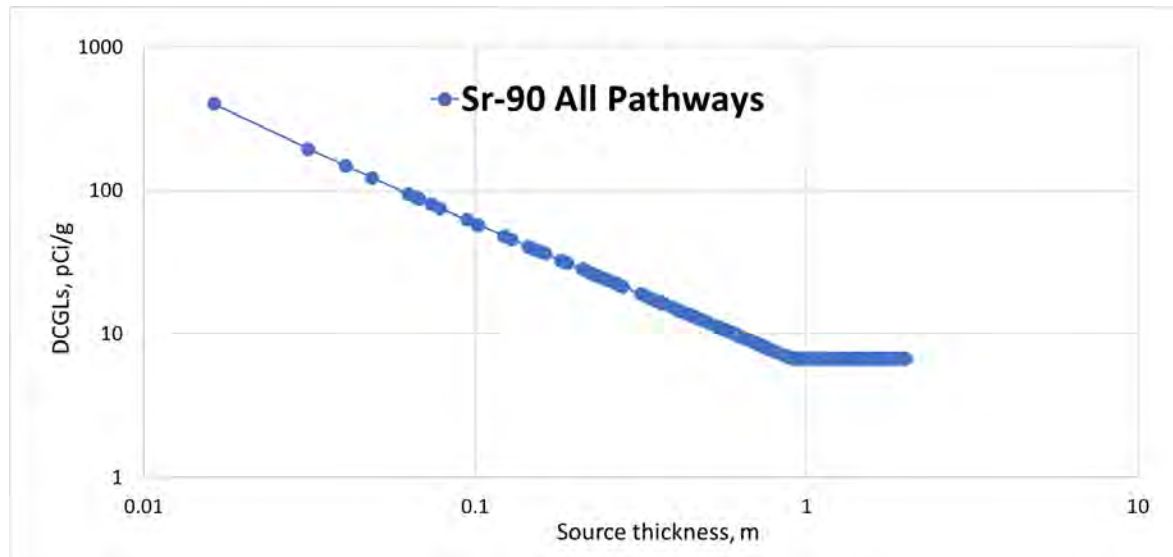
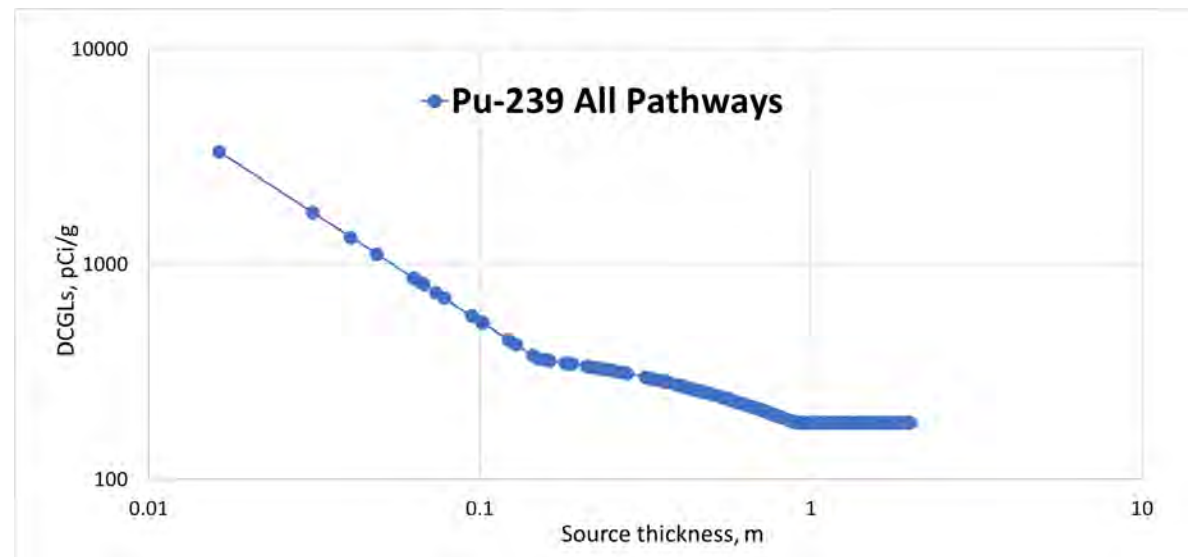
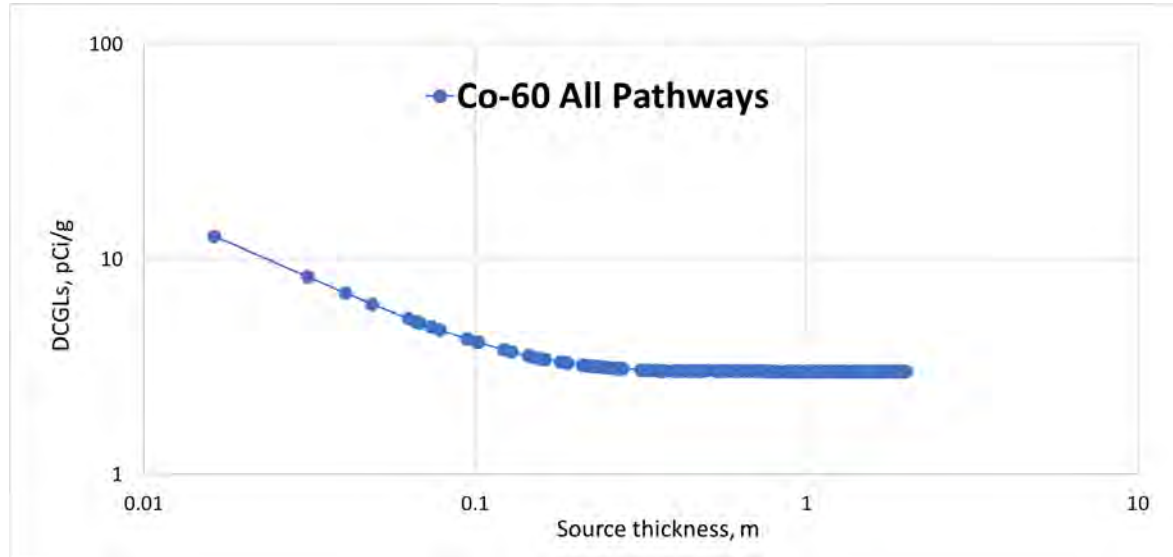
Industrial Use Scenario



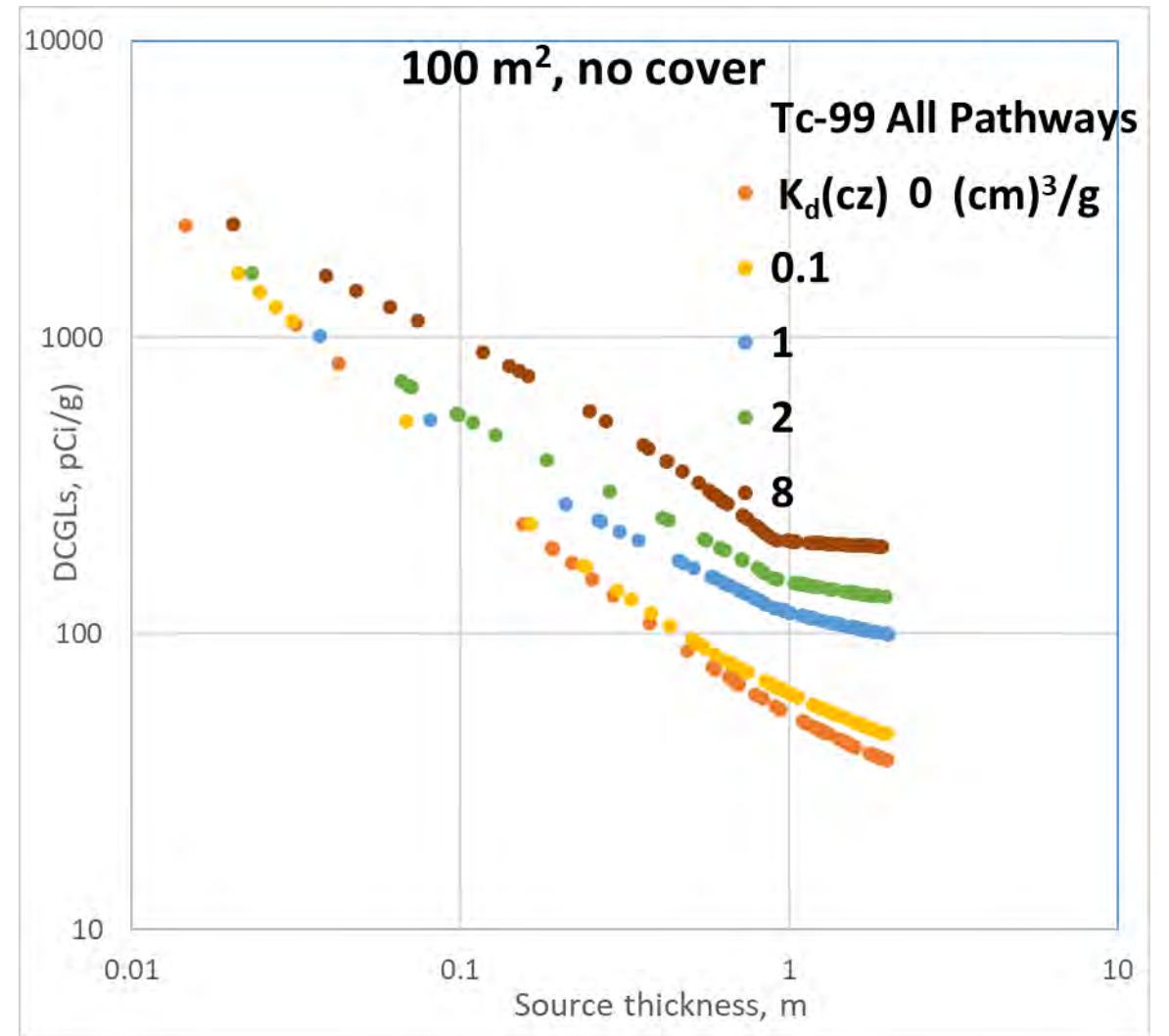
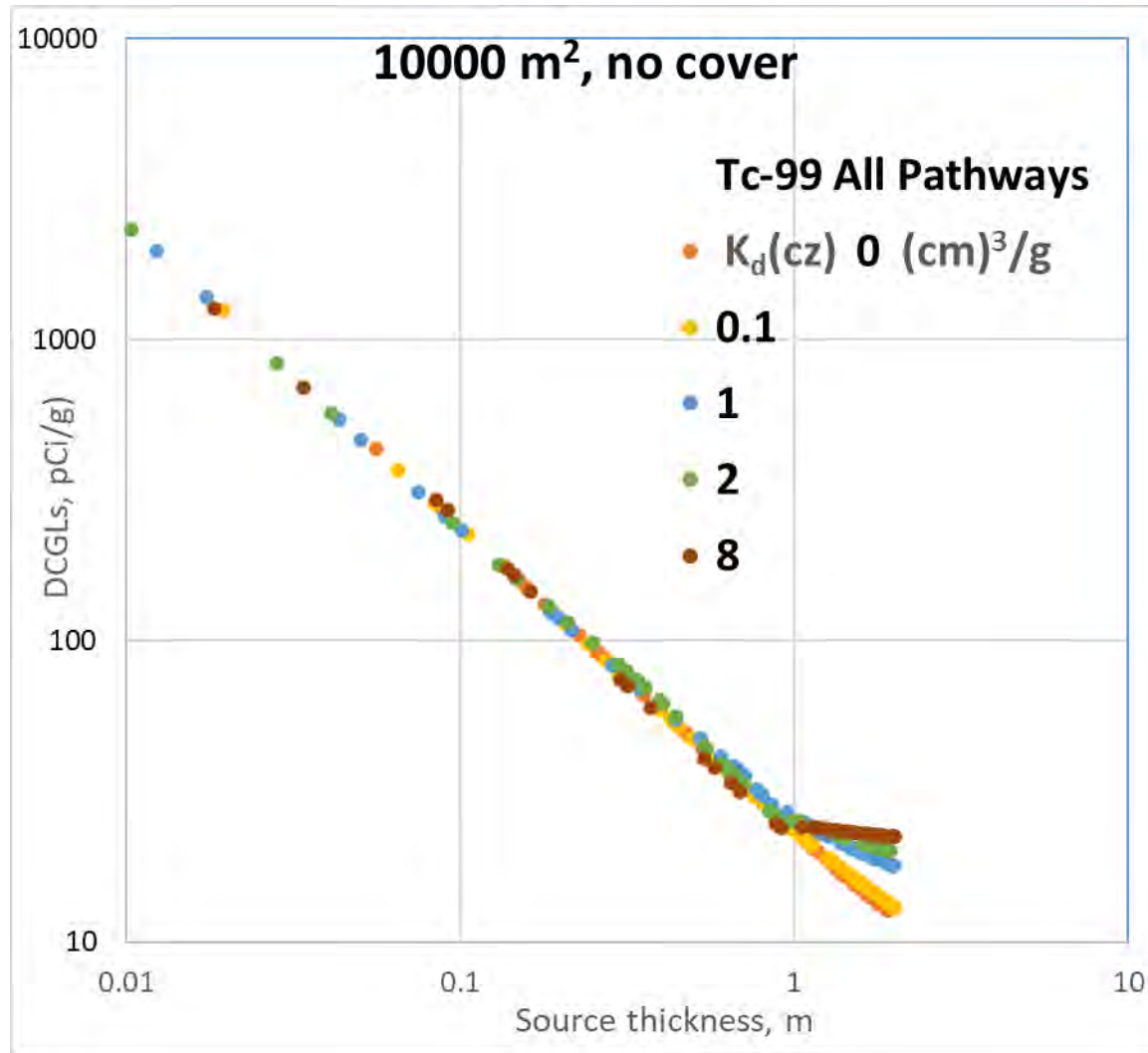
Effect of Source Thickness on DCGLs (Linear-Linear Scale, based on 25 mrem/yr, 10000 m², no cover)



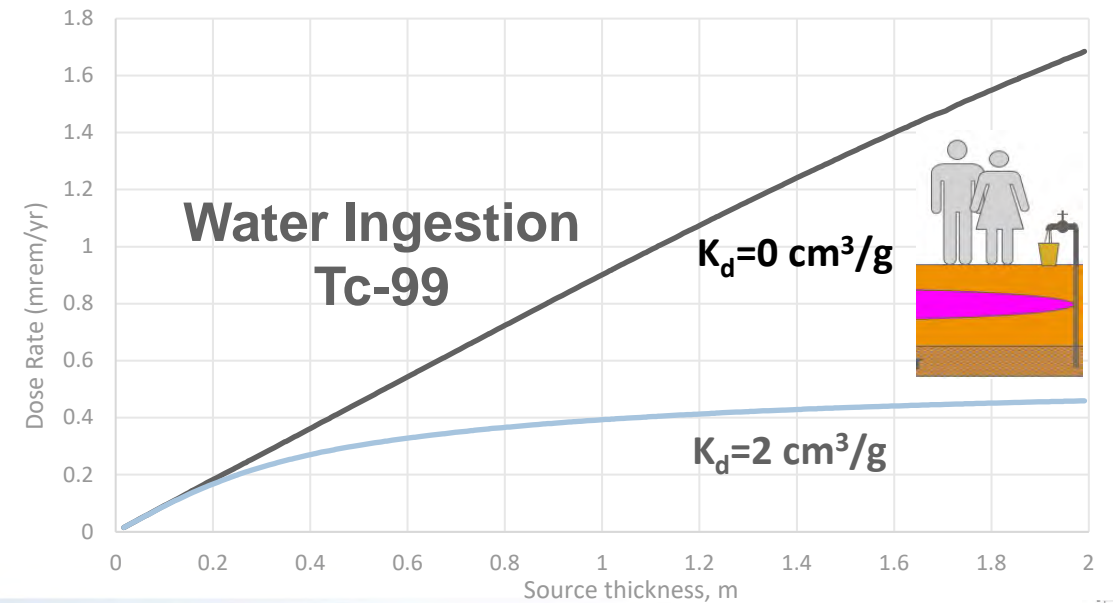
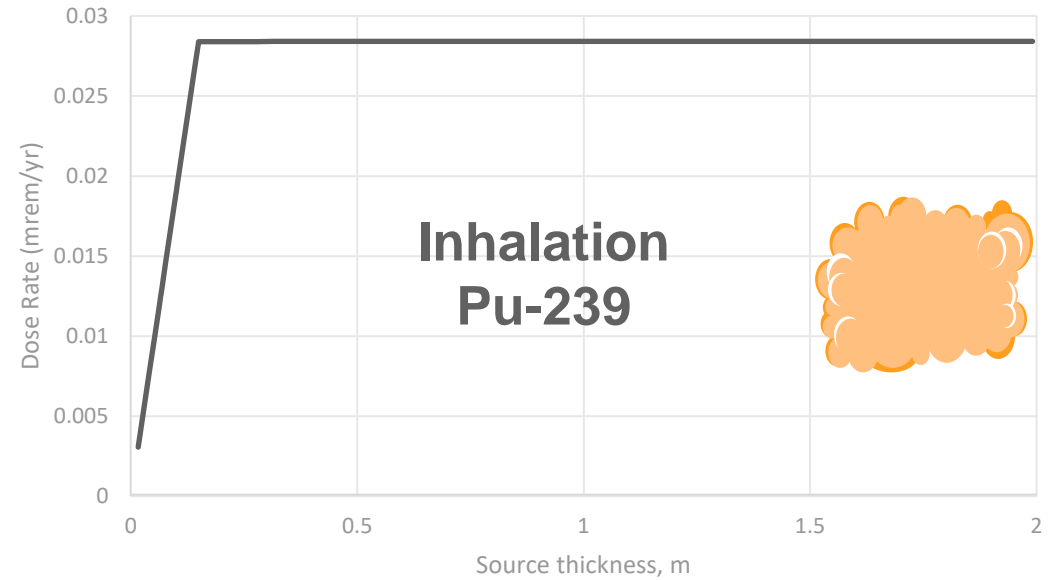
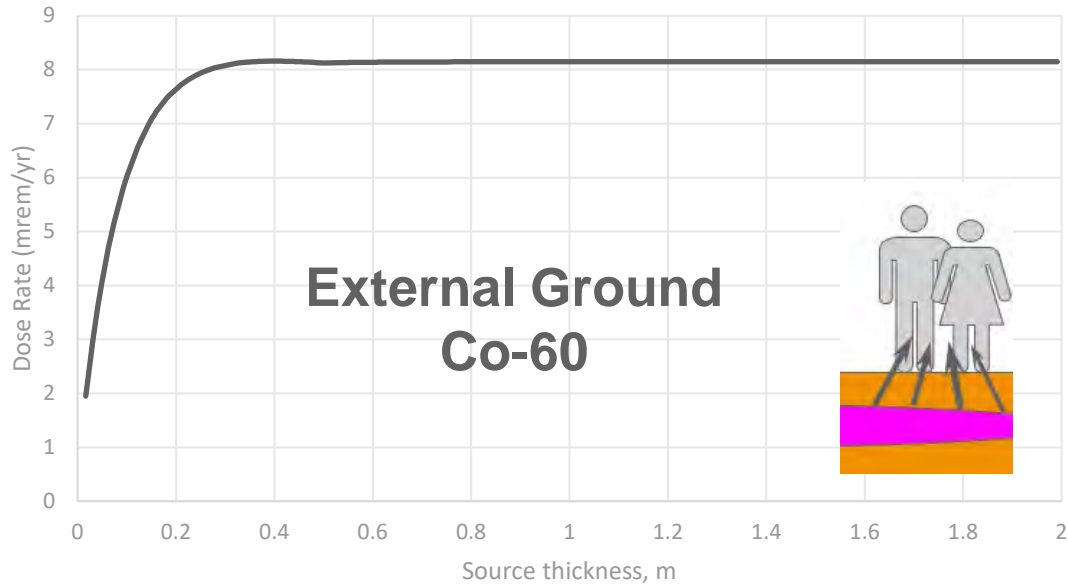
Effect of Source Thickness on DCGLs (Log-Log Scale, based on 25 mrem/yr, 10000 m², no cover)



Effect of Distribution Coefficient on DCGLs (based on 25 mrem/yr)



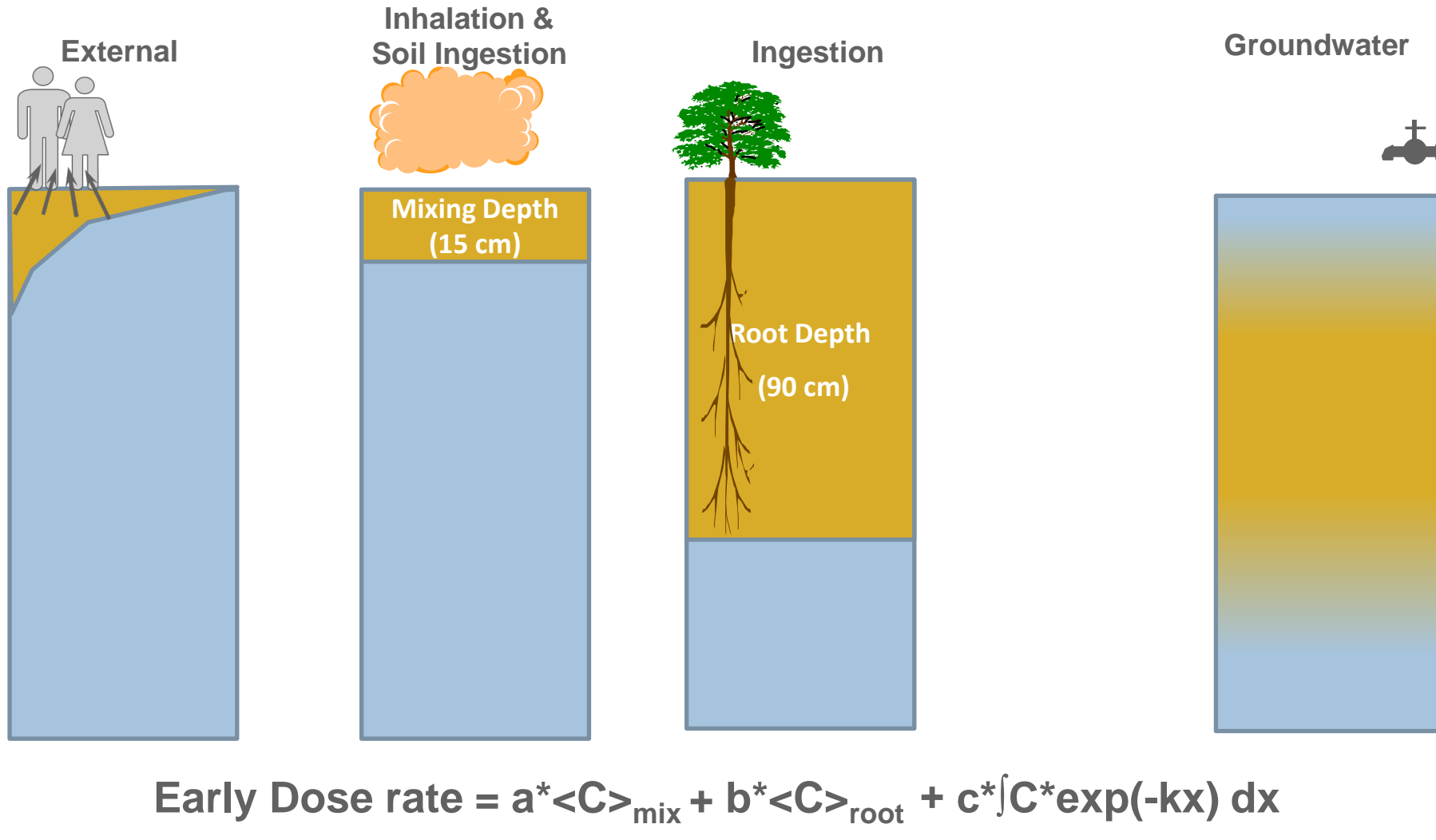
Effect of Source Thickness on Pathway Doses



(with uniform concentration, 10000 m2, no cover)

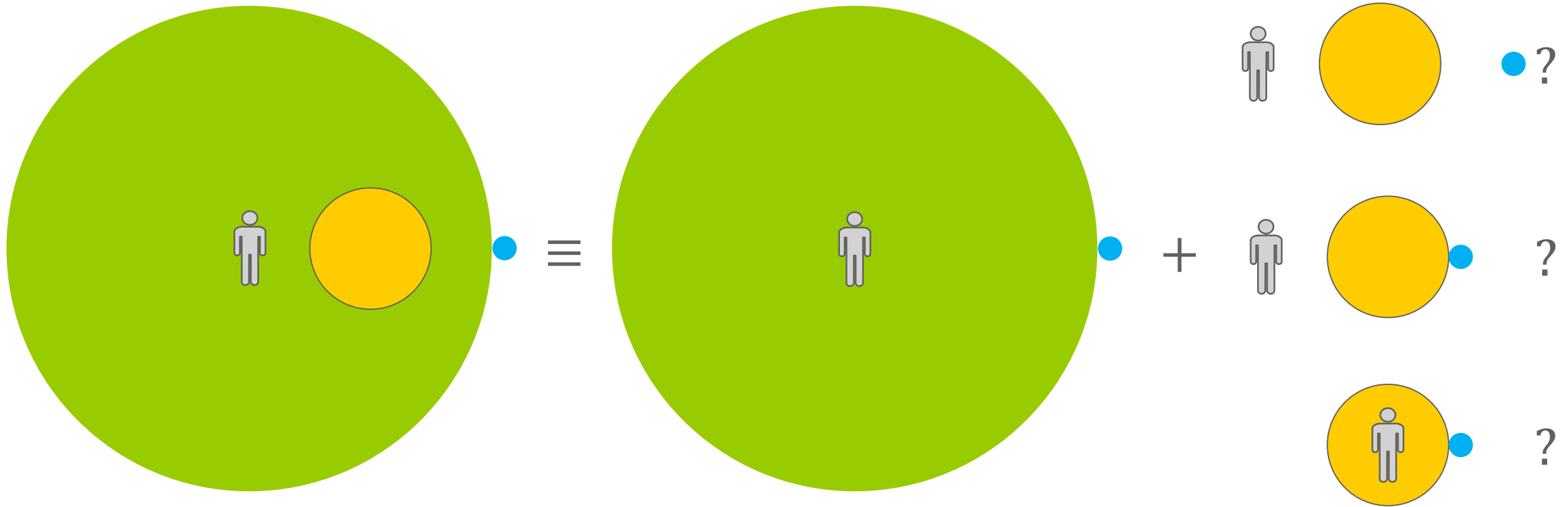
Simplified Depth Dependence of Pathways

Water Independent

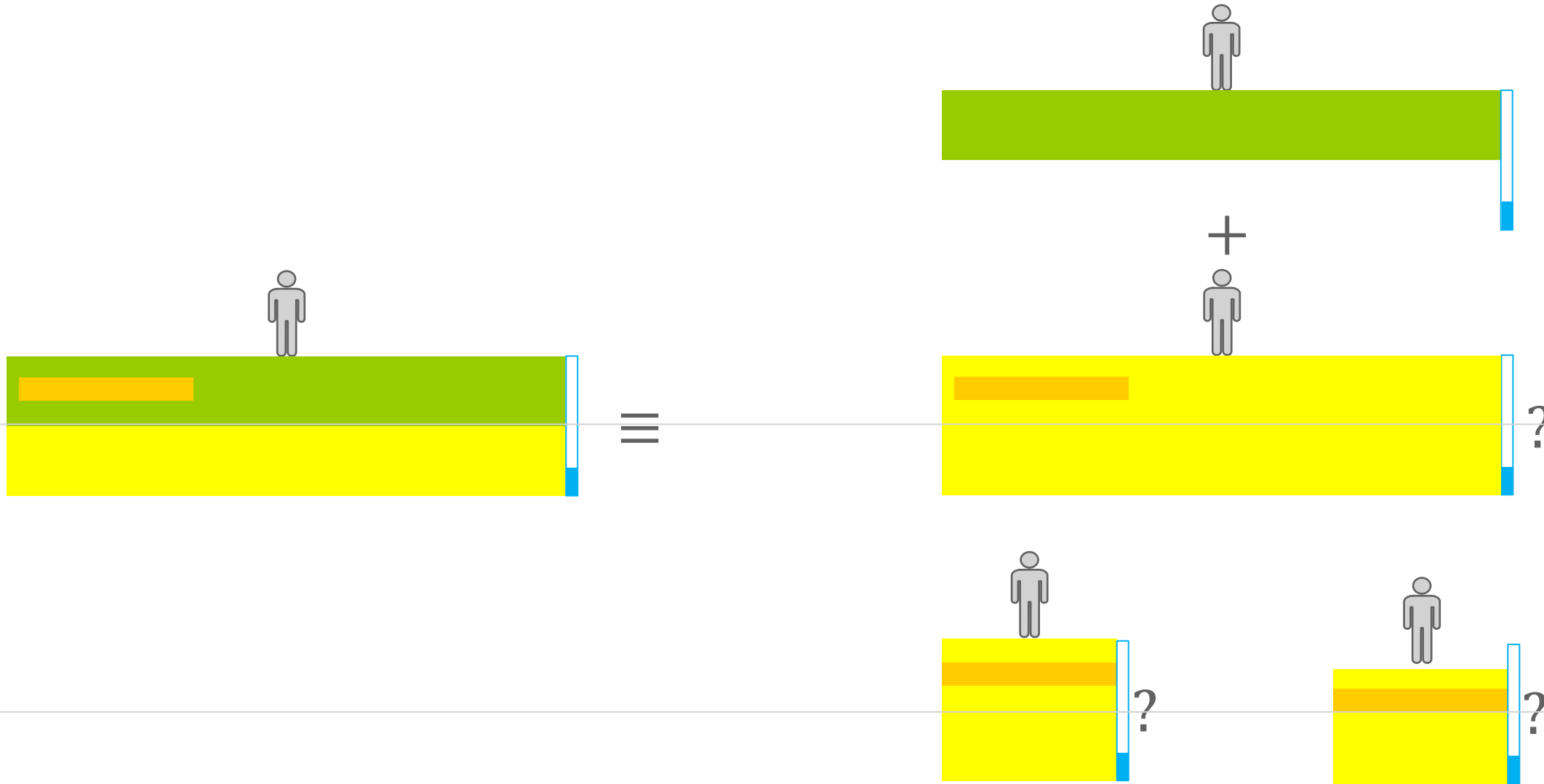


(Also need to consider: decay and ingrowth, cover)

Spatial Characterization - Area Factor Consideration



Spatial Characterization - Depth Factor Consideration



DCGLs with 15 cm Contamination at Different Depths (Cover) as Function of Area

