

Poster Title: Development of Derived Concentration Guideline Levels (DCGLs)

Summary

What are DCGLs and how are they derived?

- Derived Concentration Guideline Levels or (DCGLs) are radionuclide-specific concentration limits used to guide clean-up of a decommissioning site to meet radiological criteria for license termination.
- DCGLs are calculated based on an all-pathways dose assessment and represent a concentration limit that could potentially lead to a peak dose over a 1000 year compliance period at a specified dose limit (e.g., unrestricted release standard of 0.25 mSv/yr or 25 mrem/yr) to the average member of a group of individuals reasonably expected to receive the highest dose.
- When deriving DCGLs, one should consider how residual contamination could move through the environment, and consider how a potential receptor could be exposed through various pathways based on reasonable land use scenarios (e.g., external exposure; ingestion of soil, water, plant, and animal products; and inhalation).
- Realistic scenarios and less likely, but plausible scenarios that consider future land use should be considered.
- DCGLs are only appropriate for the conditions for which they are derived (e.g., depth, area and thickness of contamination). In some cases several DCGLs need to be derived to address different types of contaminated media such as building contamination, surficial contamination, subsurface contamination, contaminated groundwater, sediment, surface water.

What questions were raised during the review?

- Clarification was needed on how the extent of contamination assumed in the DCGL calculations would be verified in the field. Certain assumptions regarding the depth and thickness of contamination were made in deriving DCGLs (i.e., contamination was diluted by a factor of ten in clean surface soils located above the contaminated zone).
- Additional information was needed on how final status survey measurements would be averaged for comparison against DCGLs. For example, an assumption was made that the surface soil contamination was one meter thick; however, if contamination were concentrated at the surface, averaging final status survey measurements over one meter depth intervals may not be appropriate.
- Questions were raised regarding use of surrogate DCGLs for hard-to-detect radionuclides. If the actual mix of radionuclides were known, DOE could attempt to use surrogate DCGLs that implicitly consider the risk of hard to detect radionuclides without direct measurement. It was not clear if DOE would be able to support use of surrogate DCGLs to demonstrate compliance with license termination rule criteria.
- Additional justification was needed to support deterministic parameter values assumed in the dose assessment. DOE elected to use a deterministic parameter set and perform sensitivity analyses to study the uncertainty in dose predictions. NRC requested additional information to demonstrate that the parameter set selected tended to overestimate rather than underestimate the potential risk to a receptor.
- Additional information was needed to support the assumption that a cistern drilling scenario was most limiting compared to other potential exposure scenarios such as exposure to eroding waste units, natural gas drilling, and downgradient, cumulative impacts through the groundwater pathway.