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Overview of NRC's Dose Modeling Expectations

Cynthia Barr, Andrea Kock,
Chad Glenn, Rebecca Tadesse, Keith McConnell

US Nuclear Regulatory Commission

DOE and NRC Scoping Meeting on
West Valley Demonstration Project, Phase 1
Decommissioning Plan Dose Modeling Approach
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Overview

- Phased decommissioning approach
- Assumptions
- General considerations for DCGL development
- Model abstractions
- Erosion considerations
- Consideration of uncertainty
- Conclusions

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Phased Approach

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General Assumptions

- DOE will take a phased approach to decommissioning
- During Phase 1, process building and lagoons will be removed and back-filled
- Phase 1 source areas cleaned to unrestricted release levels
  - No actual release of land will occur
- All decommissioning options will be preserved
- Additional data collected and analyses conducted to support Phase 2 decisions

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DCGL Development for DP

- Derived Concentration Guideline Level or DCGL
- NRC is reviewing DOE's development of DCGLs or radionuclide-specific concentrations in media below which DOE is expected to be in compliance with release criteria
- DOE is cleaning Phase 1 sources to unrestricted release levels (i.e., 25 mrem/yr dose standard)

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General Considerations for Phase 1 DCGL development

- Consider reasonably foreseeable land use and develop appropriate exposure scenarios
- Provide justification for scenarios selected
- Evaluate less likely, but plausible scenarios
- Consider site-specific features, events, and processes

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General Considerations (cont)

- Collect and analyze data
- Develop site conceptual model
- Select computer code appropriate for the site conceptual model
- Discuss characterization efforts and iterative approach to data collection and modeling

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General Considerations (cont)

- Demonstrate understanding of how source areas can overlap in space and time

  Note: DOE can demonstrate that the residual risk associated with Phase 1 sources is very low compared to unrestricted release criteria to lessen burden of evaluating cumulative impacts from both Phase 1 and 2 sources

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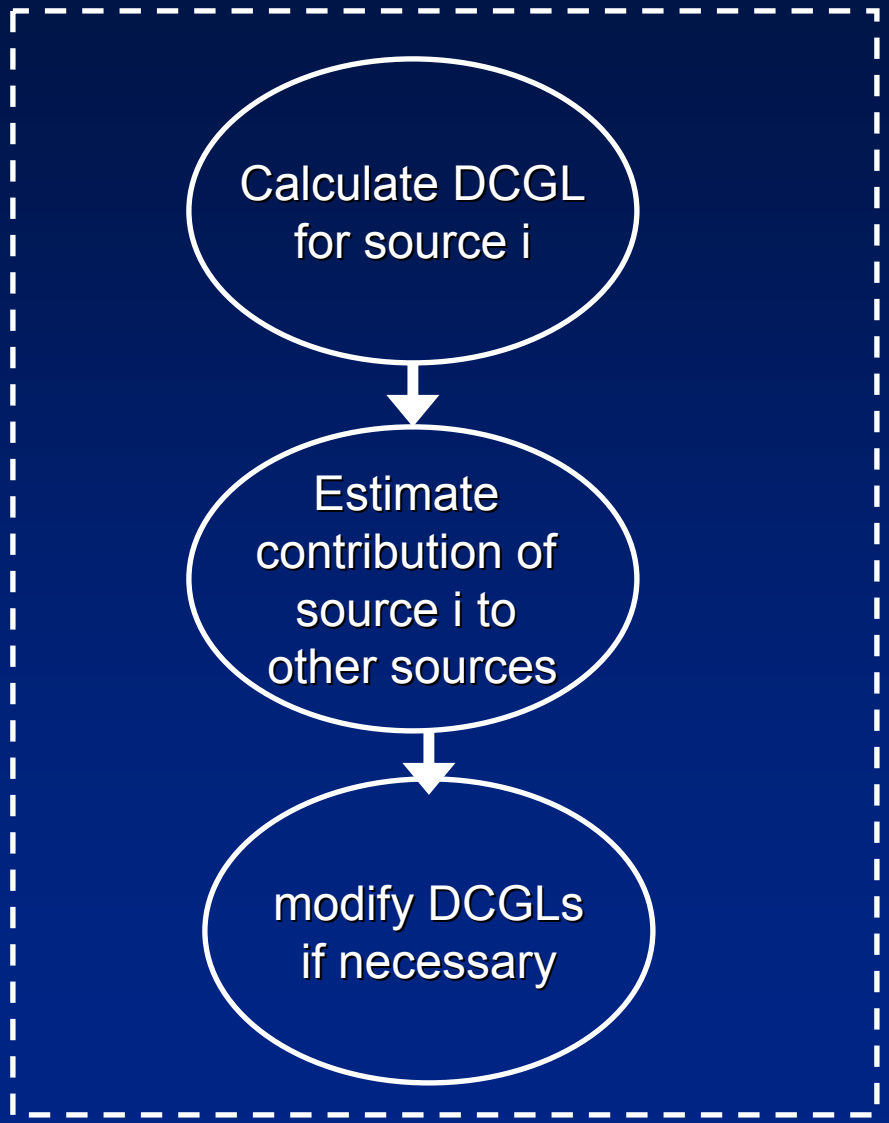
Suggested Approach



Note: To help ensure that additional remediation of Phase 1 sources will not be needed at the end of Phase 2* if for example, unrestricted release of the site is pursued, DOE can show that Phase 2 sources do not overlap with Phase 1 sources or that Phase 1 residual risk is a small fraction of the unrestricted dose limits.

risk phase 1 sources << 25 mrem/yr

*DOE cannot totally preclude the potential need for additional clean-up of Phase 1 sources. For example, recontamination of Phase 1 source areas may occur or additional information may be collected during the ongoing assessment period that shows the residual risk is higher than expected.

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Use of monitoring data and calibrated model results

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Erosion Considerations

NRC expects DOE to consider erosion for Phase 1 sources for the entire compliance period

Assumptions and additional expectations:

- No actual release of land will occur during Phase 1; offsite erosion impacts are expected to be significantly lower than onsite impacts
- Source areas are expected to be almost completely removed with little residual radioactivity remaining at depth
- NRC expects that DOE will collect additional data and conduct additional analyses during the ongoing assessment period to refine erosion predictions to support Phase 2
- NRC expects DOE to provide information on erosion controls to ensure public health and safety is protected during Phase 1 decommissioning activities including the ongoing assessment period

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Uncertainty

- Evaluate sensitivity of model results to various parameters and conceptual models
- Manage uncertainty with conservative assumptions per guidance in NUREG-1757, Volume 2 or
- Conduct probabilistic analysis

Note: Identify sensitivity of model results to both *timing* and magnitude of peak dose

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Conclusions

- Adequate characterization is needed to develop site conceptual model
- Appropriate exposure scenarios should be developed and evaluated
- Consideration of cumulative impacts of multiple source areas should be considered
- Model abstractions will be reviewed carefully
- Uncertainties should be evaluated and appropriately managed