



## **NRC's Review Process and Expectations for Dose Assessments**

September 3, 2008



## **NRC Dose Criteria**

- The NRC dose criteria for the Plum Brook is 25 mrem/year and ALARA
- This dose criteria was also used for the review of the decommissioning plan for onsite contamination

## **NRC Review of Dose Modeling**

- NRC staff review consists of 4 general areas:
  - source term assumptions
  - the exposure scenario
  - the mathematical model used
  - the parameter values and a measure of their uncertainty
- Review against guidance in NUREG-1757 (Chapter 5 and Appendix I in Vol. 2, Rev. 1)

3

## **Methods for Demonstrating Compliance with Dose Criteria**

- Two approaches exist to provide reasonable assurance that the final concentrations should meet the requirements of 10 CFR 20 Subpart E:
  - The licensee can perform a dose assessment using the final concentrations of residual radioactivity

or

  - The licensee can derive and commit to meeting nuclide specific concentration limits (DCGLs) equivalent to the dose limit of 25 mrem/year and ALARA

4

## Source Term Abstraction

- The development of the source term should consider:
  - the radionuclides of concern
  - the physical and chemical forms of the contaminated media
  - the spatial extent of the residual radioactivity
  - the distribution of residual radioactivity (configuration of elevated areas)
  - if any source of residual radioactivity in groundwater or surface water exists
- Spatial variability must be considered in the development of a source term in the dose assessment approach
- Uncertainty in the source term should be considered

5

## Source Term Abstraction (cont.)

- The configuration used for the source term needs to be well supported by characterization data
- The source term should reflect any heterogeneity in characterization data and the presence of areas of elevated contamination
- The quality of the characterization data is important in the dose assessment approach because this approach does not involve a Final Status Survey

6

## **Selection of Scenarios and Receptors**

- The critical group is defined as “the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances” in 10 CFR 20.1003
- The compliance scenario may be based on a conservative bounding scenario or be based on the reasonably foreseeable land uses
- The use of a more realistic scenario requires justification that the critical group selected is the group reasonably expected to receive the greatest exposure
- If elevated contamination areas exist, special scenarios may be needed to address exposure to these areas
- Scenarios that are less likely but still plausible should also be evaluated to risk inform the decision

7

## **Exposure Pathways**

- Exposure pathways through which the receptor is exposed to the residual radiation should be identified
- Exposure pathways can be eliminated by projected land use as well as site conditions
- Justification is required for eliminated pathways

8

## **Parameter Value Selection and Uncertainty Analyses**

- A justification should be provided for the parameter values selected
- A discussion on the level of uncertainty in results should be provided
- The uncertainty analysis should focus on those parameters affecting most significant scenario and pathway

## **Summary**

- The development of the source term should consider variability and uncertainty in the concentration of radionuclides
- The dose assessment scenario should include the group of individuals reasonably expected to receive the greatest exposure
- Justification is needed for the scenario selected, the exposure pathways included, and the parameter values used