Summary Notes from 3 October 2007 Generic Technical Issue Discussion on Concentration Averaging

Attendees: Representatives from Department of Energy-Headquarters (DOE-HQ) and the U.S. Nuclear Regulatory Commission (NRC) met at the DOE offices in Germantown, Maryland on 3 October 2007. Representatives from Department of Energy-Savannah River (DOE-SR) and the South Carolina Department of Health and Environmental Control (SCDHEC) participated in the meeting via a teleconference link.

Discussion: DOE believes that based on the position papers provided prior to the meeting, DOE and NRC staff have many areas of agreement and no significant areas of disagreement with respect to the concentration averaging requirements articulated in the respective DOE and NRC requirements. The NRC position paper was based on NUREG-1854 and the DOE position paper was based on DOE Order 435.1 and its associated technical basis and guidance documents.

Topics: The following five specific topical areas were discussed during the meeting:

1. NUREG-1854 Category 3 site-specific averaging
2. NUREG-1854 Appendix B, calculations to develop benchmark averaging expressions
3. Distribution of residual contamination
4. Inadvertent intruders – estimating release and exposure rates
5. Conservative assumptions

Summary: The following summarizes the discussion and the principal points of technical understanding identified during the meeting, unless otherwise noted.

NUREG-1854 Category 3 Site-Specific Averaging

- DOE stated its agreement with the general approach in NUREG-1854 regarding concentration averaging, in particular the site-specific averaging provisions in Category 3.
- NRC staff noted that category 3 is not open-ended. It does allow flexibility

but there are limits to what can be disposed in the near surface.

- NRC staff stated that the benchmark averaging expressions in Section 3.5 will be used by NRC staff as a review tool. DOE need not use this approach in presenting its analyses.
- DOE and NRC staff agreed that the process described in NUREG-1854 acknowledges differences in scenarios and allows consideration of site-specific conditions.
- NRC staff noted that the guidance provides four separate intruder scenarios, based on the depth to waste and the presence or absence of a robust intruder barrier, that NRC staff believes are appropriate for concentration averaging and waste classification. More optimistic scenarios would require greater justification.

NUREG-1854 Appendix B, Calculations to Develop Benchmark Averaging Expressions

- NRC staff noted that DOE need not follow the same process as NRC staff in developing calculations.
- NRC staff provided explanation of how Appendix B was developed.
- DOE and NRC staff agreed that DOE should provide adequate documentation and basis for parameter assumptions, approaches and scenarios.
- NRC staff noted that in preparing Appendix B a probabilistic approach was used in order to incorporate uncertainty and variability in model input parameters. The input parameters used were selected to represent ranges in national values, not site-specific values. The peak of the mean result from the most limiting radionuclide was used to develop the constant in the example benchmark averaging expressions. Both acute and chronic scenarios were evaluated. In general, the chronic scenarios were more limiting.

Distribution of residual contamination

- DOE and NRC staff acknowledged that the distribution of waste may not be uniform, which may lead to the need for different parts of the system to be analyzed separately for classification purposes. For example contamination

on the bottom of a tank may require different analyses than residual contamination on the wall of a tank.

- DOE and NRC staff agreed that DOE should consider the location of potential intrusion events and scenarios to account for differences in distribution of residual contamination.
- NRC staff noted that for residual waste on the bottom of a tank, differences in thickness and distribution should be addressed.
- NRC staff noted that for residual waste on the wall of a tank, it would be appropriate to convert the waste to an equivalent thickness that would be intersected by a drilling event.

Inadvertent Intruders – Estimating release and exposure rates

- DOE and NRC staff agreed that if a Category 3 approach is used, DOE should base the waste classification on the limiting intruder scenario.
- DOE and NRC staff agreed that in applying the Category 3 approach, DOE should look at a variety of scenarios to confirm that the limiting scenario has been identified.

Conservative Assumptions

- DOE and NRC staff agreed that DOE should provide the rationale for its assumptions, particularly for deterministic analyses.
- NRC staff noted that either a deterministic or probabilistic approach could be used for concentration averaging.
- DOE and NRC staff agreed that DOE should recognize the site-specific nature of parameters when making assumptions.
- DOE noted that it is planning to use a probabilistic approach to modeling the F-Area Tank Farm at the Savannah River Site.

Conclusions and Actions:

No additional conclusions or actions were identified.