



U.S. DEPARTMENT OF **ENERGY**

Savannah River Site Saltstone Disposal Facility Performance Assessment

NRC's Saltstone Monitoring and Technical Evaluation Report

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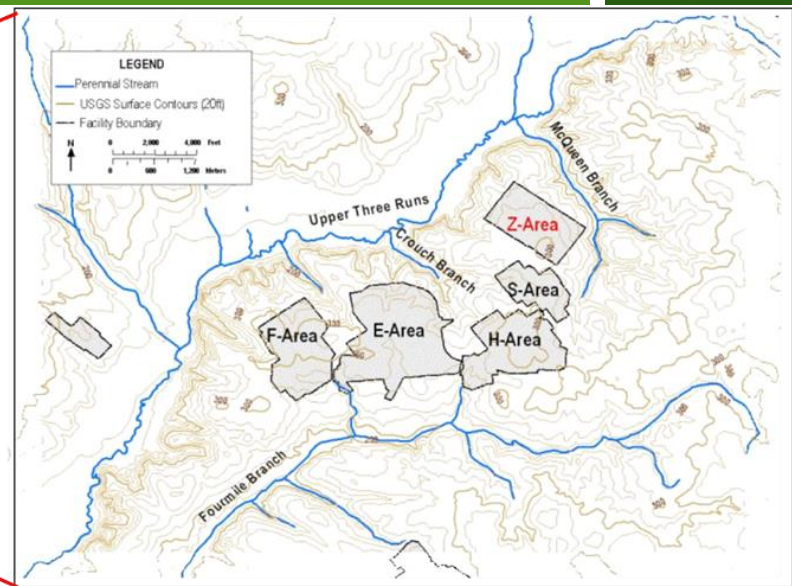
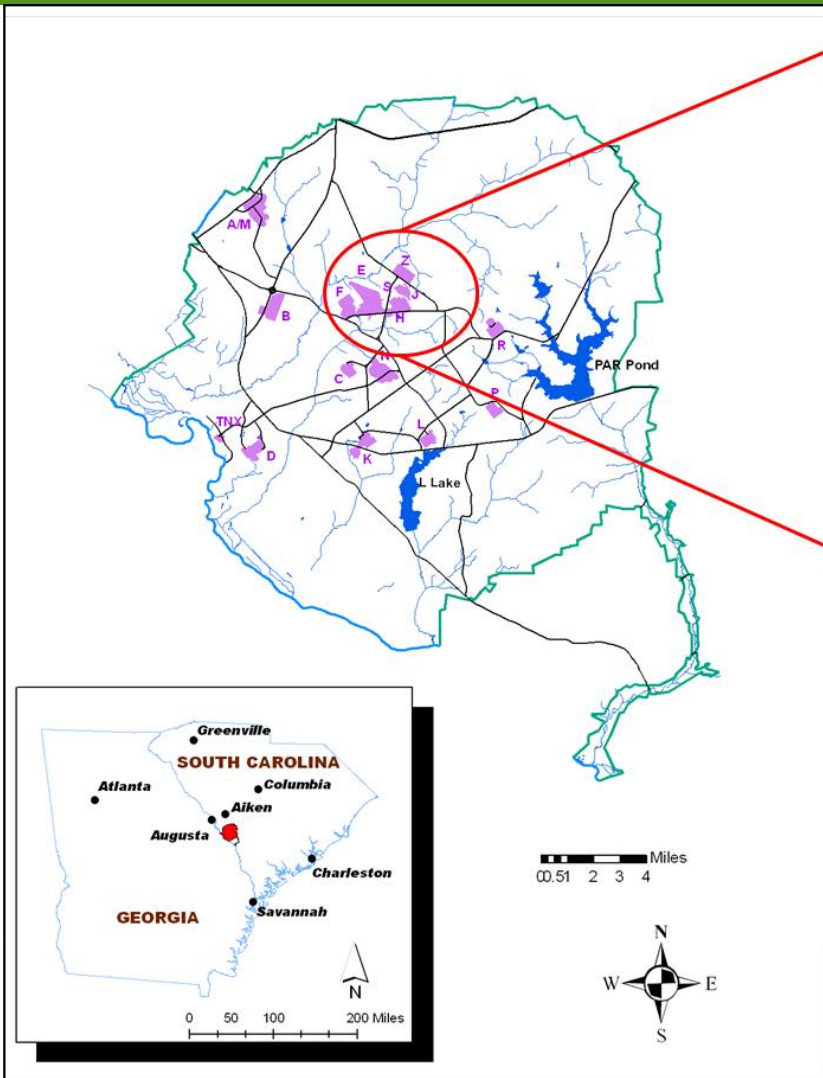


EM *Environmental Management*

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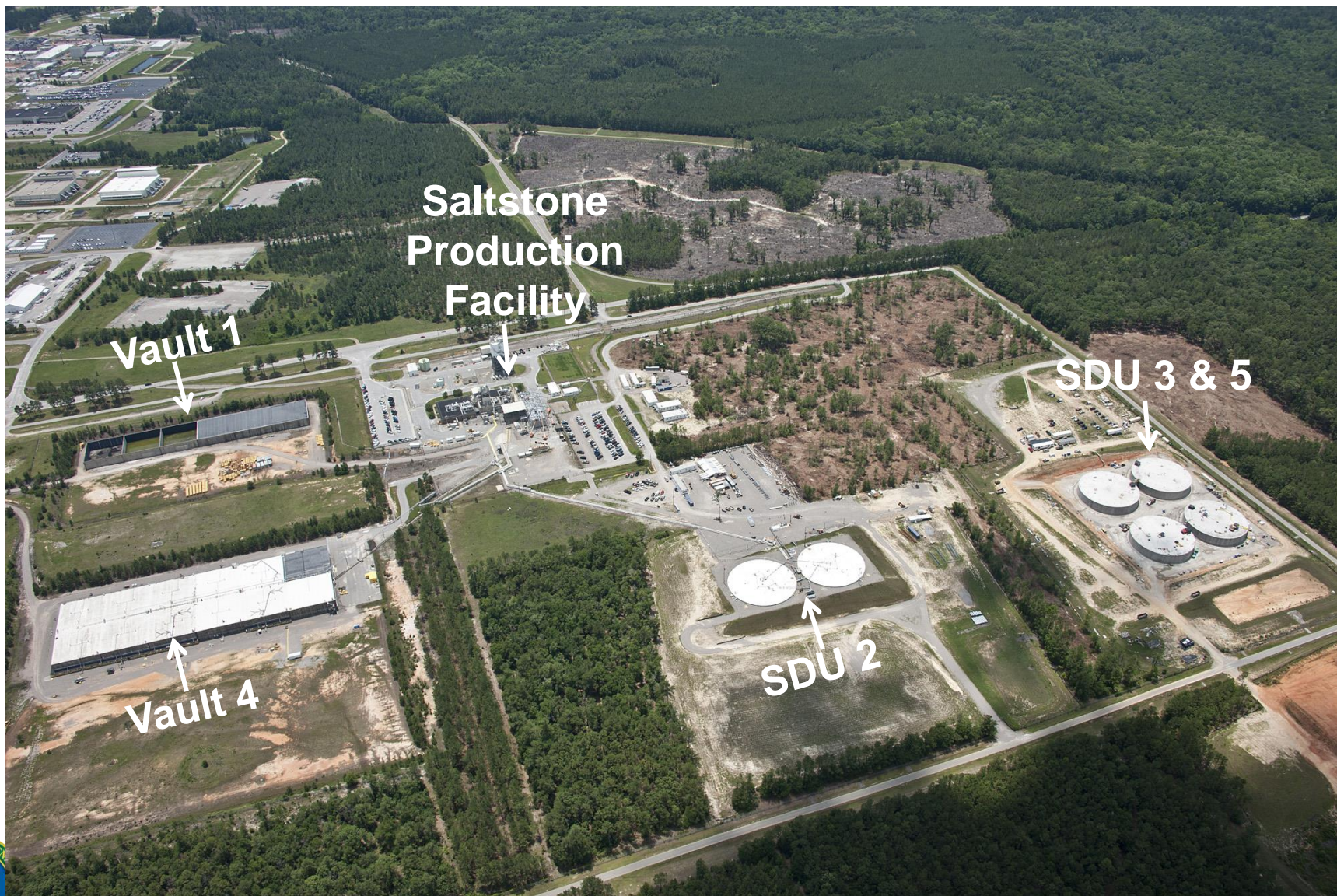
Location of the SDF



- The SDF is located in Z-Area within the “General Separations Area.”
- SDF sits approximately six miles from the closest SRS site boundary and approximately ten miles from the Savannah River.
- The reported peak annual doses are at 100 meters from SDF.



Saltstone Disposal Facility



Robust Disposal Unit Design



New Disposal Unit Design Features:

- Cylindrical 150' diameter, 24' high
- 2.9 million gallon grout capacity
- High quality Class III sulfate resistant concrete
- Minimum 8" walls, 12" floor, 8" roof
- Interior epoxy coating
- Interior drain water collection system
- Significant design improvement over the existing rectangular disposal units
- Hydrotesting of disposal cells

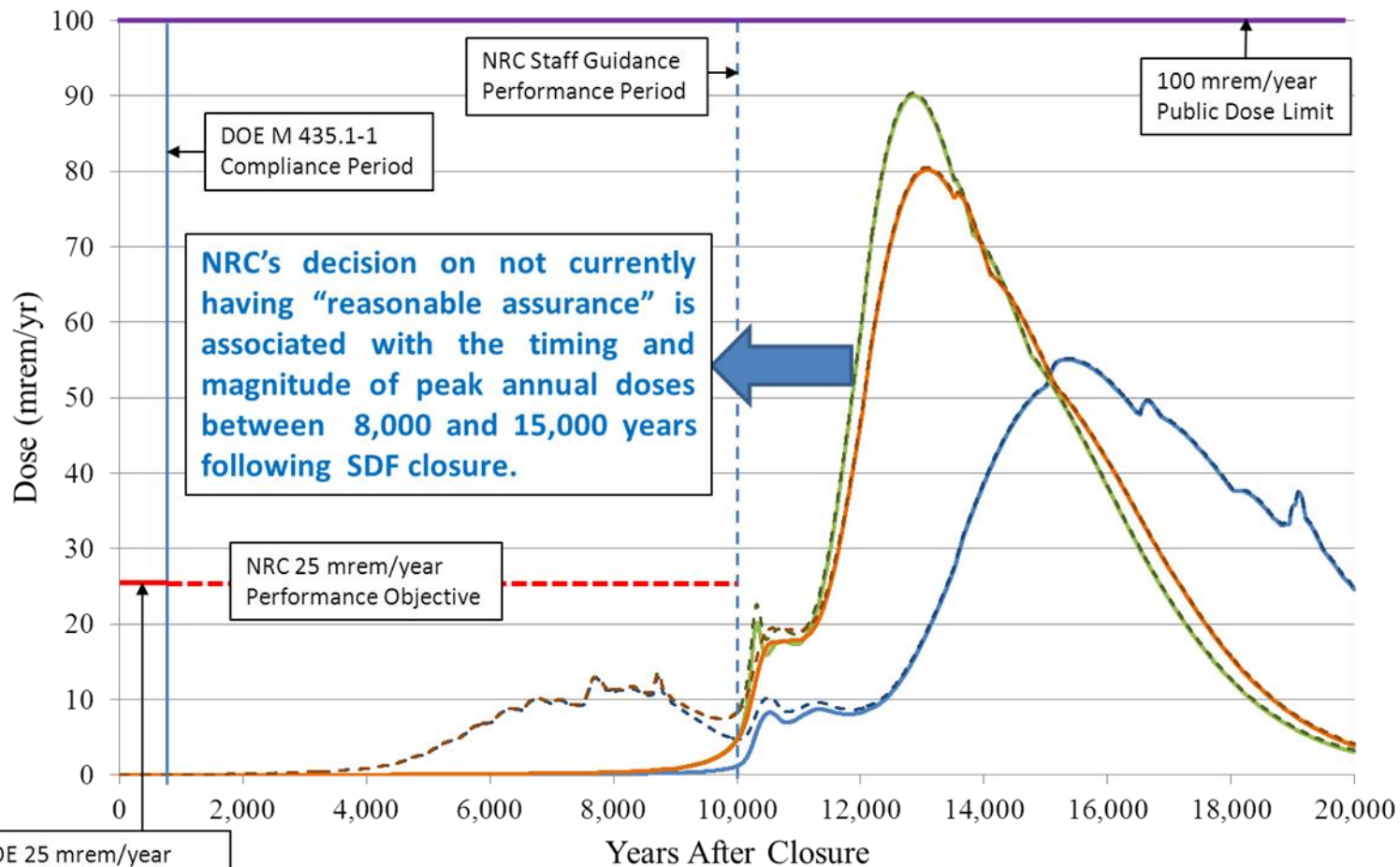


2009 SDF PA Development

- Development of the “new” PA began in earnest in 2007
 - Built upon Scoping Meetings held on F-Tank Farm PA with SCDHEC, NRC and EPA
- Used extensive new material testing data and enhanced computer modeling - both deterministic and probabilistic
- Provided to DOE Low-Level Waste Disposal Facility Federal Review Group (LFRG) in 6/2009
- LFRG recommended release for public review in 10/2009 following implementation of their key recommendations
- Formally issued to SCDHEC and NRC on 11/23/2009



NRC TER on the SDF PA



DOE 25 mrem/year
Performance Objective

- Tc-99, Case K, $K_d = 1000$ to 10 mL/g
- Tc-99, Case K1, $K_d = 500$ to 0.8 mL/g
- Tc-99, Case K2, $K_d = 500$ to 10 mL/g
- - - Total, Case K, $K_d = 1000$ to 10 mL/g
- - - Total, Case K1, $K_d = 500$ to 0.8 mL/g
- - - Total, Case K2, $K_d = 500$ to 10 mL/g

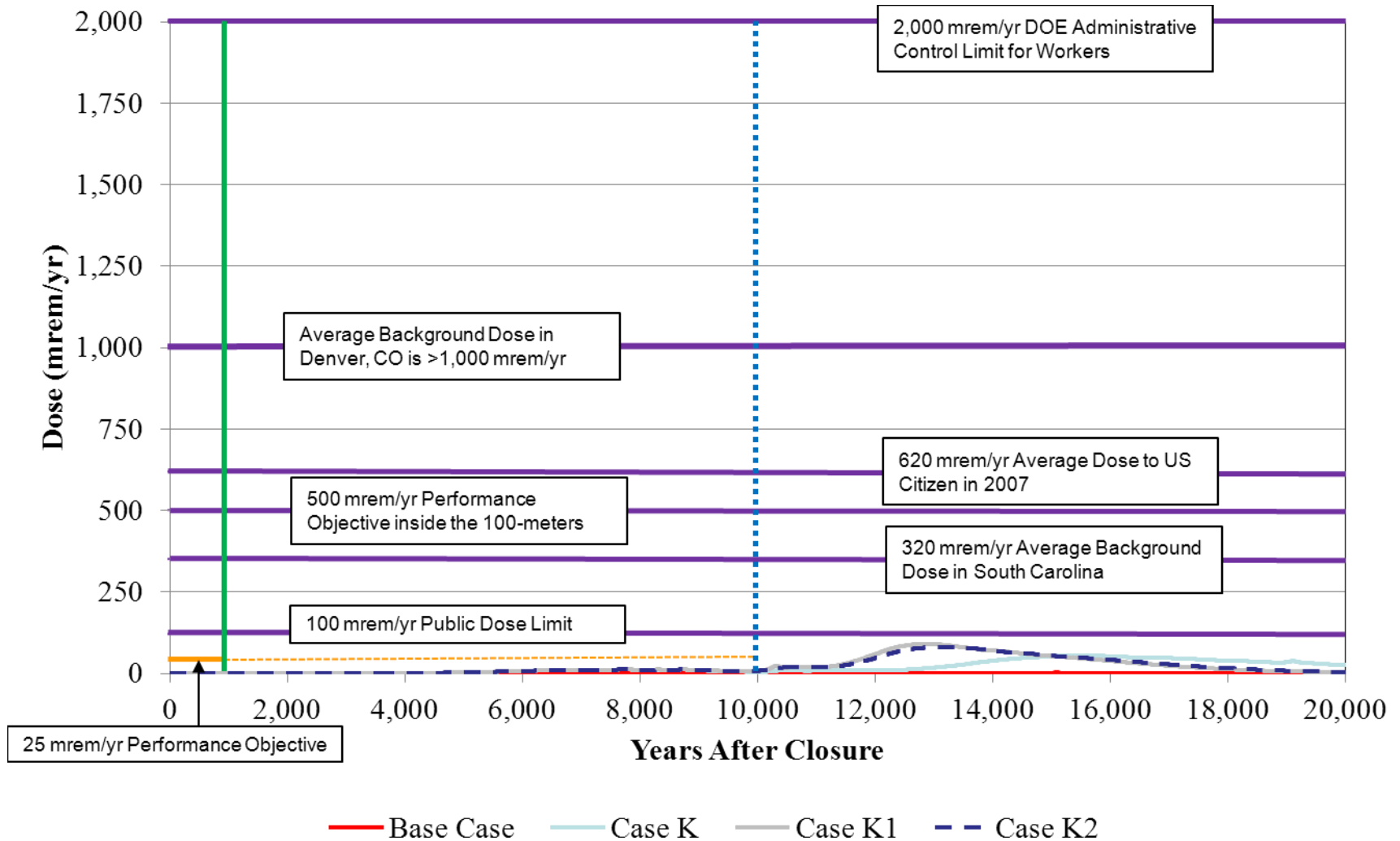


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Putting Issue Into Perspective



Key Points

- NRC's review confirmed that DOE will meet its DOE Manual 435.1-1 performance objective for the member of the public during the DOE 1,000-year compliance period
 - Identified the peak dose could occur within 10,000 years following closure of SDF
 - Seeking reduction in uncertainty of the projections 8,000 to 15,000 years into the distant future
 - Acknowledged that distant future risk is low - peak annual doses are <100 mrem



DOE Decision Making Process

- Due to the large uncertainties in projecting doses 100's to 1,000's of years into the future, DOE considers a myriad of cases and scenarios in reaching a determination of “reasonable expectation” that a performance objective will be met
- DOE further considers the risks to current workers and members of the public from delaying activities
- DOE also recognizes that, if new information is discovered, design changes or remedial actions can be taken to ensure performance objectives are met



DOE PA Maintenance Process

- All DOE PAs are required to have maintenance plans, reviewed annually, to address uncertainties or gaps in existing data
- The 2012 SDF PA Plan consists, in part, of the following activities:
 - Technetium K_d sorption testing and column testing
 - Property testing of saltstone produced under varying conditions
 - Verification of Disposal Cell hydraulic & physical properties
 - Degradation of saltstone and similar cementitious materials
 - Oxidation rate analytical method development
 - Long-term radiological lysimeter program
- The 2013 SDF PA Plan update will consider NRC's TER monitoring factors and prioritization, availability of funds, risk mitigation and program impacts



DOE Responses to NRC TER/Concern

- Letter dated June 13, 2012
 - Transmitted 6 documents to NRC including updated stochastic model (all pre-dated the NRC TER)
- Letter dated July 12, 2012
 - Addresses risk associated with near term disposal at SDF (Vaults 1, 4 and SDU 2, 3, 5)
- Letter dated July 26, 2012
 - Identifies the path forward to address the identified risk for all planned SDF operations

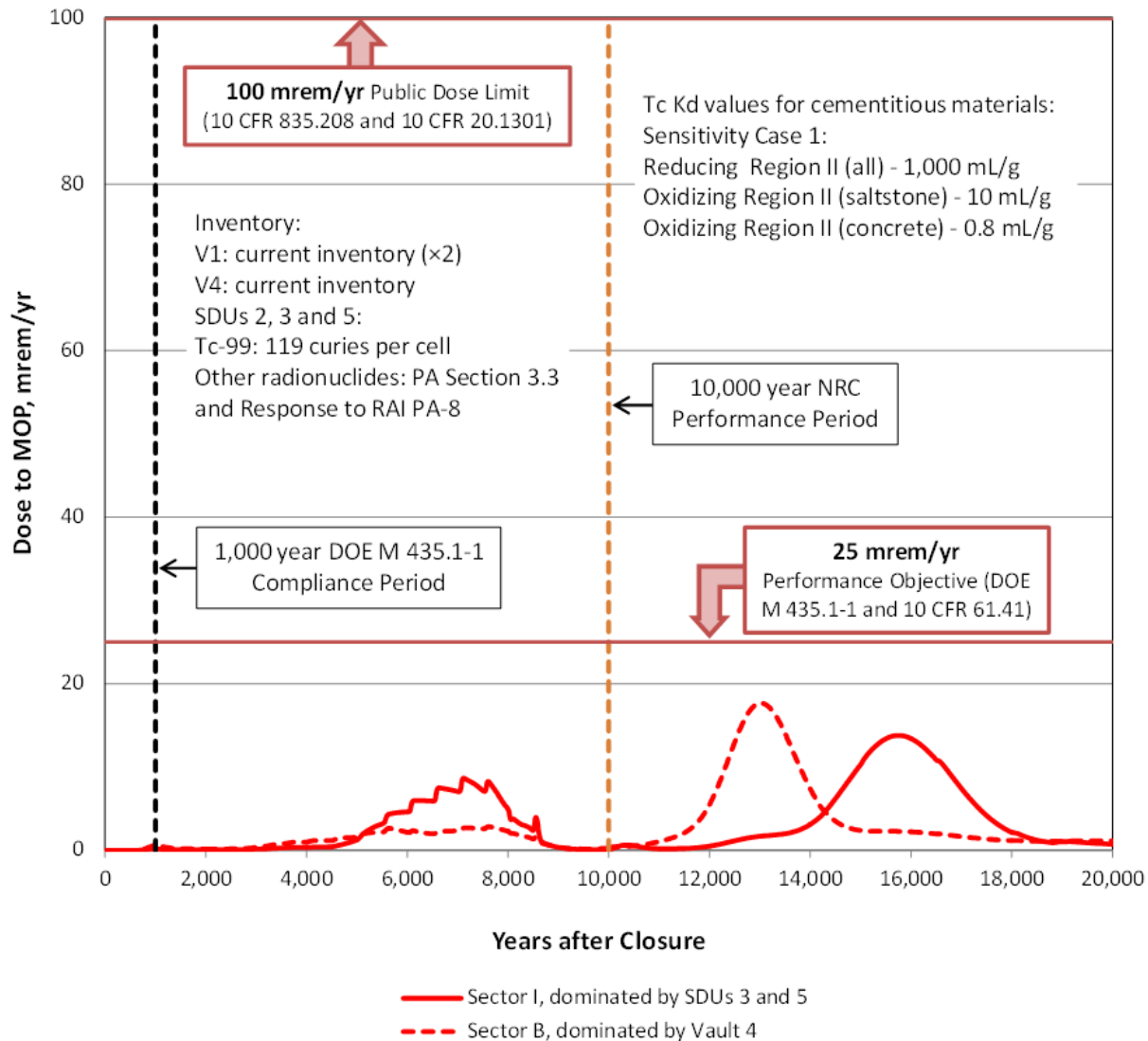


July 12, 2012 Transmittal

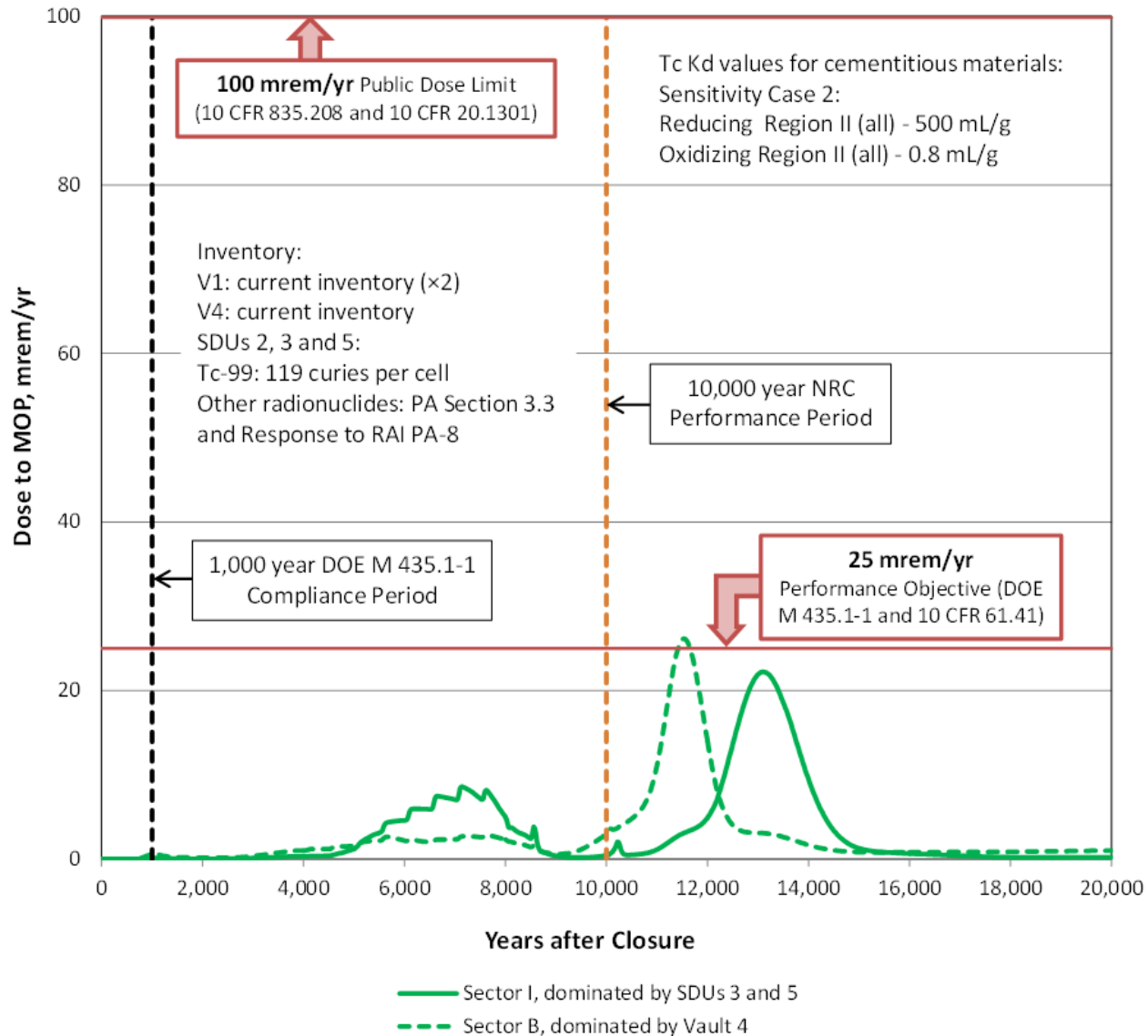
- Projected Tc-99 inventory in SDUs 2, 3, and 5 to be about 20% of the current modeled inventory of 540 curies
- Performed a Sensitivity Analysis using the updated stochastic model to evaluate dose results for Cases K and K1 using the current Vault 1 and 4 inventories and the updated projected SDU 2, 3, and 5 Tc-99 inventories (all other radionuclides remained unchanged from RAI PA-8 response)



Sensitivity Analysis Case K



Sensitivity Analysis Case K1



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July 26, 2012 Transmittal

- Attachment 1 and 2 identifies DOE's approach to address each NRC TER item identified in Table A-1 and Table A-2, respectively.
 - Fold into DOE's PA maintenance program
- DOE proposes to perform new modeling to address the identified Tc-99 risk for all planned SDF operations.
 - Consider NRC's TER when performing new modeling
 - Incorporate new information, as available
 - Engage in technical discussions with NRC prior to performing the new modeling



Path Forward

- DOE looks forward to continuing to work with NRC to:
 - Support NRC and SCDHEC's monitoring role
 - Answer questions related to responses submitted to date
 - Schedule technical discussions related to planned additional modeling efforts

