



**Savannah River  
Remediation**

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# Path Forward to Resolve NRC Concerns

August 6, 2012

Kent Rosenberger

Savannah River Remediation

Closure and Waste Disposal Authority

SRR-CWDA-2012-00122



SAVANNAH RIVER SITE ▪ AIKEN, SC ▪ [WWW.SRS.GOV](http://WWW.SRS.GOV)

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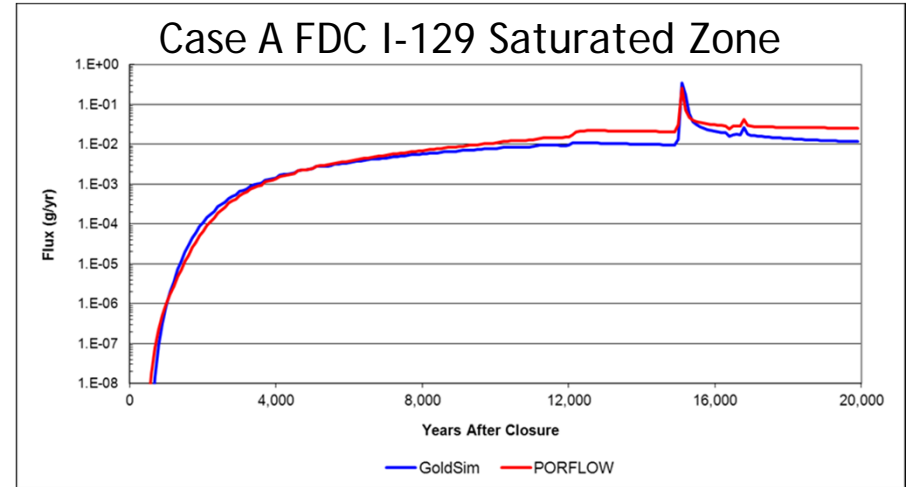
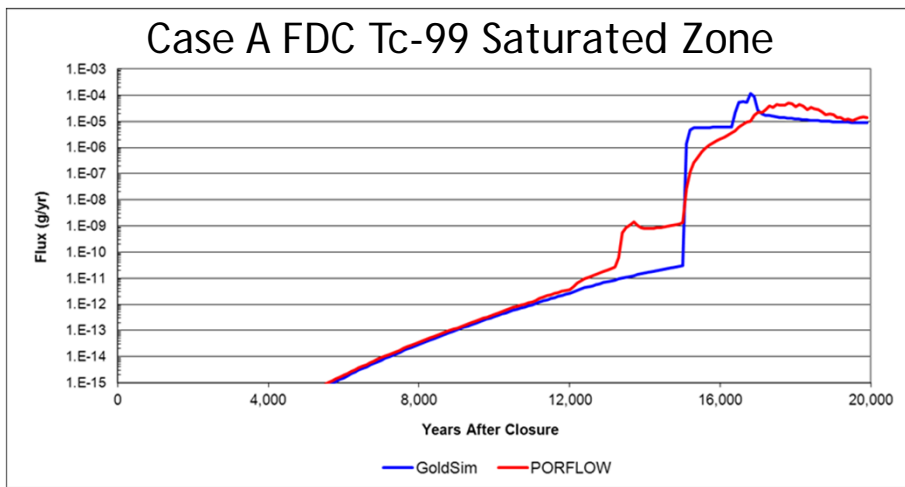
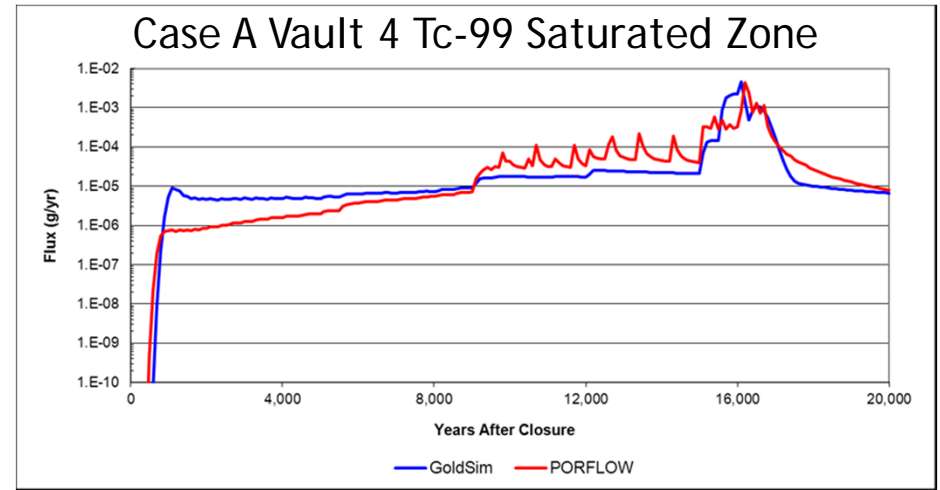
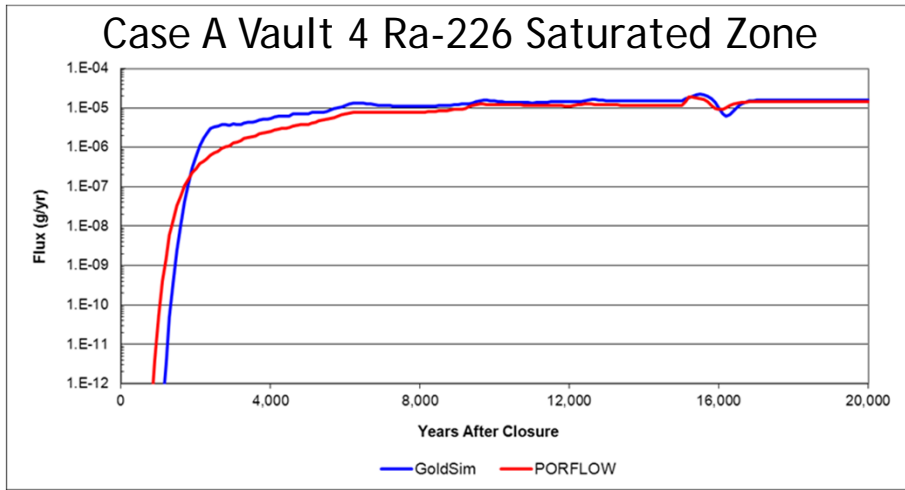
- DOE has transmitted new information related to the Saltstone Disposal Facility to the NRC and SCDHEC since the April 2012 issuance of the NRC's Technical Evaluation Report for the 2009 Performance Assessment
  - WDPD-12-52 dated June 13, 2012
  - WDPD-12-62 dated July 12, 2012
  - WDPD-12-64 dated July 26, 2012
- We plan to discuss the information included in the first two transmittals today

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- Information included in June 13, 2012 transmittal
  - *Saltstone Disposal Facility Stochastic Fate and Transport Model, SRR-CWDA-2011-00178*
  - *Uncertainty and Sensitivity Analyses for Saltstone Disposal Facility Performance Assessment Case A and Alternative Sensitivity Case K, SRR-CWDA-2011-00188*
  - *Revised Methodology for Determination of Inventories in SDF Vaults 1 and 4 Through 9/30/2011, SRR-CWDA-2012-00002*
  - *Savannah River Site Liquid Waste Facilities Performance Assessment Maintenance Program FY2012 Implementation Plan, SRR-CWDA-2012-00020*
  - *Technetium Sorption by Cementitious Materials Under Reducing Conditions, SRNL-STI-2011-00716*
  - *Full-Scale Testing of the Formed-Core Sampler for Saltstone Facility Vaults, SRNL-STI-2011-00706*

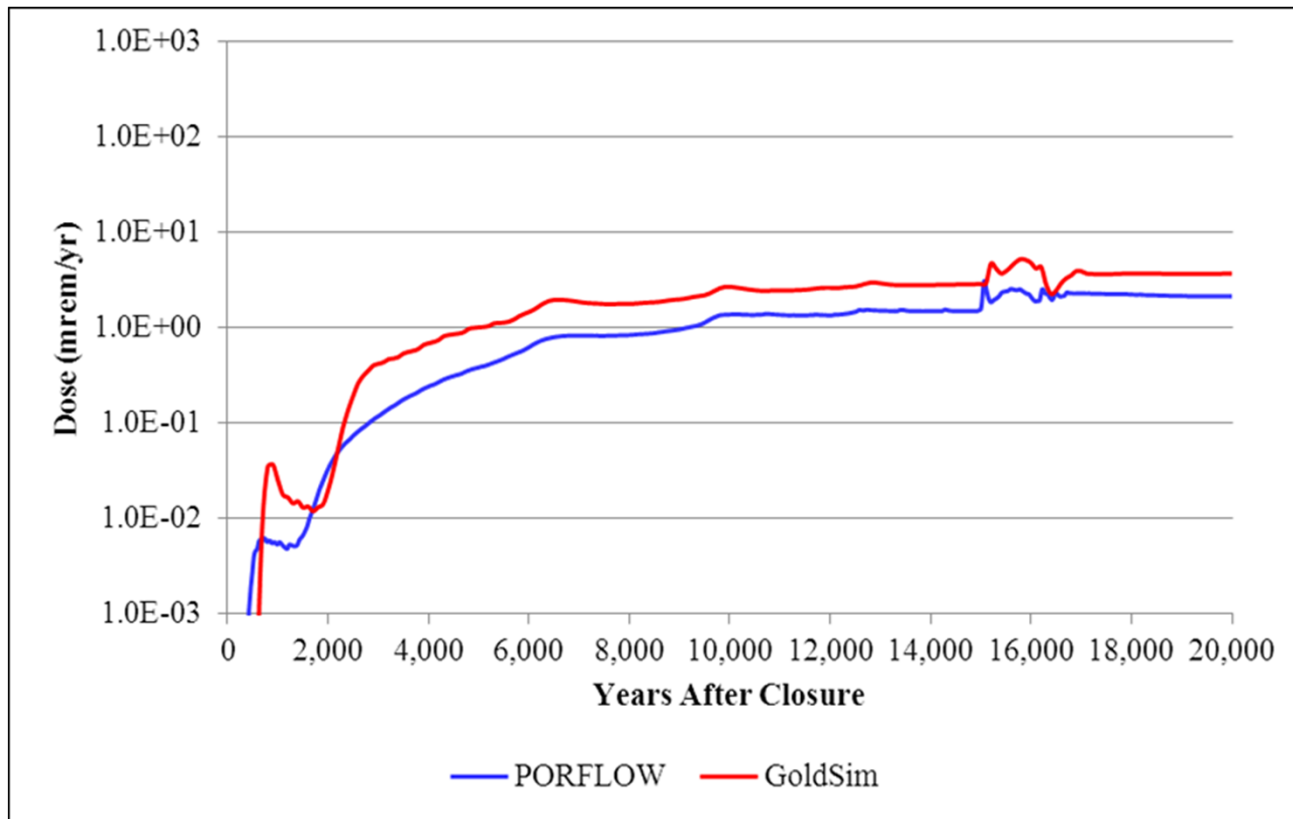
- SRR revised the GoldSim stochastic fate and transport model to incorporate modeling improvements
  - Complete revision of the model structure using looping function for FDCs
  - Elimination of benchmarking factors
  - Incorporation of pipe pathways in saturated zone
  - Explicit definition of disposal unit inventories
  - Performed benchmarking of new model versus the PORFLOW results for Cases A and K

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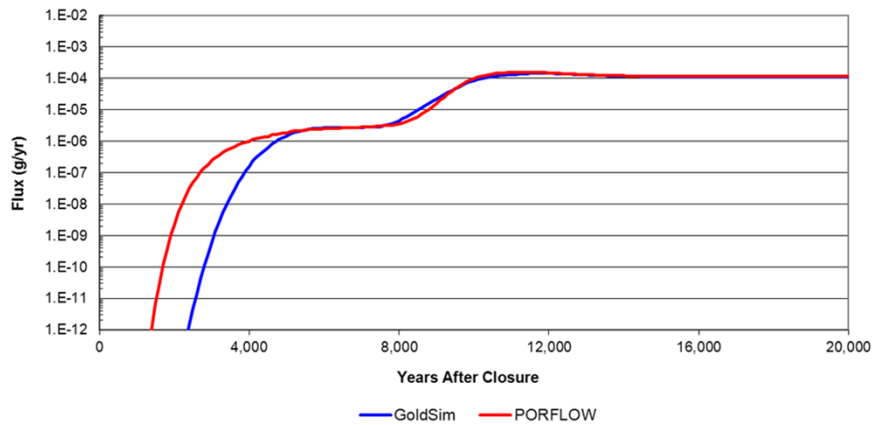
## Case A Comparison Between PORFLOW and GoldSim Calculated 100 Meter Doses



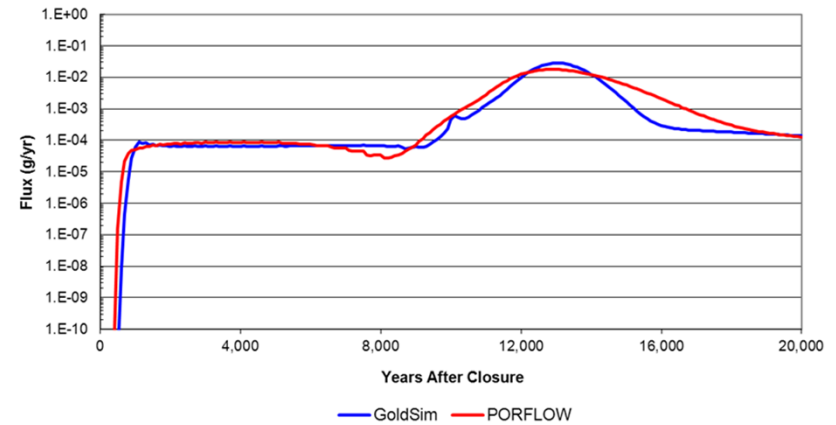
# Stochastic Model Case K Benchmarking

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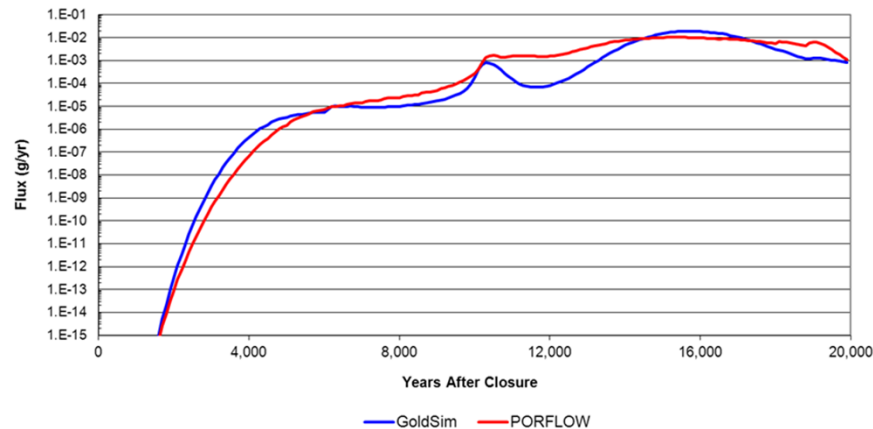
Case K Vault 4 Ra-226 Saturated Zone



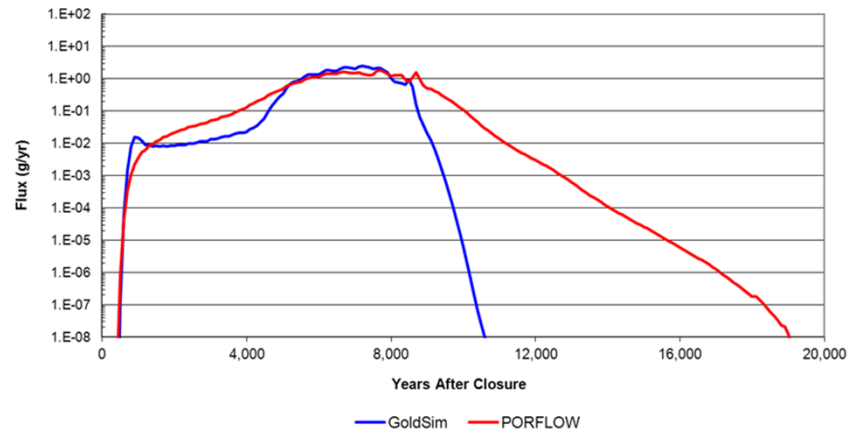
Case K Vault 4 Tc-99 Saturated Zone



Case K FDC Tc-99 Saturated Zone

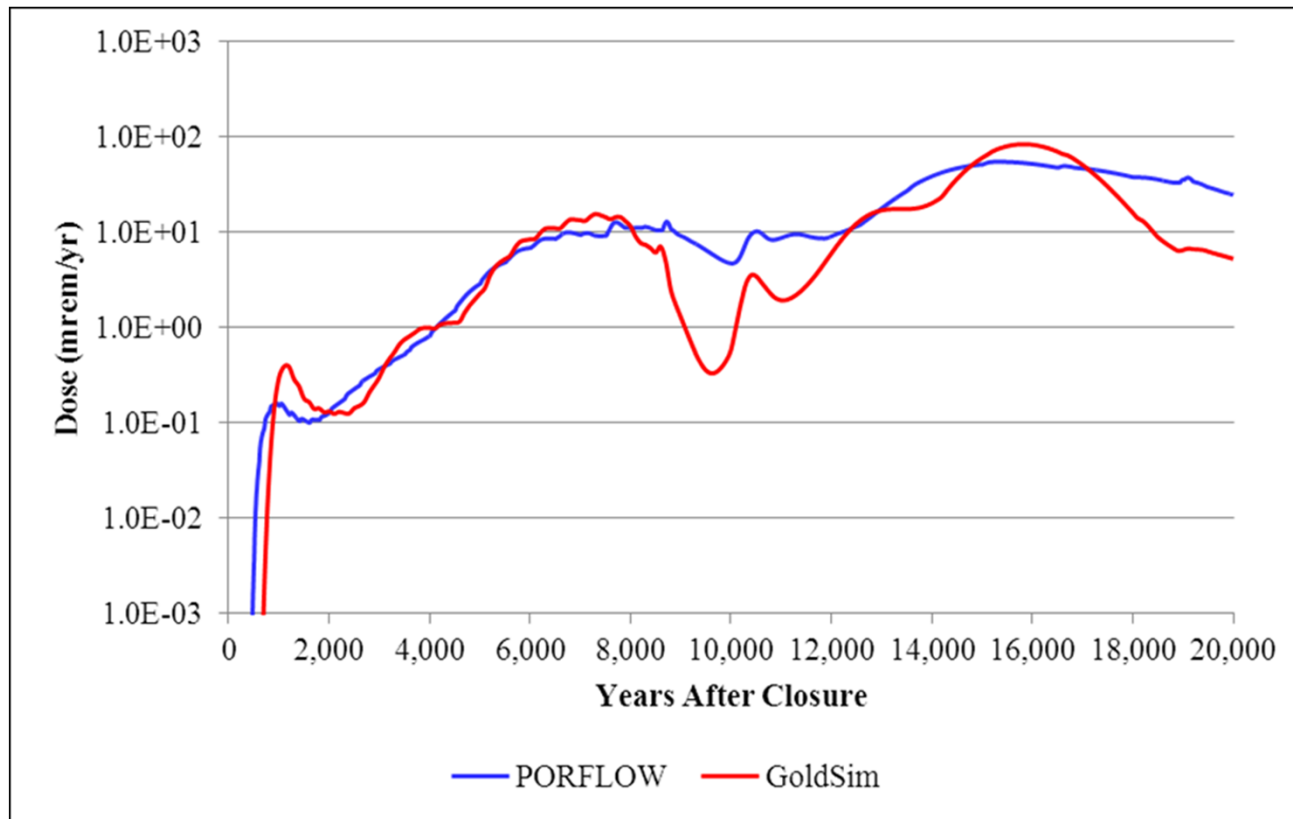


Case K FDC I-129 Saturated Zone



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## Case K Comparison Between PORFLOW and GoldSim Calculated 100 Meter Doses



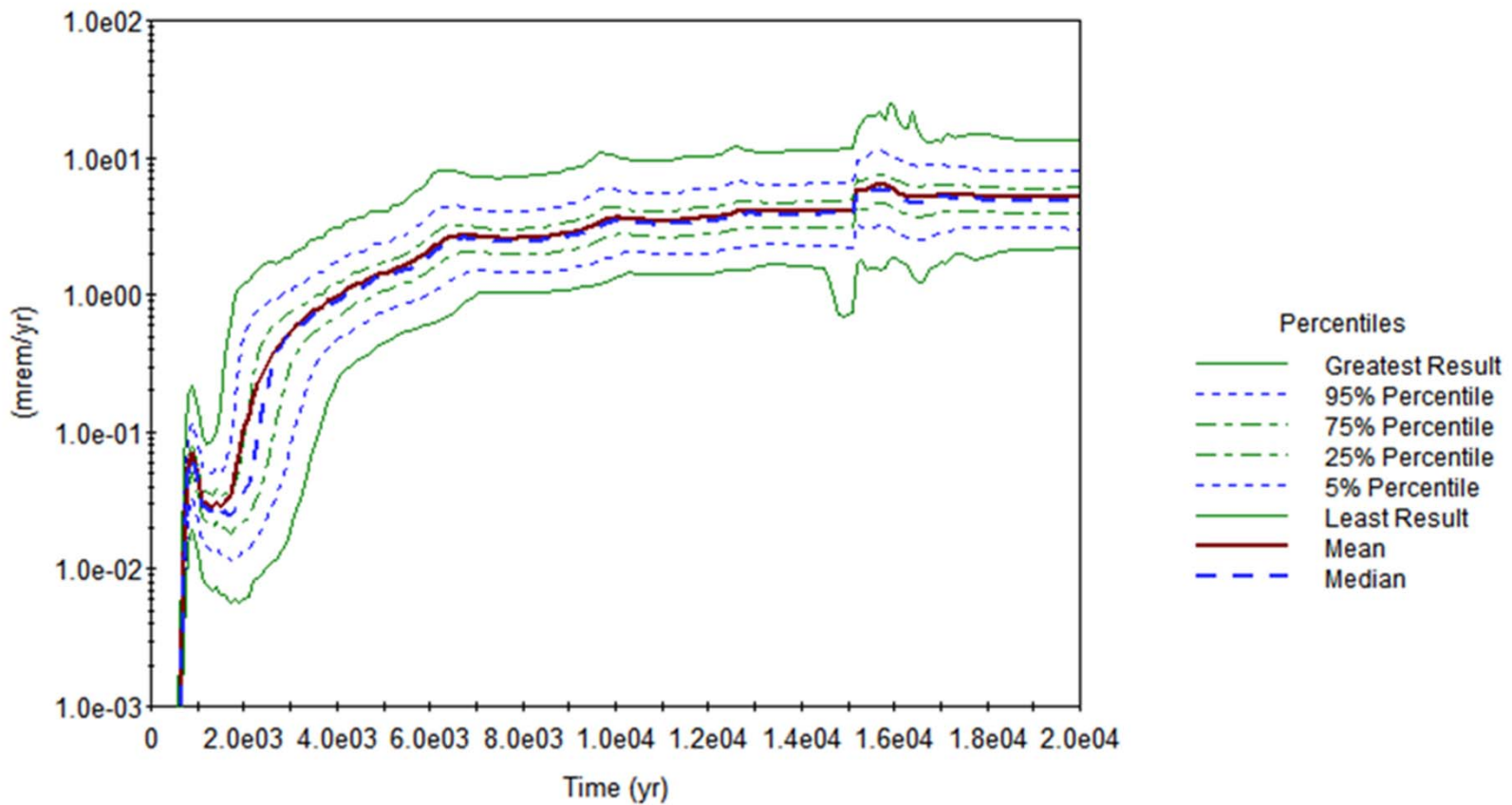


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- Performed uncertainty and sensitivity analyses for Cases A and K using the updated stochastic model
- Revised stochastic elements detailed in SRR-CWDA-2011-00188
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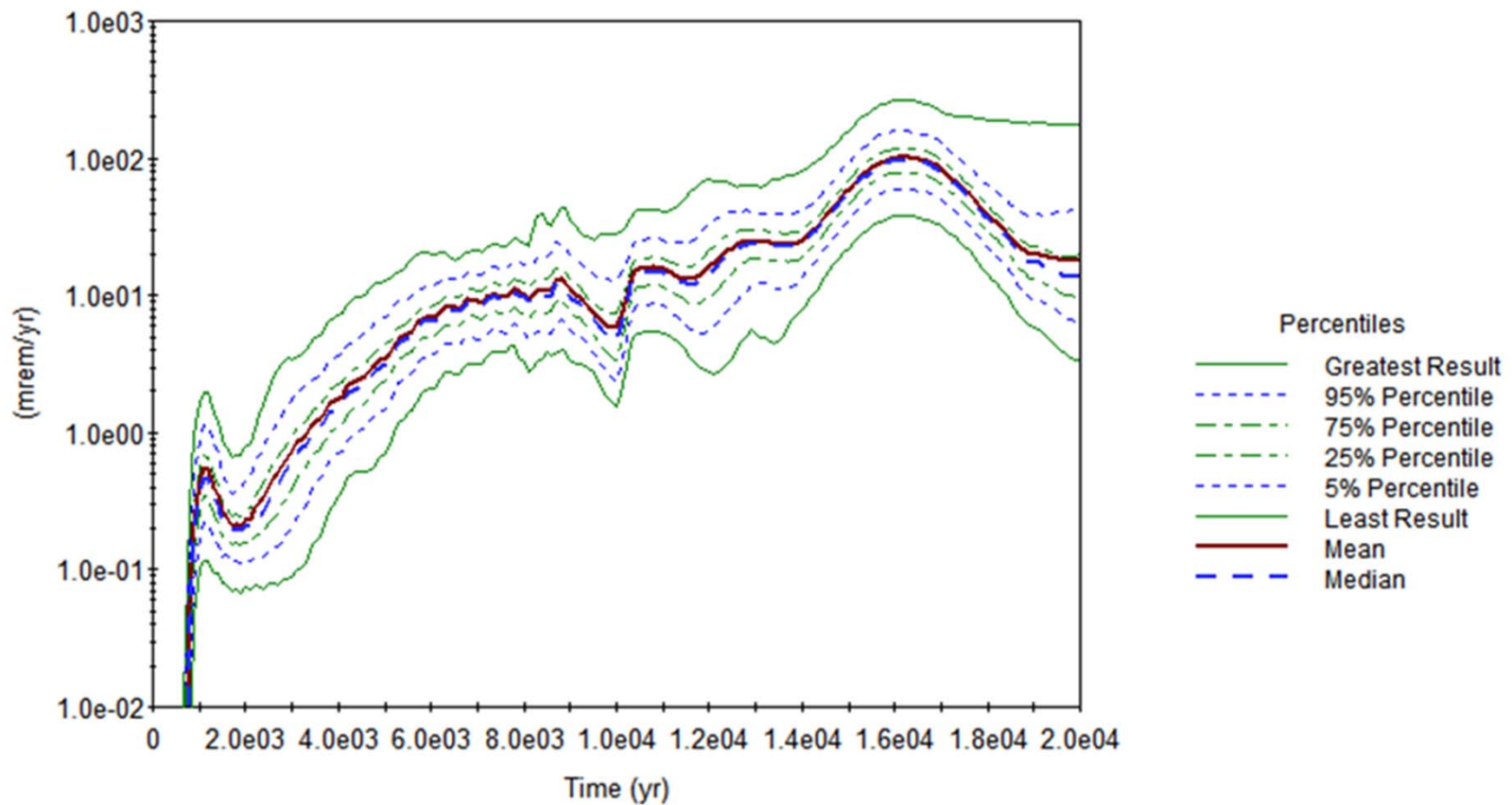
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## Case A Sector B Uncertainty Results



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## Case K Sector B Uncertainty Results



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- Similar to the 2009 PA sensitivity analysis, saturated zone thickness, vegetable pathway factors, and fish ingestion pathway factors are sensitive parameters
- Due to revisions to the stochastic model, the  $K_d$  value for iodine is no longer a sensitive parameter

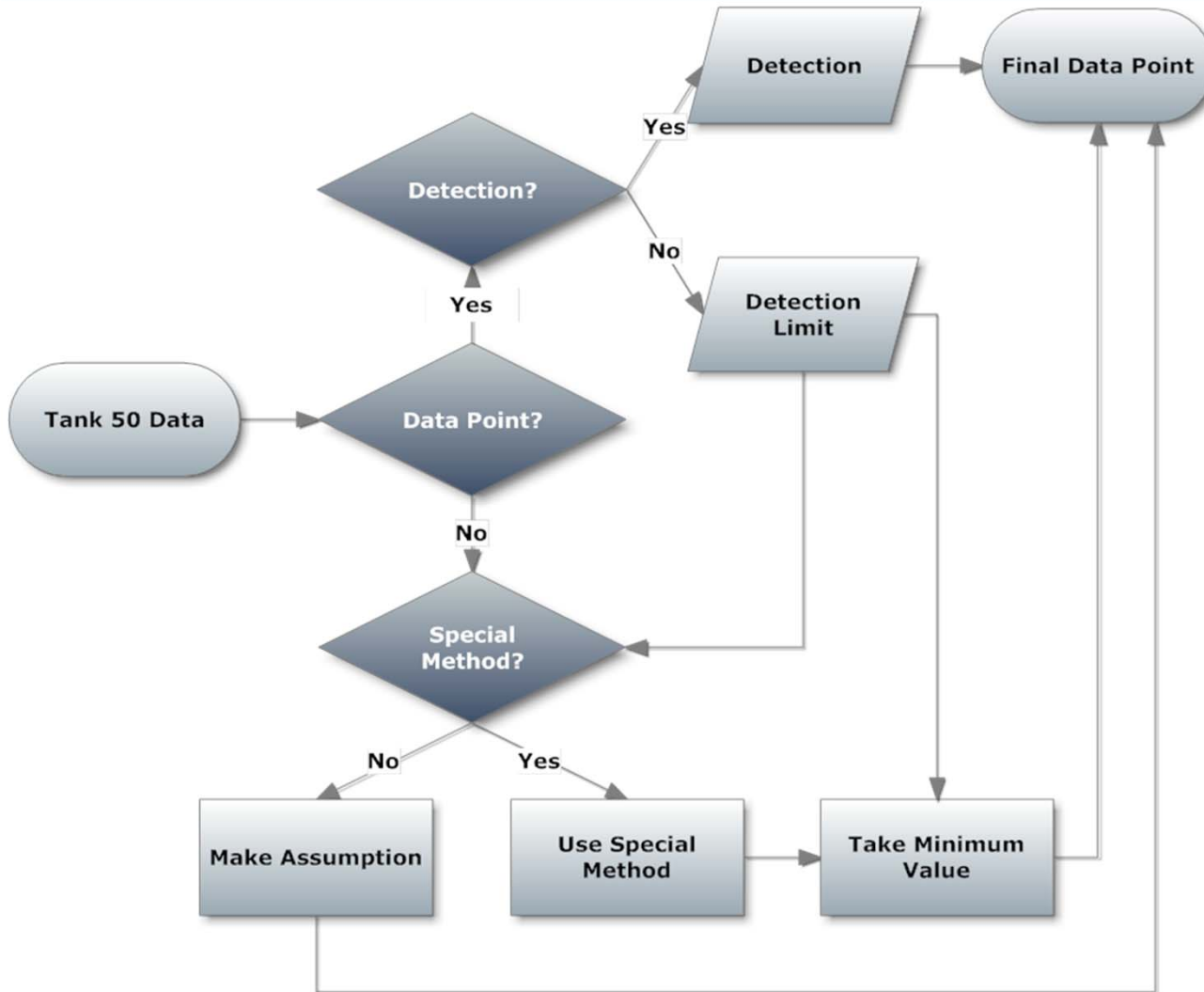
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- Similar to the Case A sensitivity analysis, saturated zone thickness is a sensitive parameter
- Due to inventory and  $K_d$  revisions for Case K, parameters associated with Ra-226 are no longer sensitive
- Inventory and pore volume parameters for I-129 are sensitive

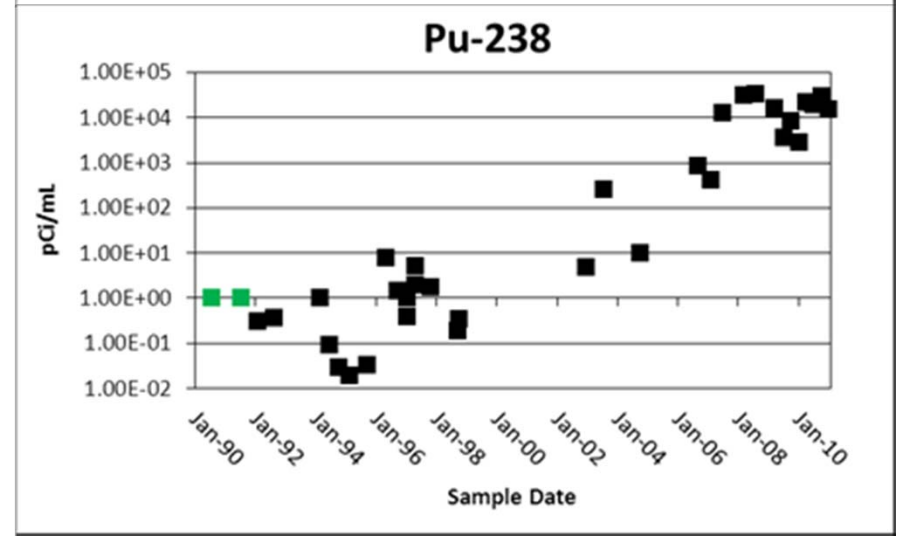
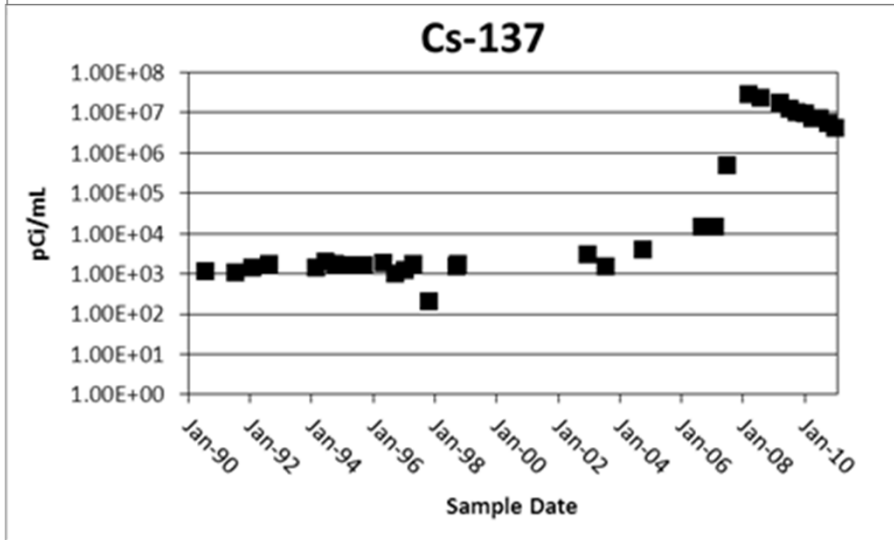
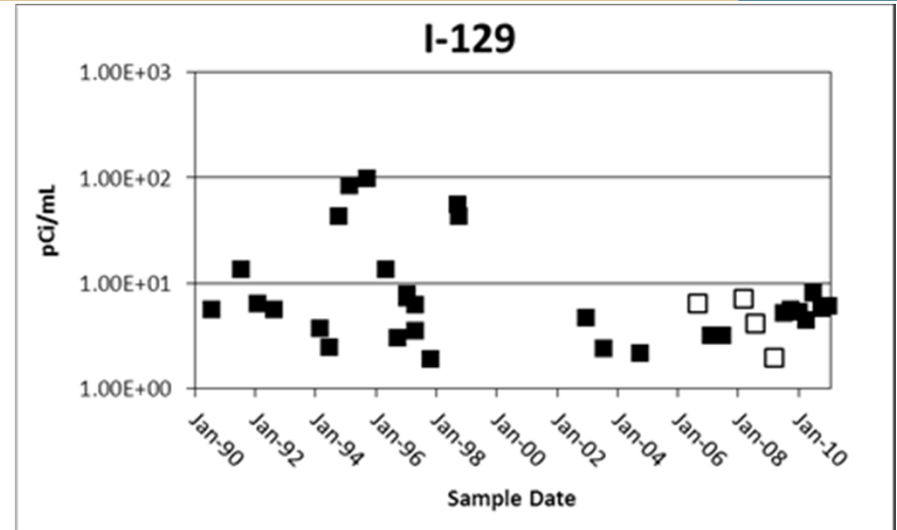
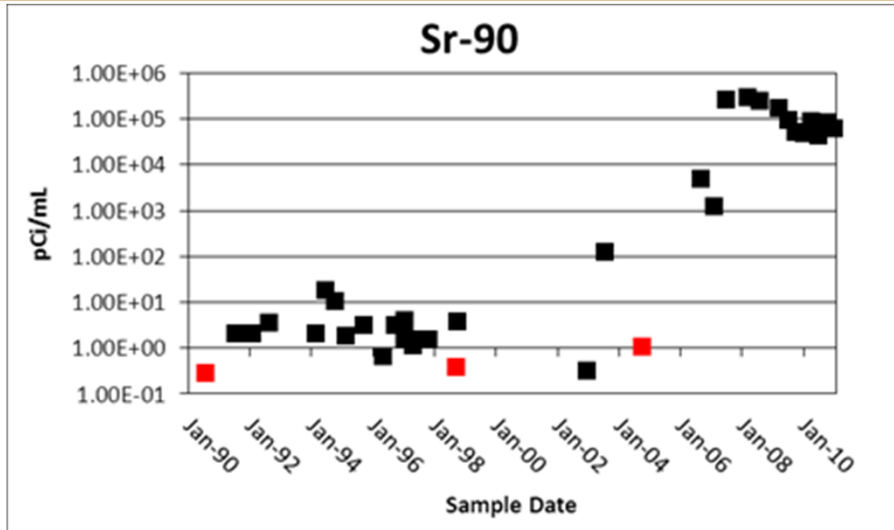
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- Conservatisms in inventory calculations have been a discussion in several monitoring interactions
- Developed methodology for inventory calculations with input from all SRR impacted work groups to remove conservatisms with previous methods
- Primary source of salt solution concentrations is actual concentration measurements from Tank 50 samples

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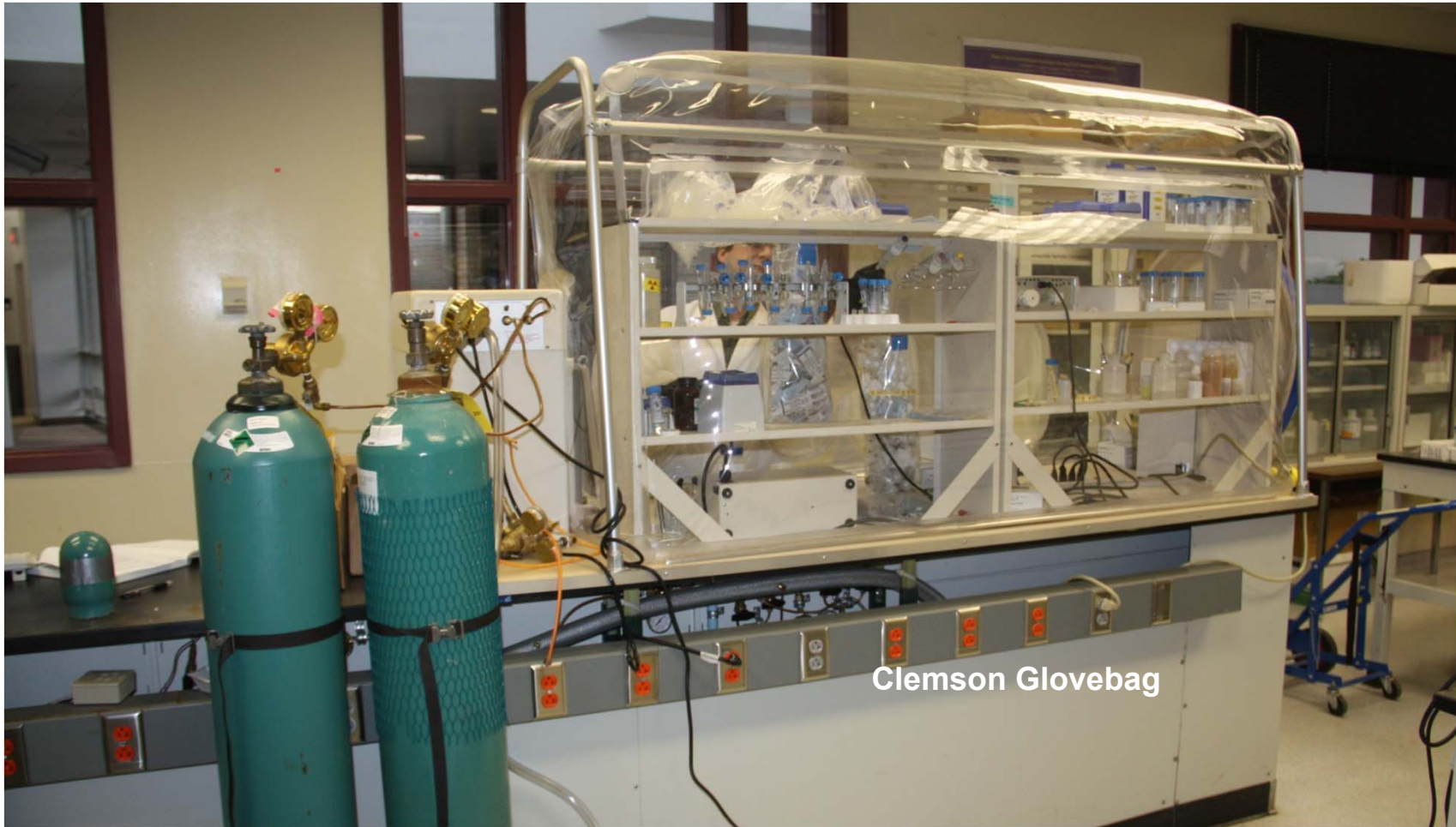
- FY2012 Implementation Plan for Performance Assessment Maintenance Program provided information on all activities planned for current fiscal year and out years
- Provided summary of maintenance activities completed in FY2011 and summaries of activities that were planned in FY2012



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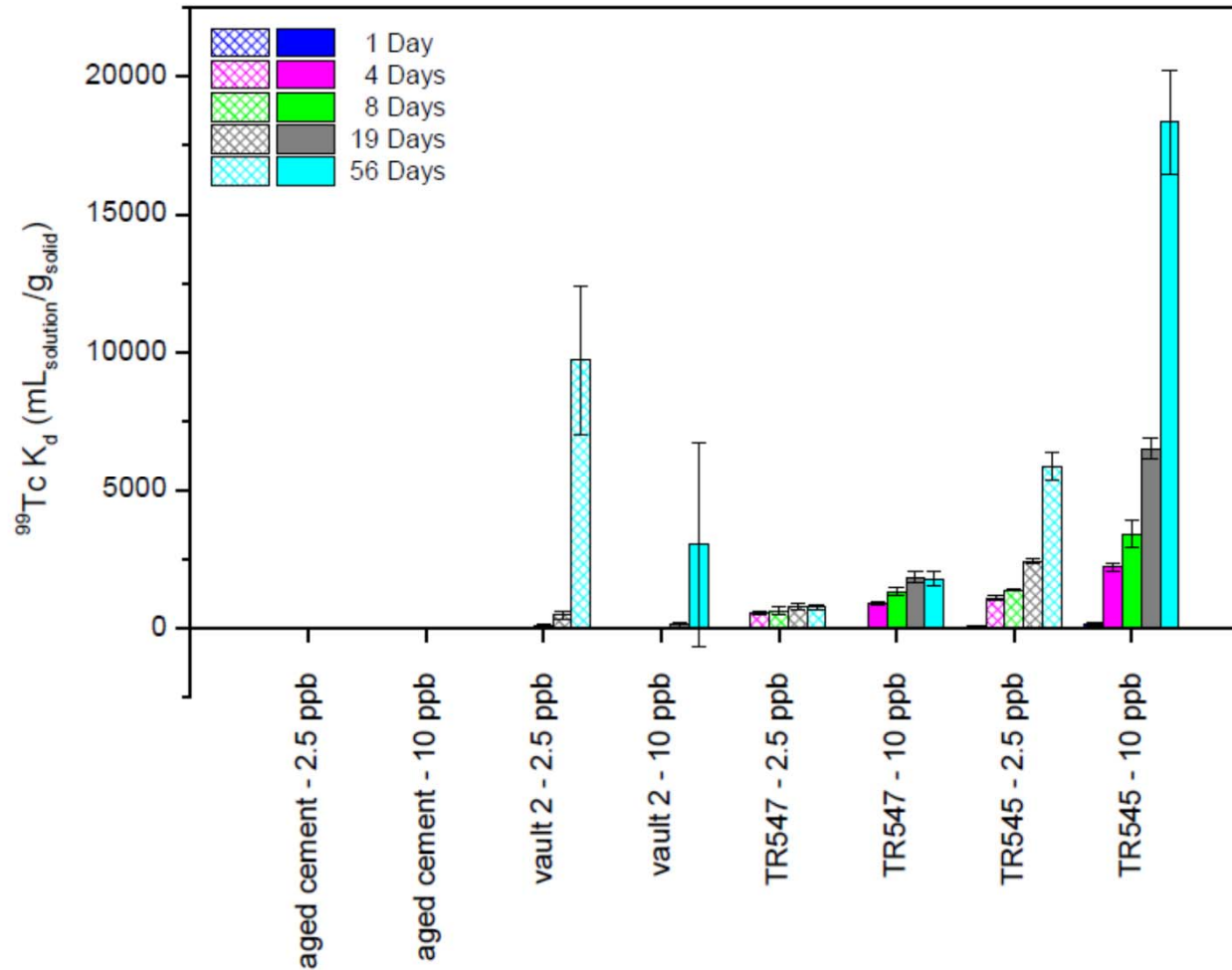
- Study of technetium sorption to cementitious materials under reducing conditions
- Improved the containment system for the study to eliminate potential hydrogen contamination of system
- Included no slag concrete control
- Tested saltstone, SDU 2 concrete and a high slag content grout

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Clemson Glovebag

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- Formed core method of sampling emplaced saltstone has been discussed during previous monitoring interactions
- Performed proof-of-concept testing in FY2011
- Mockup demonstrated functionality of method but did identify areas for modifications and equipment development

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- Information included in July 12, 2012 transmittal
  - *Projected Technetium-99 Inventory in Saltstone Disposal Facility Units 2, 3, and 5, SRR-CWDA-2012-00095*
  - *Sensitivity Analysis for Disposal Operations into Saltstone Disposal Facility Vault 1, Vault 4, and SDUs 2, 3 and 5, SRR-CWDA-2012-00103*

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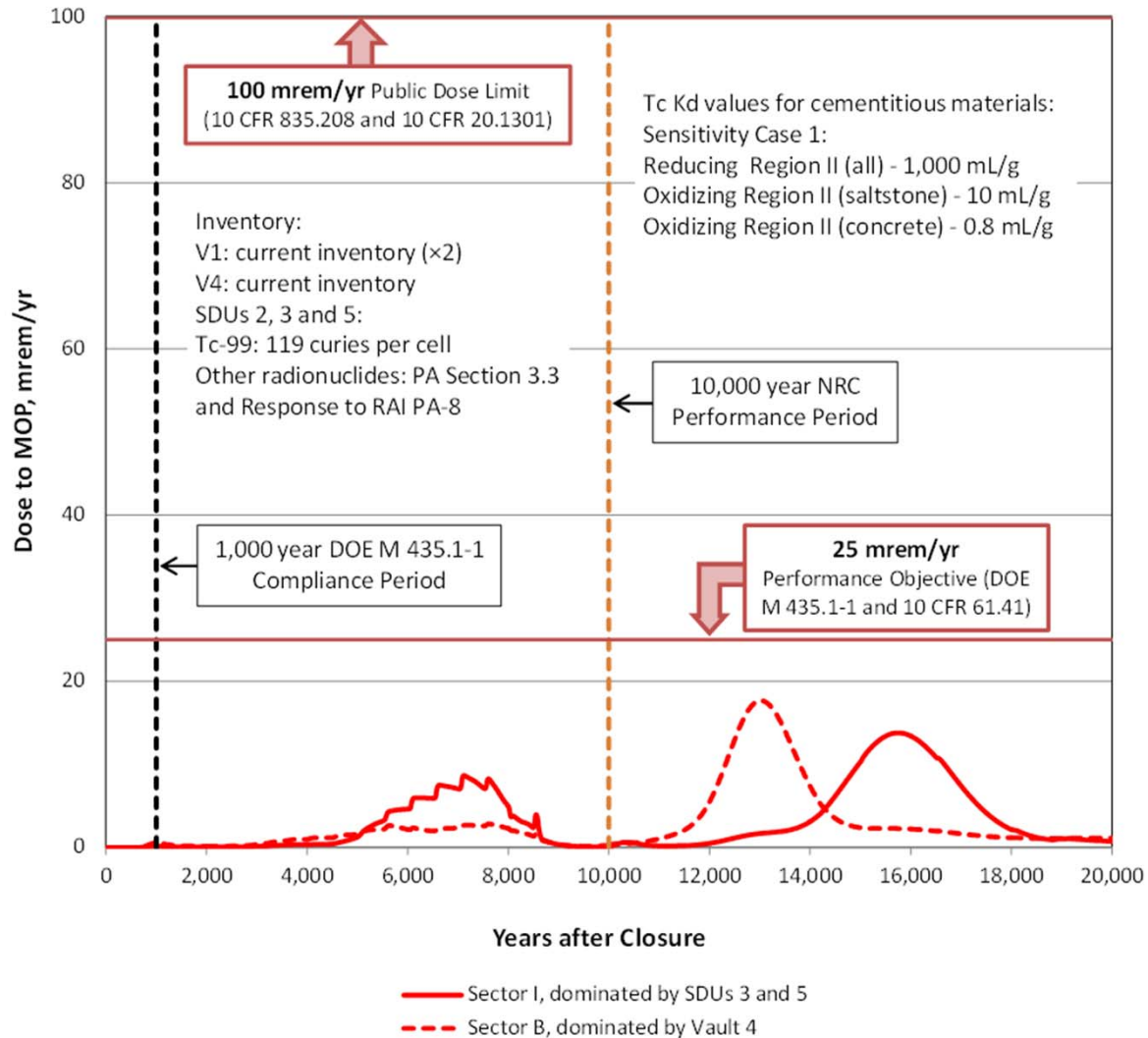
- Evaluated projected Tc-99 inventory in SDUs 2, 3, and 5 based on current salt disposition batching plans
- Evaluates two scenarios of ARP/MCU dilution and grout-to-salt solution volume ratios to determine projected Tc-99 inventories versus PA modeling inventory
  - Results indicate that the individual cell inventories of Tc-99 will be between 18% and 22% of the current modeled inventory of 540 curies

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- Used stochastic model to evaluate dose results for two sensitivity cases based on Cases K and K1 but using the current Vault 1 and 4 inventories and updated projected SDU 2, 3, and 5 Tc-99 inventories (all other radionuclides the same as in RAI PA-8)
- Evaluates near-term disposal actions for Vaults 1 and 4 and SDUs 2, 3, and 5

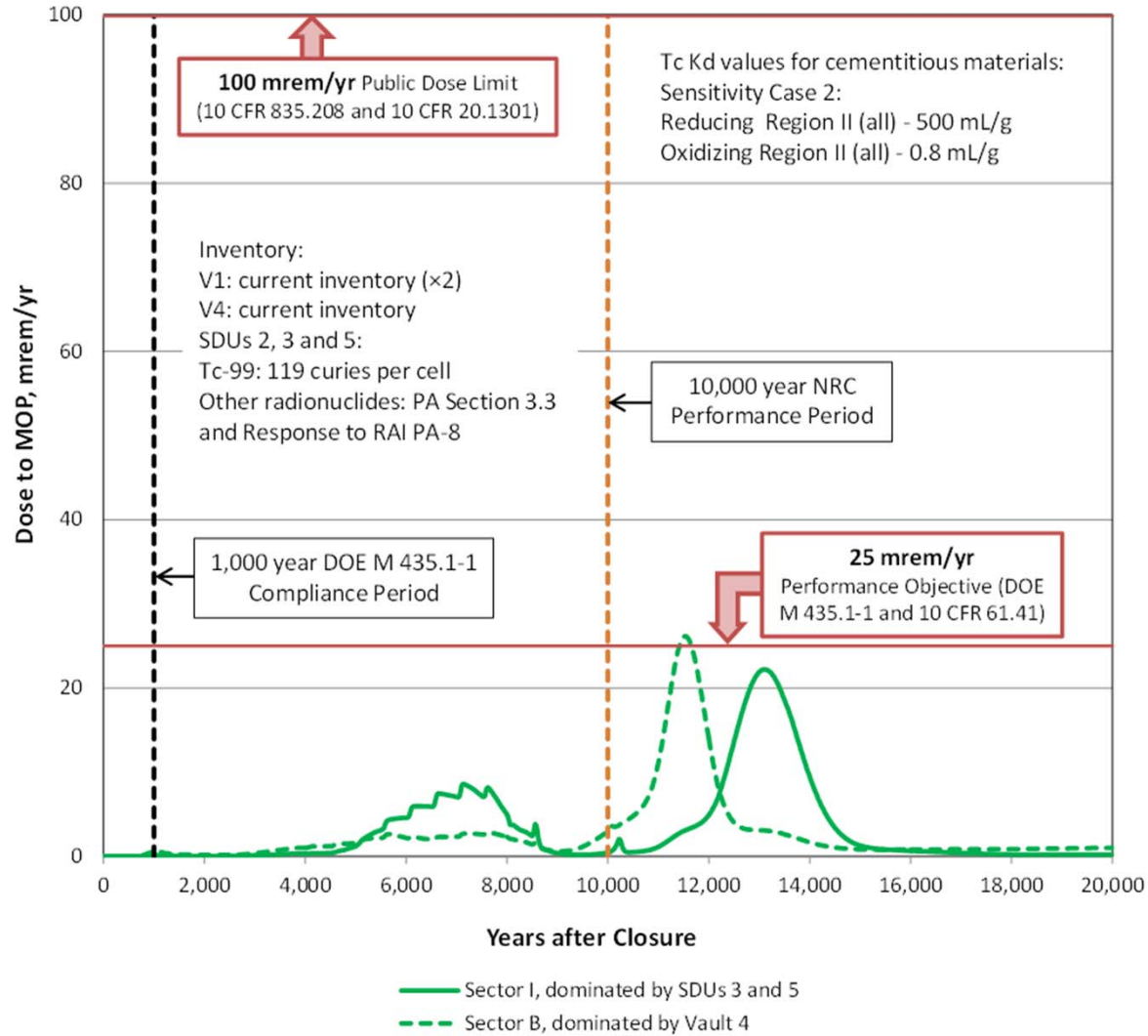


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# Sensitivity Analysis Case K1

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