

Savannah River  
Remediation

*We do the right thing.*


# Saltstone Disposal Facility Performance Assessment Overview

Presentation to the Savannah River Site  
Citizens Advisory Board  
Waste Management Committee

Tom Robinson  
Savannah River Remediation  
Manager, Closure and Disposal Assessment  
January 12, 2010

SRR-CWDA-2010-00001

SAVANNAH RIVER SITE • AIKEN, SC • WWW.SRS.GOV



Savannah River  
Remediation

*We do the right thing.*

## What is a PA?

- PA = Performance Assessment
- **Performance Assessment** = a key risk assessment tool used to inform closure and disposal decisions
  - Models **fate and transport** of materials over long periods of time to determine potential consequences
  - Utilizes informed assumptions
  - Provides most likely consequences of planned actions

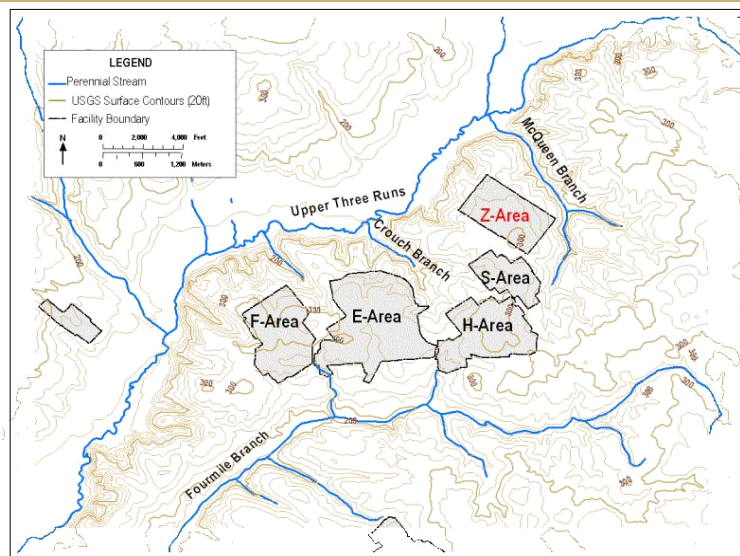
SAVANNAH RIVER SITE • AIKEN, SC • WWW.SRS.GOV

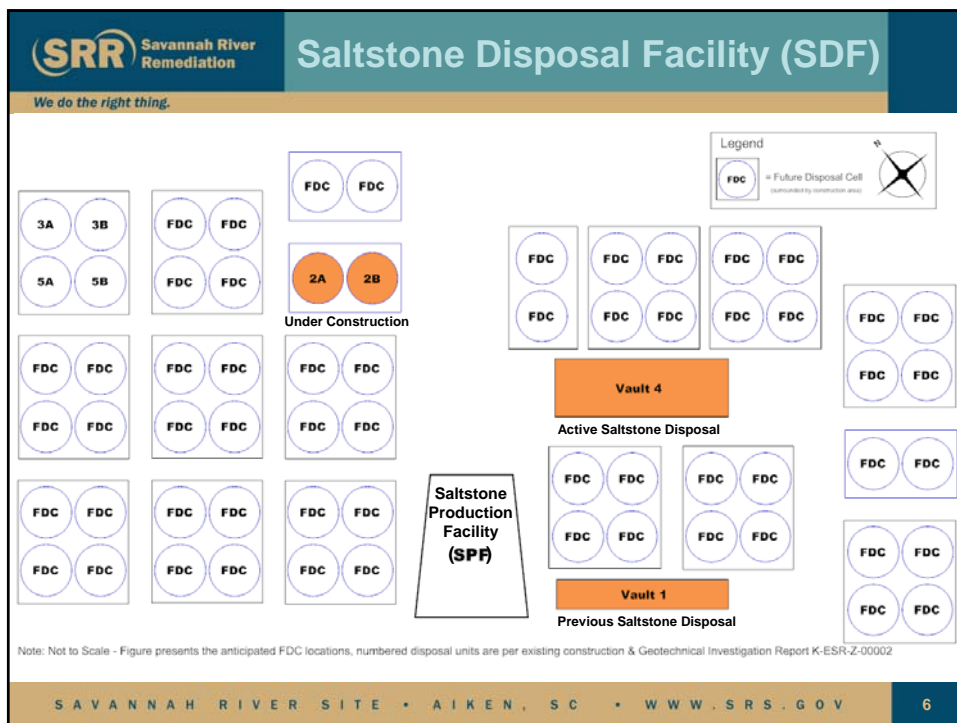
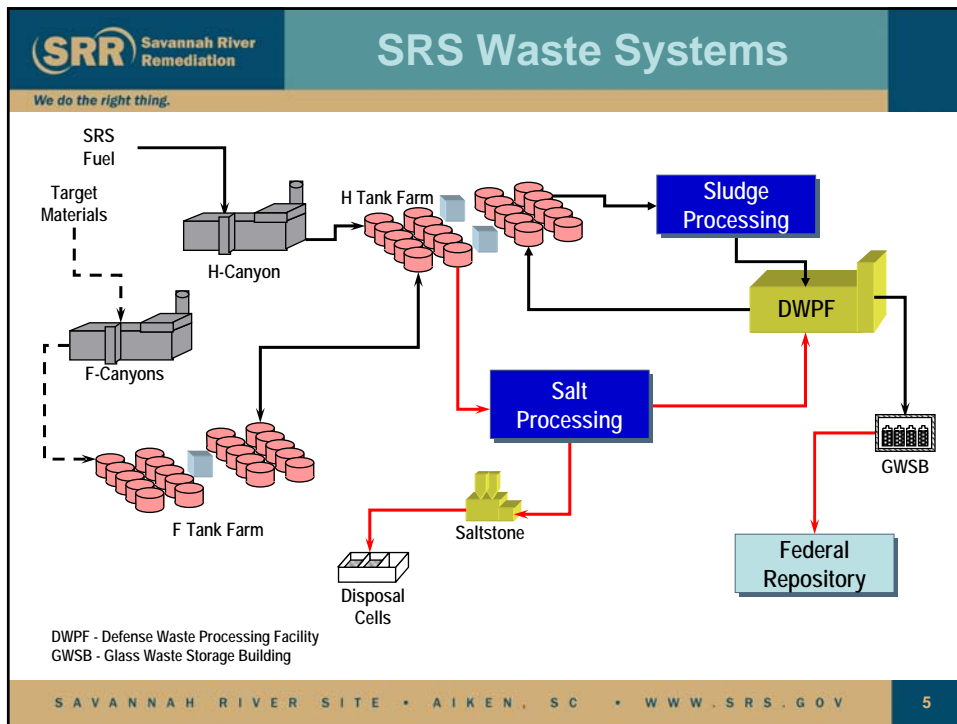
2


## How does a PA inform?

- PA provides best estimation of what the dose consequences will be, both chemical and radiological, over time
  - Focused on determining “**peak dose**” - worst one-year period – or “**peak concentration**”
  - Reflects **potential variation in parameters** and identifies key parameters for which the model has the greatest **sensitivity** (importance)

## General Separations Area








**SRR** Savannah River  
Remediation

*We do the right thing.*

Existing Disposal Units



**Vault 1**


Six 100'x100' cells

Approximately 25' high


**Vault 4**

Twelve 100'x100' cells

Approximately 26' high



SAVANNAH RIVER SITE • AIKEN, SC • WWW.SRS.GOV
7




**SRR** Savannah River  
Remediation

*We do the right thing.*

Vault 2–Future Disposal Cells


**11/20/2008**

Site Prep




**5/15/2009**

Wall Panels




**7/23/2009**

Roof Form



**10/14/2009**

Cell Interior



SAVANNAH RIVER SITE • AIKEN, SC • WWW.SRS.GOV
8





**SRR** Savannah River Remediation  
We do the right thing.

## SDF PA Development

- SRS initiated a PA revision in October 2007 per DOE O 435.1 to support disposal operations
- Revised PA accounts for a new disposal cell design, new research data since 2005 and incorporates new information related to the eight factors from the NRC Technical Evaluation Report (ML053010225) issued in December 2005
- Revision A was submitted for review by a DOE Savannah River Operations Office appointed team in March 2009

SAVANNAH RIVER SITE • AIKEN, SC • WWW.SRS.GOV

10

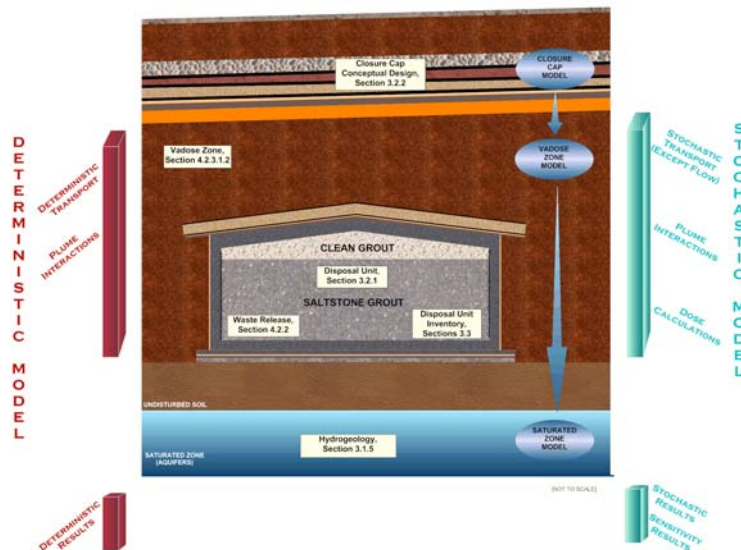
- Revision B was submitted for review by a DOE Low Level Waste Federal Review Group (LFRG) appointed team in June 2009
- The LFRG on-site review was conducted August 10-14, 2009 and NRC staff were observers
  - NRC issued observation report (ML092710477)
- Revision 0 was submitted to NRC and SCDHEC in November 2009

- Eleven Chapters and twelve appendices
  - Including disposal facility characteristics, performance analysis, analysis results, inadvertent intruder analysis, and results interpretation
- More than 290 figures and 170 tables of information in the main body of PA
- Volume 1 of the Revised PA (663 pages) and the appendices comprise over 2000 total pages

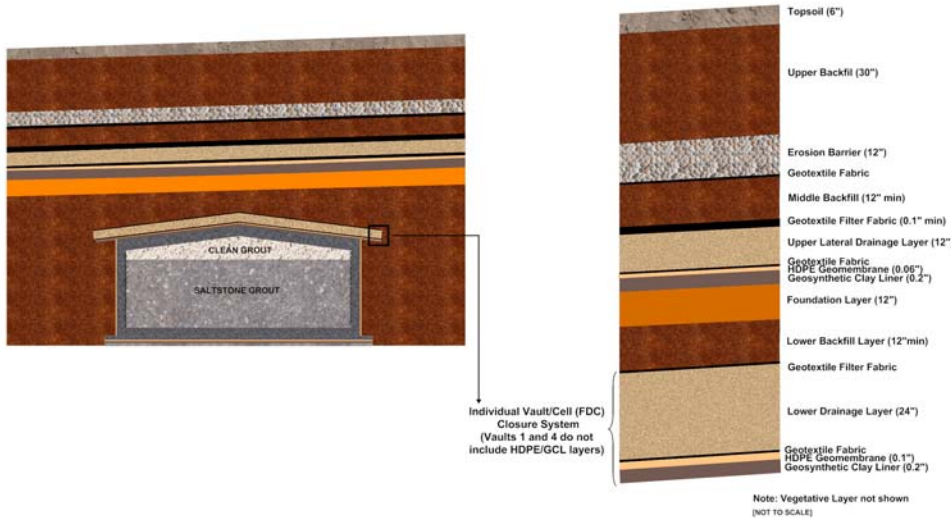
## Hybrid Modeling Approach

- Modeling is a hybrid approach with the deterministic (PORFLOW) results as the baseline and the sensitivity/uncertainty analyses performed with a probabilistic code (GoldSim) to evaluate all parameters at once
- PORFLOW also used for one-off sensitivity analyses

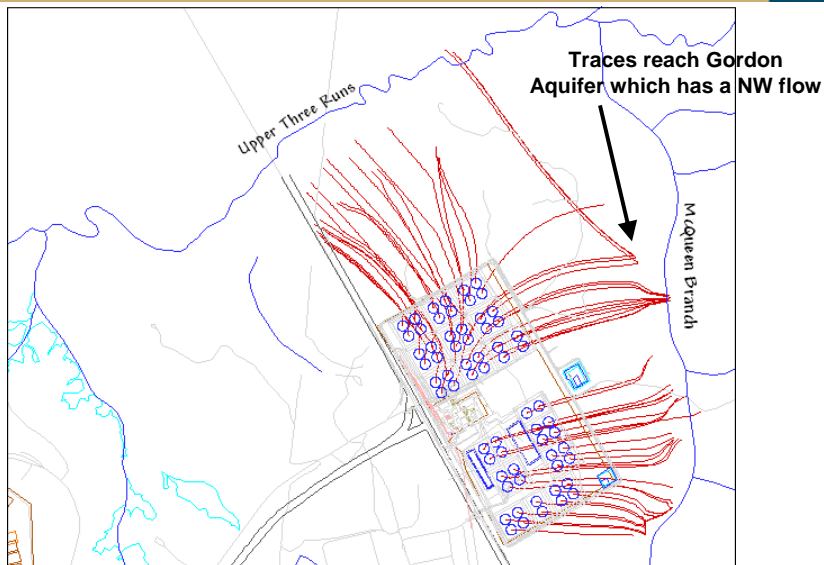
## Conceptual Model



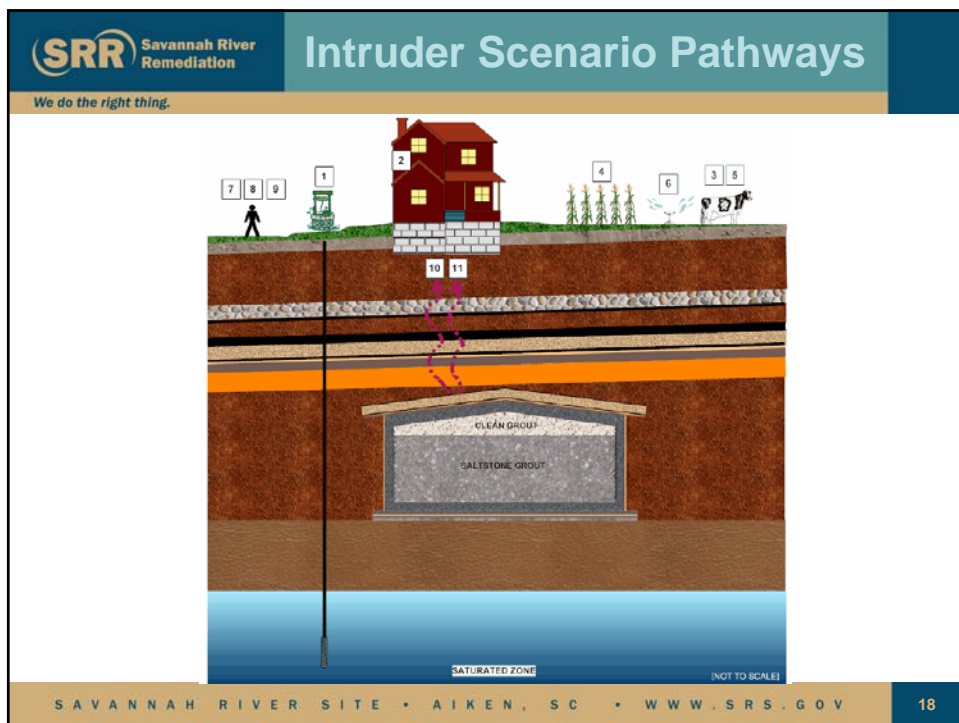
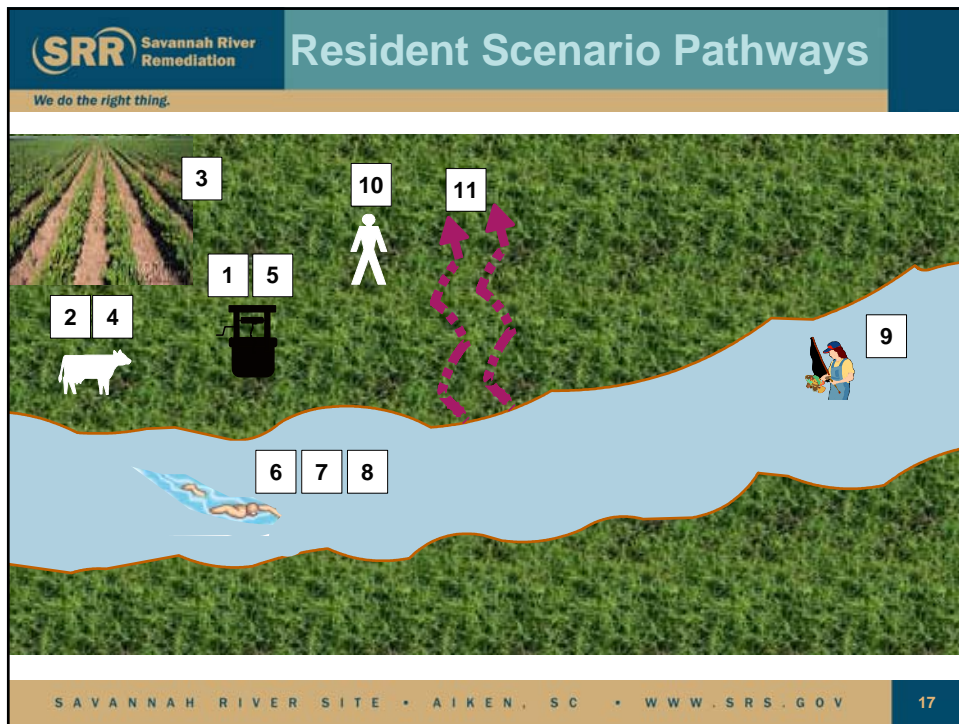
## Model Example: Closure Cap



## Far-Field Flow Pathlines







## Requirement Bases

- The PA development process is regulated by DOE Order 435.1
- Disposal requirements are based on:
  - DOE Order 435.1
  - 10 CFR 61 Performance Objectives as dictated by Ronald W. Reagan National Defense Authorization Act (NDAA) for Fiscal Year 2005
  - SCDHEC “SWM: Solid Waste Landfills and Structural Fill” [SCDHEC R.61-107.19] and “Standards for Wastewater Facility Construction” [SCDHEC R.61-67]

## Conclusions

Performance Measure		Limit	Result
DOE O 435.1-1	All-Pathways Dose	25 mrem/yr	1.4 mrem/yr
DOE O 435.1-1	Intruder Dose	500 mrem acute 100 mrem/yr chronic	N/A – acute 1.9 mrem/yr - chronic
DOE O 435.1-1	Air Pathways Dose	10 mrem/yr	<4E-09 mrem/yr
DOE O 435.1-1	Radon Flux	20 pCi/m <sup>2</sup> /s At ground surface	2.0E-13 pCi/m <sup>2</sup> /s
DOE O 435.1-1 And Safe Drinking Water Act	Groundwater Protection - Maximum Contaminant Levels	Total β/y 4 mrem/yr Total α 15 pCi/L Total U 30 mg/L Total Ra 5 pCi/L	1.16 mrem/yr 1.9 pCi/L 8.0E-9 mg/L 1.9 pCi/L
10 CFR 61.41	All-Pathways Dose	25 mrem/yr	1.4 mrem/yr
10 CFR 61.42	Intruder Dose	500 mrem/yr	1.9 mrem/yr

- SDF PA has been completed and is currently undergoing external review
- Planned SDF disposal activities result in peak year doses / concentrations well below regulatory requirements