

Savannah River Site Innovative Technology Integration Means Success

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Acting Assistant Manager

Waste Disposition

Savannah River Site

Waste Management Symposia 2015

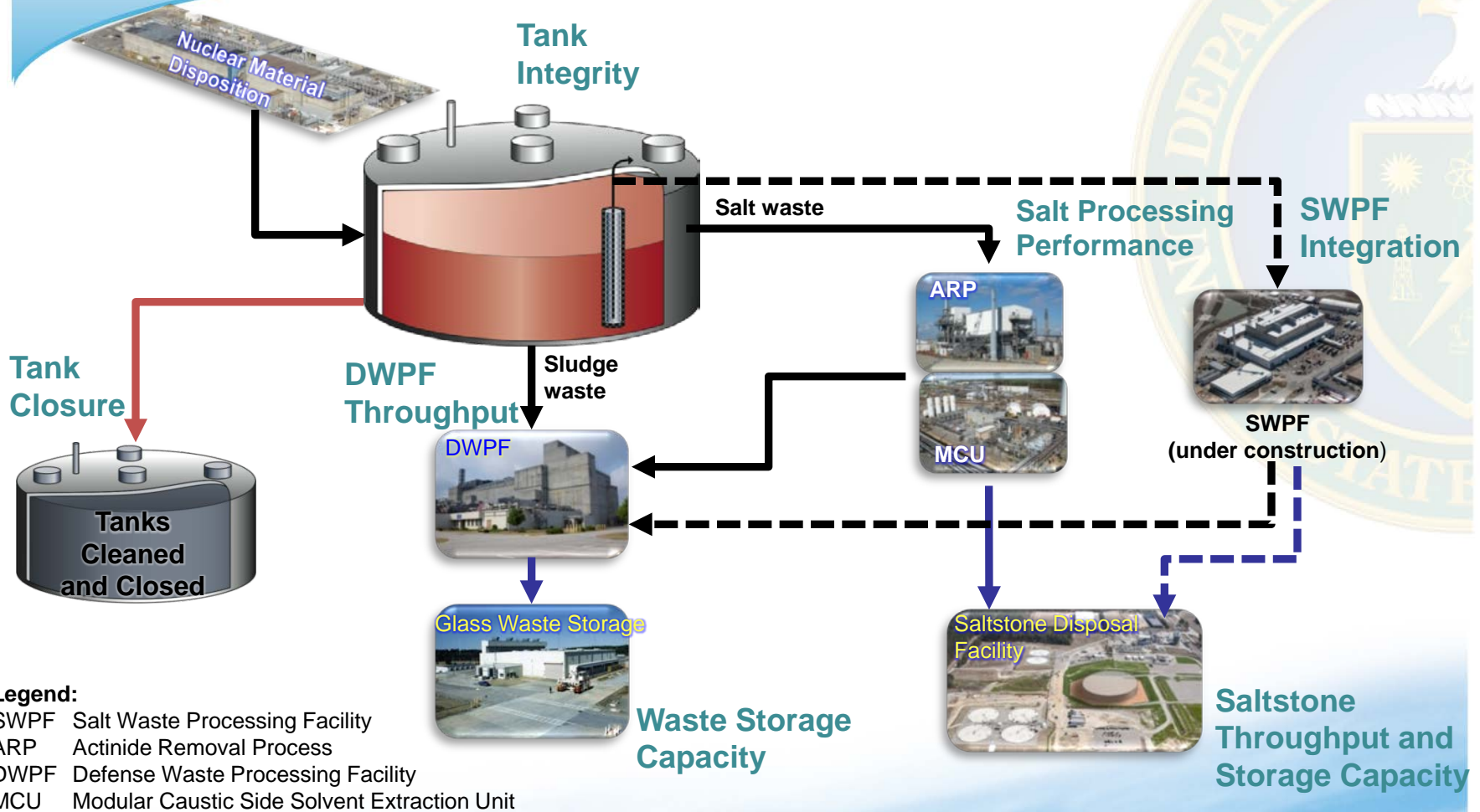
March 17, 2015

Savannah River Site





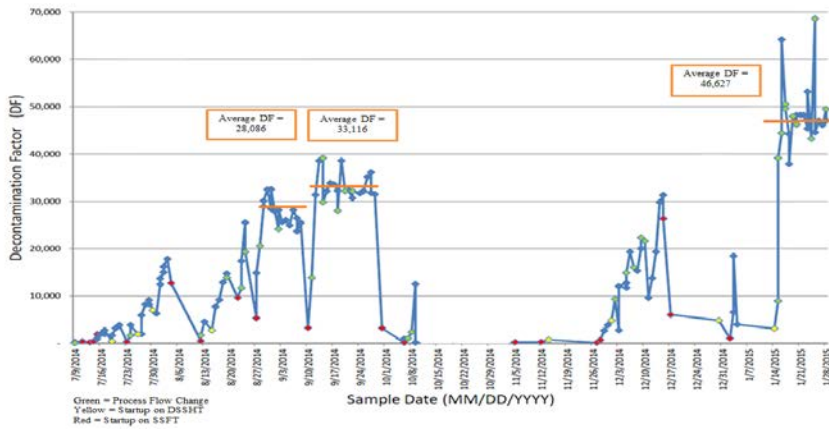
Major Liquid Waste System Components





Technology Opportunities

Reducing Risk

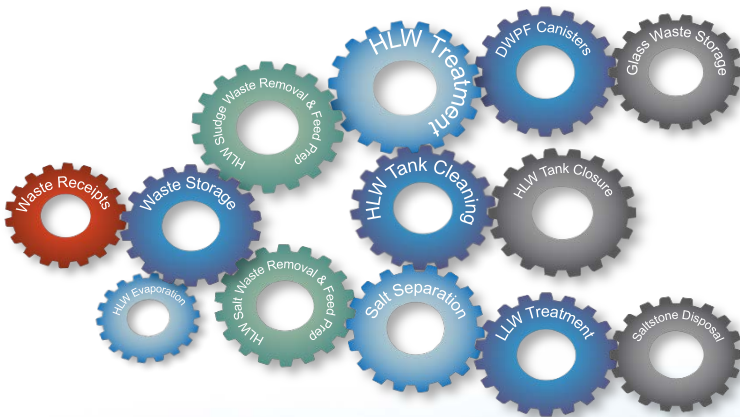


Integrating with New Facilities (e.g. Salt Waste Processing Facility)



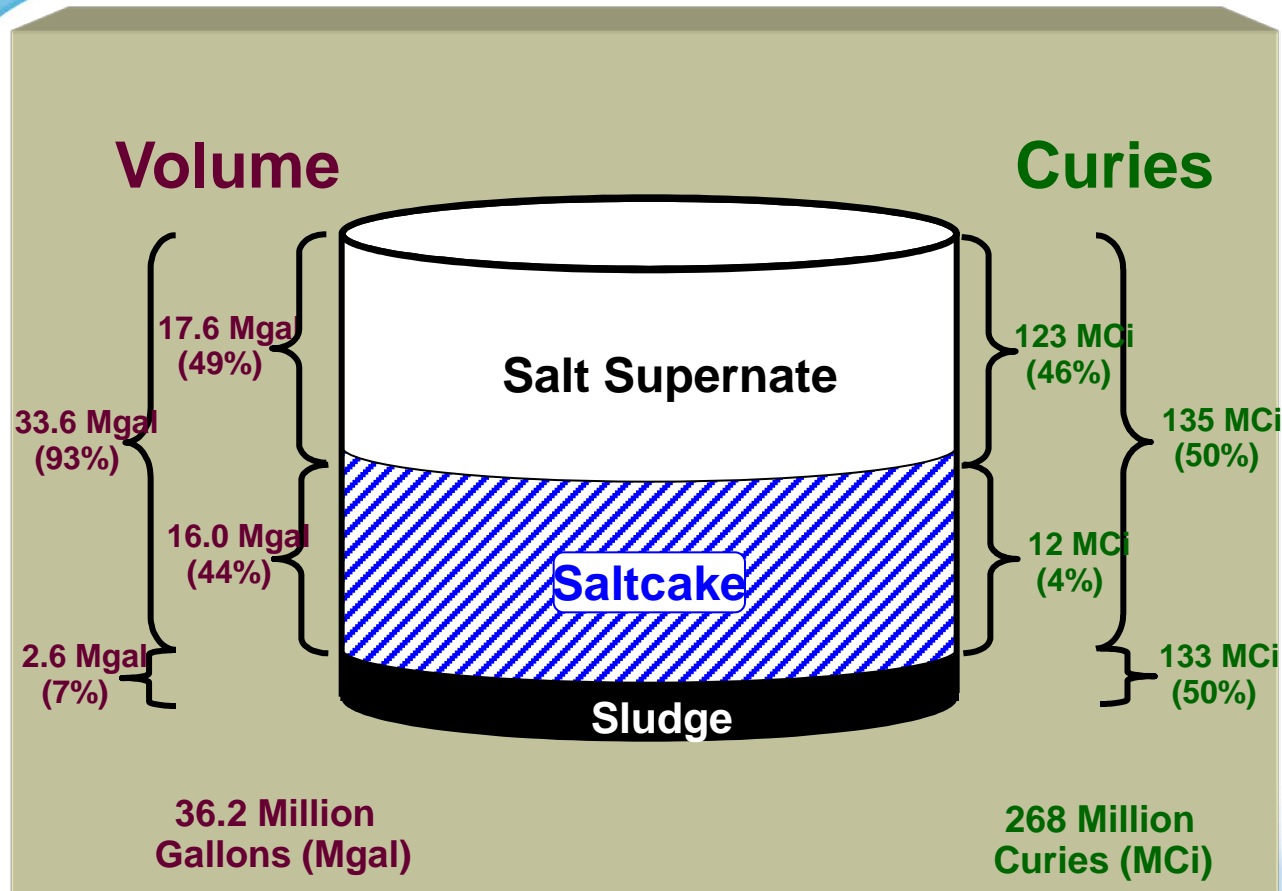
Meeting/Accelerating Production Demands

Upgrading Aging Infrastructure/Equipment

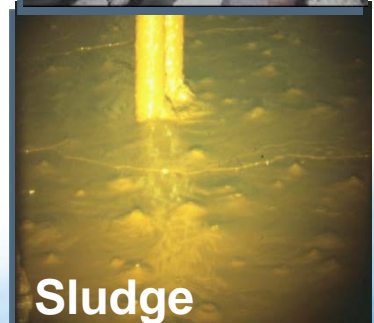




The Challenge – SRS Composite Inventory



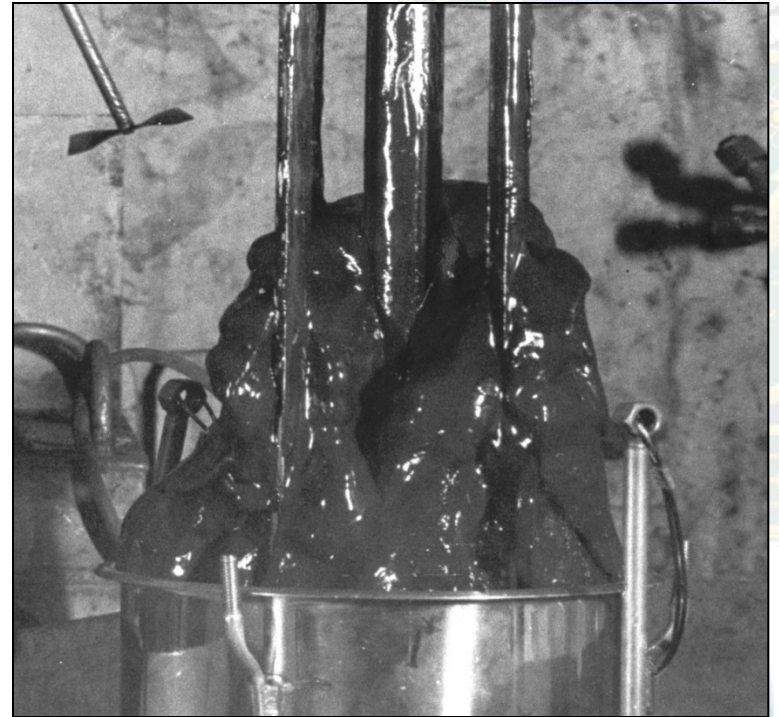
Inventory values as of 2014-12-31





Waste Processing and Facility Needs

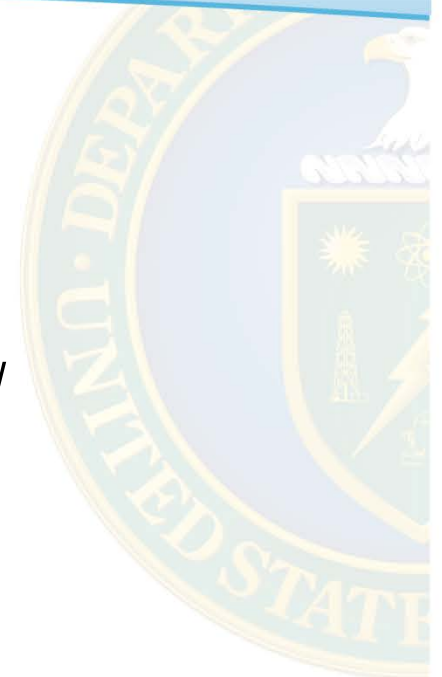
- Tank Integrity during storage and waste retrieval
 - Most tanks have cooling coils
- Sludge Waste Processing
- DWPF Throughput
 - Waste Storage Capacity
- Tank Closure





More Waste Processing and Facility Needs

- Salt Waste Processing
 - Higher salt processing rates – interim and after SWPF startup
- Low Activity Waste Treatment - throughput and storage Capacity
- Salt Waste Processing Facility Integration





Waste Retrieval

- Processing 1.0 gallon of settled sludge increases new style tank inventory by 1.3 gallons.
- One tank full of saltcake (1.3 million gallons) dissolves into more than 3 tanks full of dissolved salt.

Storing Waste



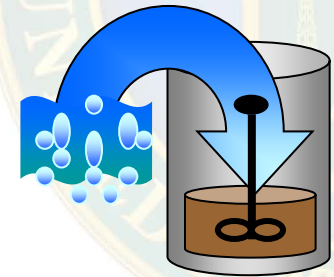
16 Old Style
27 New Style



6 Closed Tanks (Old Style)
2 in closure process (Old Style)

51 Total

Removing Waste from Tanks



Water and
Liquid Waste

Is focused on the Old Style Tanks first as space in new style tanks allows.

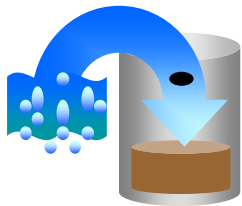


Sludge Processing



Immobilize Waste for Disposal

Removing Sludge Waste from Tanks



Water and Liquid Waste

Defense Waste Processing Facility

- World's largest vitrification plant
- Entire 36 million gallons of waste awaiting disposition has about 268 million Curies of radioactivity
- Almost all radioactivity from waste dispositioned via DWPF
 - Over 56 million Curies to date
- Over 3,900 canisters filled since 1996



Interim Storage of Canisters

- DWPF Glass Waste Storage Buildings (GWSB)
 - *Seismically qualified underground concrete vaults*
 - *Designed for safe interim storage*
- Approaching capacity of existing storage
 - *GWSB 1 is full (contains 2,244 canisters)*
 - *GWSB 2 contains ~1,630 canisters (2,339 capacity)*
- Canister Double Stacking in GWSB#1
- Modular storage concept being considered for remaining cans ~2026

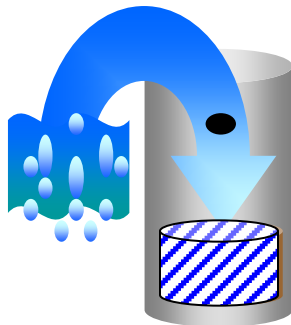




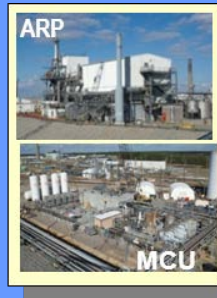
Salt Waste Processing

The vast majority of radioactivity from salt waste is sent to the DWPF

Removing Salt Waste from Tanks



Water and Liquid Waste



Interim (ARP/MCU)

Salt Waste Processing

•SWPF (Future)



Saltstone Facility



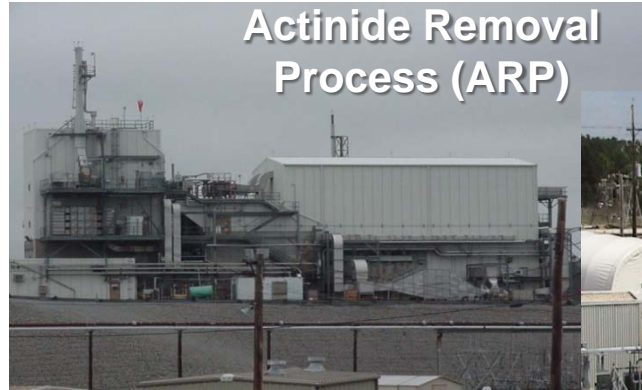
Over 99% of the volume is sent to Saltstone for disposal in concrete cells



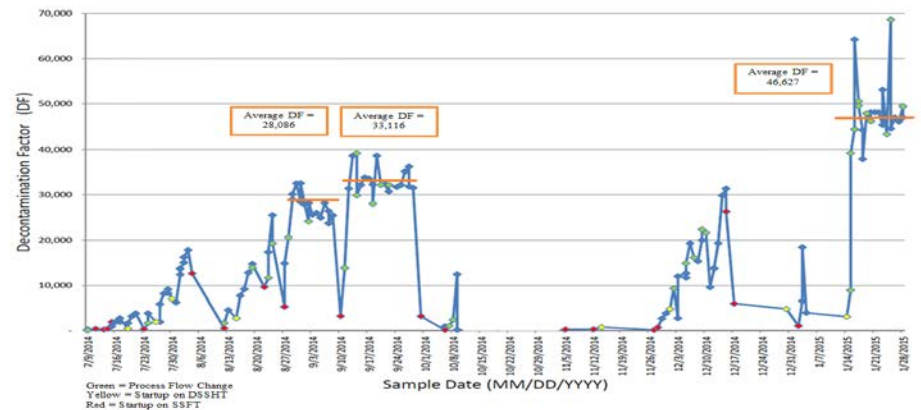
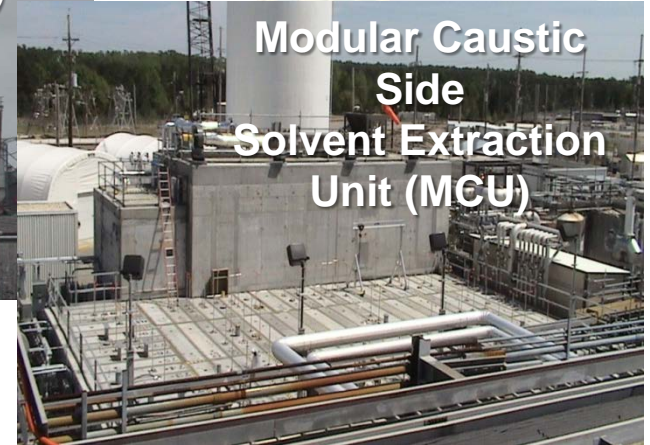
Interim Salt Processing Facilities

- ARP/MCU operational since 2008, over 5 million gallons treated to date
- Removes Cesium, Strontium/actinides from salt waste, with nominal capacity 1.5 Mgal/yr
- Decontamination and throughput exceed initial expectations
- Completed installation of Next Generation Solvent for improved cesium removal
- Providing operating experience for SWPF startup and initial operations

Actinide Removal Process (ARP)



Modular Caustic Side Solvent Extraction Unit (MCU)





Future Salt Waste Treatment Capability

Salt Waste Processing Facility



Constructed by Parsons

This critical facility will:

- Reduce radioactive waste volume requiring vitrification
- Utilize the same actinide and cesium removal technologies as Interim Salt Processing Facilities
- Ultimately process over 90% of Tank Farm liquid radioactive waste



Saltstone

Saltstone Processing Facility

- Vast majority of waste volume from tanks – but little radioactivity – left in SC
- Low activity waste is treated for disposal at the Saltstone Processing Facility
 - *Salt solution stabilized by mixing with cement, flyash and slag*
 - *Resulting grout mixture mechanically pumped into concrete Saltstone Disposal Units (SDUs)*
- Safely processed over 14 Mgal of low-level radioactive liquid salt wastes into grout (over 17Mgal) to date containing approximately 433 KCi of radioactivity



Saltstone Disposal Facility

- Engineered low level waste disposal facility
- Grout is non-leaching and has low water permeability
- Initial 12-cell rectangular vault (Vault 4) filled
- Saltstone Disposal Unit (SDU) -2 – modern watertight design – now full
- SDU 3 and 5 completed and being filled
- Currently constructing 3rd generation SDU-6

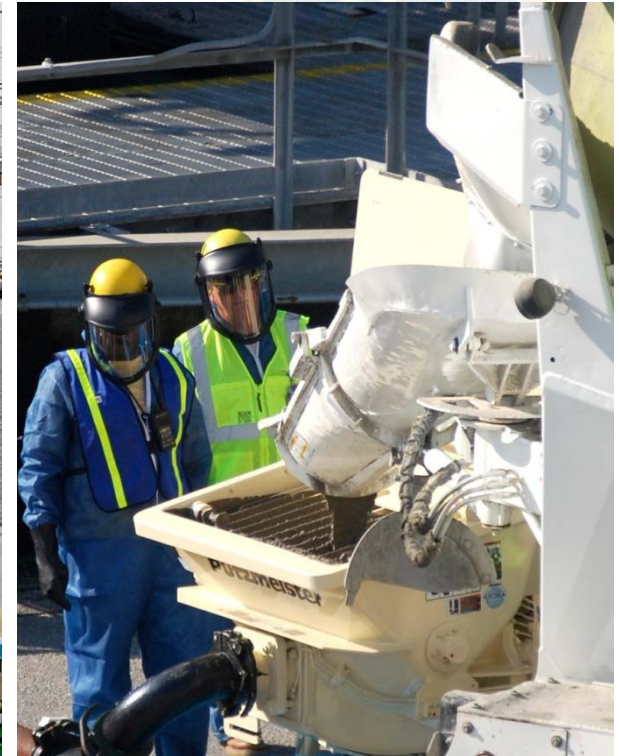




Liquid Waste Processing End State

Tank Closure

- All tanks will be emptied of waste, cleaned and closed
- Closure of 24 "Old Style" tanks driven by Federal Facility Agreement (FFA)
- Tanks 17 and 20 closed 1997
- Tanks 18 and 19 closed 2012
- Tanks 5 and 6 closed 2013
- Tanks 12 and 16 in progress



Pouring Grout into SRS Waste Tanks
(April 2012)



Acronyms

- SRS – Savannah River Site
- ARP – Actinide Removal Process
- MCU – Modular Caustic-side Solvent Extraction Unit
- SWPF – Salt Waste Processing Facility
- DWPF – Defense Waste Processing Facility

