• Liquid Waste Objectives
• Overview of Liquid Waste Facilities and Processes
  - Tanks
  - Waste Removal
  - Sludge Processing
  - Salt Processing
Safe disposal of the Savannah River Site waste

- Eliminate risks versus managing risks
- Protect the public, the workers and the environment
- Reduce the life cycle costs
Liquid Waste Program Objectives

- Process salt waste and reclaim tank space
- Reduce lifecycle cost and schedule for salt processing
- Reduce lifecycle cost and schedule for sludge processing
- Close tanks
- Support H-Canyon nuclear materials stabilization operations
Savannah River Site

Liquid Waste Facilities
Liquid Waste System

- DOE Complex Legacy Materials
- Savannah River & other Spent Fuel
- H Canyon
- At-Tank Treatment SCIX
- H Tank Farm
- Aluminum Dissolution
- Sludge Washing
- ARP/MCU (NGS)
- SWPF
- DSS
- Salt Processing
- DSS
- Saltstone
- Vaults
- Disposal
- GWSBs
- HWF
- F Tank Farm
- Empty Tanks -> Closure
- Aluminum Dissolution
- Sludge Washing

Key Terms:
- DWPF - Defense Waste Processing Facility
- GWSB - Glass Waste Storage Building
- ARP - Actinide Removal Process
- MCU - Modular Caustic Side Solvent Extraction Unit
- SWPF - Salt Waste Processing Facility
- DSS - Decontaminated Salt Solution
- SCIX - Small Column Ion Exchange
- NGS - Next-generation Solvent
Liquid Waste Work Scopes

- **Tank Farm Operations**
  - Continue storing liquid radioactive wastes in a safe and environmentally sound manner
  - Remove waste and prepare for salt and sludge treatment

- **Waste Treatment**
  - Operate DWPF to process high-activity components of sludge and salt streams into a vitrified waste form for future permanent disposal
  - Operate the Saltstone Processing Facility to process low-activity waste for disposal at the Saltstone Disposal Facility

- **Tank Closure**
  - Clean and Close non-compliant tanks meeting the requirements of the Waste Determination (WD) Basis documents and Federal Facility Agreement (FFA) schedules

- **Salt Disposition Integration**
  - Install infrastructure to support future operation of Salt Waste Processing Facility (SWPF)

- **Small Column Ion Exchange (SCIX)**
Tank Designs

51 Tanks

24 “Old-Style”
- Types I, II & IV
- 2 closed
- 6 emptied
- 18 contain waste

27 “New-Style”
- Type III/IIIA
Type IV Tank Construction

Inner Carbon Steel Liner

Outer Concrete Tank
Tank Closure Status

15 More in Progress

- Bulk Waste Removal
- Mechanical Heel Removal
- Chemical Cleaning
- Cooling Coil Flushing
- Annulus Cleaning
- Isolation/Final Sampling
- Grout Tank

- Tanks 4, 7, 9, 10, 11, 13, 14, & 15 in Progress
- Tank 8 being Prepped for Chemical Cleaning
- Tank 12
- Tank 16 in Progress
- Tanks 5 & 6 in Progress
- Tanks 18 & 19 Complete
- Tanks 17 & 20 Closed

- Tanks Closed
Waste Retrieval

- **Submersible Mixer Pumps (SMPs)**
  - 7,600 gpm, 300 hp, floor mounted, reliable, easy to decon, reusable
  - Local, portable control station & power supply

- **Hydrolances**
  - High pressure spot cleaning in dormant areas of the tank
  - Used in concert with SMPs

- **Robotic vacuum system for SRS tanks with no cooling coils**

BEFORE CLEANING  SAND MANTIS  AFTER CLEANING
Tank 5
Salt waste stored in Tank 41

Sludge sample
Salt

Volume

34.8 million gallons (92%)

3.2 million gallons (8%)

38.0 million gallons

Radioactivity

177 million curies (51%)

166 million curies (49%)

343 million curies

Inventory values as of 2010-12-31
Liquid Waste System

DOE Complex
Legacy Materials

Savannah River & other Spent Fuel

H Canyon

H Tank Farm

F Tank Farm

Empty Tanks -> Closure

At-Tank Treatment SCIX

- Aluminum Dissolution
- Sludge Washing

Sludge Preparation

ARP/MCU (NGS)

SWPF

DSS

Salt Processing

Saltstone

Vaults

GWSBs

Disposal

canisters

DWPF

canisters

DSS - Decontaminated Salt Solution

SCIX - Small Column Ion Exchange

NGS - Next-generation Solvent

DWPF - Defense Waste Processing Facility

GWSB - Glass Waste Storage Building

ARP - Actinide Removal Process

MCU - Modular Caustic Side Solvent Extraction Unit

SWPF - Salt Waste Processing Facility
Sludge Processing

Sludge from Waste Removal

Chemical Processing

Chemical Addition

Tank Farm

Sludge Prep → Sludge Feed

Glass Melting

Glass Waste Storage Building

Defense Waste Processing Facility
Salt Treatment Facilities

Tank 49

Salt Waste Feed

ARP (96-H) → MCU

Decontaminated Salt Solution

Tank 50

Saltstone

ARP - Actinide Removal Process
DWPF - Defense Waste Processing Facility
MCU - Modular Caustic Side Solvent Extraction Unit
MST - MonoSodium Titanate

Cs Laden Strip Effluent

MST/Sludge Stream

DWPF

Disposal
• Deploy At-tank treatment process
  - Rotary Microfilter
  - Small Column Ion Exchange
  - Spent Resin Disposal
• Provide additional salt processing capability
• Operational Expectations
  - Throughput: 2.5 Mgal/yr
Saltstone Disposal Cells 2A & 2B
Future Disposal Cells
Liquid Waste Program Mission

Safe disposal of the Savannah River Site waste

- Eliminate risks versus managing risks
- Protect the public, the workers and the environment
- Reduce the life cycle costs
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<thead>
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<th>Acronym</th>
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<td>Actinide Removal Process</td>
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