Savannah River Remediation
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ARP/MCU
Operating Performance Status

Presented to the SRS Citizens Advisory Board
Waste Management Committee
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Purpose

- **To satisfy The Waste Management Committee Work Plan by:**

  Providing an update on the operating performance of the "Salt Disposition Project (SDP)", also known as the "Actinide Removal Process (ARP) / Modular Caustic Side Solvent Extraction Unit (MCU)"

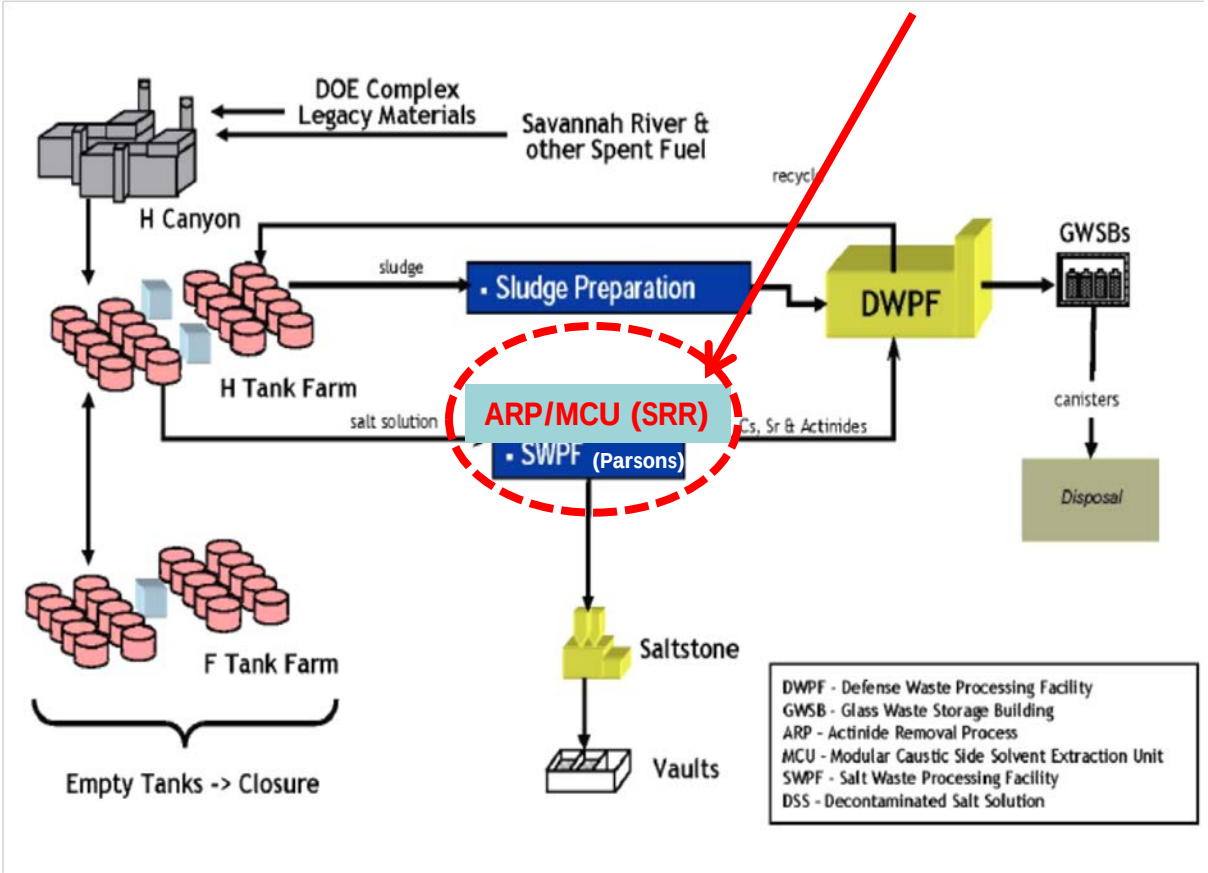
Agenda

- Acronym List
- Process Overview
- Continued Operations Improvement Strategy
- ARP/MCU Operational Performance
- Summary

Acronym List

ARP	Actinide Removal Process
CSSX	Caustic Side Solvent Extraction
DSS	Decontaminated Salt Solution
DWPF	Defense Waste Processing Facility
DF	Decontamination Factor
GWSB	Glass Waste Storage Building
GPM	Gallons Per Minute
MCU	Modular Caustic Side Solvent Extraction Unit
NGS	Next Generation Solvent
SRNL	Savannah River Nuclear Laboratory
SRR	Savannah River Remediation
SRS	Savannah River Site
SWPF	Salt Waste Processing Facility

Process Overview
Salt Disposition



Process Overview: ARP/MCU Mission

- **Process Salt Solution for Disposal Utilizing the ARP/MCU process:**
  - **Continuing to optimize the "First of a Kind" process**

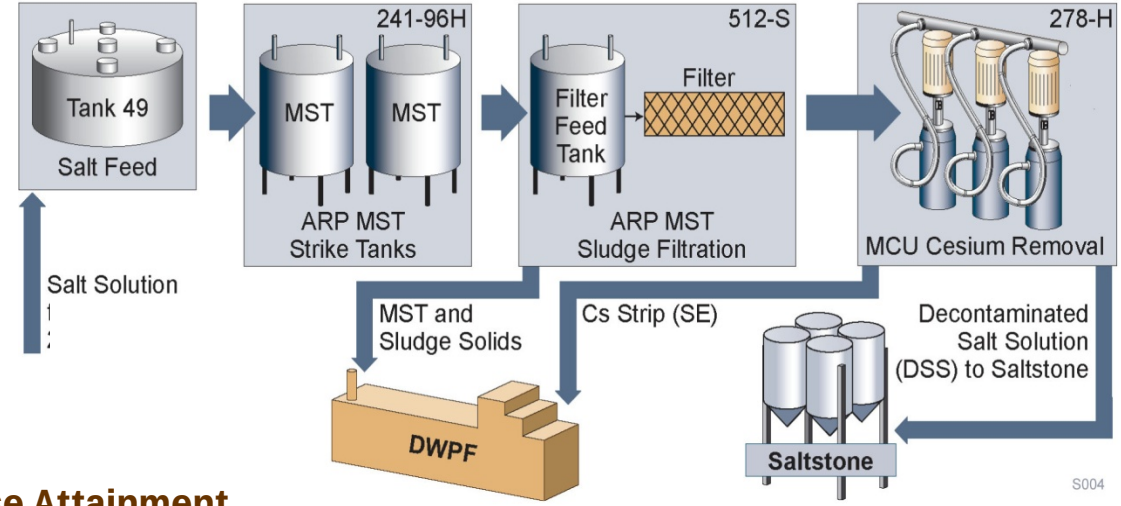
- **Support Continued DWPF Vitrification Operations Until SWPF Start-up:**

- **Provide Operational Experience for the Salt Processing Program:**
  - Continuing to gain process chemistry, equipment reliability and operational/maintenance knowledge and experience

Continued ARP/MCU Operations Improvement Strategy

Objectives:

- Extend the salt processing capability (life-cycle):
  - Replace high risk equipment
  - Improve equipment reliability and maintainability
  - Improve process operations and attainment



Increase Attainment

Optimize the Process Flow-sheet

Upgrade Key Process Equipment to Improve Reliability

Modify Equipment to Facilitate Routine Maintenance

Improve MCU Performance (Cesium Removal)

Improve Equipment Monitoring & Diagnostic Capability

Increase Preventative Maintenance

Procure Spare Parts & Equipment

ARP - Actinide Removal Process
Cs - Cesium
DWPF - Defense Waste Processing Facility
MST - Monosodium Titanate (Used for Actinide Removal)
MCU - Modular Caustic-Side Solvent Extraction Unit
SE - Strip Effluent (Concentrated Cesium Stream from MCU)

ARP/MCU Operational Performance

Project Baseline:

- ~4 years from Pre-Conceptual Design to Radiological Start-Up and Operation
- 3 year Operational Life (minimal capacitance and redundancy)
- 4.0 gpm nominal flow rate
- 12 DF (Cs 137)

FY14 (Historical):

- Completed implementation of the Next Generation Solvent (NGS)
  - The NGS continues to show improved hydraulic and DF performance.
  - NGS sets the stage for continued operation.

FY15 Performance - Best Ever:

- Completed process & equipment reliability improvements for continued operations.
- Ranged from 4.0 -8.5 gpm processing rate
- Achieved > 40,000 DF (Cs 137) with the new process solvent (NGS)
- Achieved 31 day production record of 262 Kgal (2/15/15), previously 202 Kgal
- Achieved 60 day production record of 444 Kgal (3/11/15), previously 349 Kgal
- Achieved 90 day production record of 522 Kgal (3/29/15), previously 456 Kgal
- ~5.4 Mgal since start-up (4/08)

FY15/FY16 Improvements to Support Continued Operations

We do the right thing.

I. 512-S Filtration Improvements
- -Improve 512-S process controls / filter cleaning (COMPLETE)
- -Design and install a new "split-design" secondary filter (COMPLETE)
- -Design and fabricate an upgraded (spare) cross-flow filter (COMPLETE, Replace on Forward Fit)
- -Initiate filtration performance improvement demonstrations (FY16)

II. Reduce Impacts of Process Sampling Requirements
- -Complete "ARP/MCU Sample Cycle Time Improvement Team" Actions (COMPLETE)
- -Evaluate methods to reduce impacts of sampling at increased flow rates (FY16)

III. Implement MCU Equipment and Process Improvements
- -Upgrade the MCU Caustic Wash System (COMPLETE)
- -Upgrade the MCU DSS Hydraulic Accumulator Pump System (95% complete)
- -Upgrade Key Process Flow Control Instrumentation (Design Complete, Initial installation 99% complete)

V. Design and Fabricate "Robust" Spare MCU Process Pump Assemblies
- - Upgrade 3 spare pump assemblies to replace the less reliable sets (COMPLETE, Replace on Forward Fit)
- - Upgrade 5 spare pump assemblies to provide process improvements. (COMPLETE, Replace on Forward Fit)

Summary

- **The ARP/MCU process continues to provide successful salt processing since start-up in 4/08:**
  - Helps reduce the lifecycle of the Salt Processing Program
  - Helps bridge the gap until the Salt Waste Processing Facility starts up
  - Enables continued optimization of the process flow-sheet
  - Provides valuable process, equipment and operational experience for the Salt Processing Program.

- **The ARP/MCU equipment and process improvements set the stage for continued operations.**