ARP/MCU Operating Performance Update

Presented to the SRS Citizens Advisory Board Waste Management Committee
December 2, 2014

Brent A. Gifford
Savannah River Remediation (SRR)
Salt Processing Manager
SRR-TFO-2014-00099 Rev. 1
• To satisfy Waste Management Committee Work Plan by:

1) Providing 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)”

2) Providing update on the demonstrated performance of the Next Generation Solvent (NGS) for the ARP/MCU process
Agenda

- Acronym List
- Process Overview
- Continuous Life Cycle Improvement Strategy
- FY14/FY15 ARP/MCU Operational Performance
- Summary
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARP</td>
<td>Actinide Removal Process</td>
</tr>
<tr>
<td>CSSX</td>
<td>Caustic Side Solvent Extraction</td>
</tr>
<tr>
<td>DSS</td>
<td>Decontaminated Salt Solution</td>
</tr>
<tr>
<td>DWPF</td>
<td>Defense Waste Processing Facility</td>
</tr>
<tr>
<td>DF</td>
<td>Decontamination Factor</td>
</tr>
<tr>
<td>GWSB</td>
<td>Glass Waste Storage Building</td>
</tr>
<tr>
<td>MCU</td>
<td>Modular Caustic Side Solvent Extraction Unit</td>
</tr>
<tr>
<td>NGS</td>
<td>Next Generation Solvent</td>
</tr>
<tr>
<td>SRNL</td>
<td>Savannah River Nuclear Laboratory</td>
</tr>
<tr>
<td>SRR</td>
<td>Savannah River Remediation</td>
</tr>
<tr>
<td>SRS</td>
<td>Savannah River Site</td>
</tr>
<tr>
<td>SWPF</td>
<td>Salt Waste Processing Facility</td>
</tr>
</tbody>
</table>
Salt Disposition Process Overview

We do the right thing.
Process Overview:
ARP/MCU Mission

We do the right thing.

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

- **Continued Operations - Mitigate Impact of Delay in SWPF Start-up:**
  - Deploy/demonstrate the MCU- Next Generation Solvent

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

---

**Procure Spare Parts & Equipment**

---

**Abbreviations:**

- 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)
FY14/FY15 ARP/MCU Operational Performance

• FY14: Completed the initial Next Generation Solvent (NGS) demonstration processing over 550,000 gallons:
  - The NGS solvent shows improved hydraulic and DF performance.
  - NGS sets the stage for continued life cycle and increased MCU throughput.

• FY15: Completed reliability improvements during Oct/Nov. 2014 site steam outage.

• FY15: ARP/MCU processed ~40,000 gallons to date. MaxCalix

• Processed over 4,600,000 gallons since initial start-up.
FY14/FY15 ARP/MCU Operational Performance - (NGS DF)

Cesium DF

Decontamination Factor

Sample Date (MM/DD/YYYY)

Restart of MCU after Removal of Solids

Average = 28,086

Average = 33,116

Red denotes startup on S5FT after restart
Green denotes change of CSS flow during continuous operation
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 lifecycle enhancements set the stage for continued ARP/MCU operations

Implementation of the MCU-“Next Generation Solvent”:
- Provides a lower curie cesium waste stream to Saltstone for the continued operational life of MCU.
- Sets the stage for increased throughput (with additional funding)
Back-Up: MCU Contactors