SRS LIQUID WASTE OVERVIEW

Mark Schmitz
SRR Chief Operating Officer and Deputy Project Manager
SRR Contract

- Savannah River Remediation is responsible for the safe storage and disposition of radioactive liquid waste produced from Cold War era nuclear weapons production.
- SRR contract began on July 1, 2009.
- 6-year base contract, plus 2-year option.
- Current workforce of ~2,500 employees (including subcontractors).
Safety

- **Record-setting worker safety**
  - 11 million safe hours without a missed day of work injury (December 2018)
  - 4 million safe hours through August 2019
  - SRR Construction >31 million safe work hours (20 years)

- **Earned DOE’s Voluntary Protection Program Star of Excellence each year of the contract**

![Image of award ceremony]

- **Zero Environmental Notices of Violation**
- **Zero Price-Anderson Notices of Violation**
SRS Liquid Waste Program

Legend:
- ARP: Actinide Removal Process
- BWRE: Bulk Waste Removal Efforts
- DWPF: Defense Waste Processing Facility
- ISS: Interim Safe Storage
- MCU: Modular Caustic Side Solvent Extraction Unit
- TCCR: Tank Closure Cesium Removal
- SWPF: Salt Waste Processing Facility

Operational Goals:
- Radionuclides to glass
- Chemicals to Saltstone
- Tanks cleaned and operationally closed

Salt waste

Salt Processing

(Suspended Operations) Ops: 2008-2019

Tanks Cleaned and Closed
<1% radionuclides remain in tanks

1954-

1996-

Recycle

Glass Waste Storage

Most radionuclides to glass

4,207 cannisters poured of projected 8,121

8 tanks grouted and closed

17.7 Mgal salt waste treated

31 Mgal grout dispositioned

<1% radionuclides to saltstone

Saltstone Disposal Facility

Spent Columns

Interim storage pad

(pilot project) 2019-

ARPA

MCC

DWPF

Interim Safe Storage

Modular Caustic Side Solvent Extraction Unit
Produced over 4,200 canisters (>1,460 under SRR) and poured over 6 million pounds of vitrified radioactive waste
- Installed melter bubbler innovation for mixing to improve glass rate by 50%
- Replaced Melter 2 with Melter 3 (completed December 2017)
- Installing Lab Waste Handling project to handle high strontium/cesium streams from SWPF
Glass Waste Storage Buildings: Canister Double-Stack

- Stacked the first two radioactive canisters in August 2016
- Modifies existing locations to store two canisters each (from 2,254 to 4,508)
- Creates safe interim storage through Fiscal Year 2029
- Postpones expense of another storage facility, saving >$74 million
ARP/MCU: The Model for Salt Cleanup

- Processed 7.4 million gallons of salt waste through interim salt processing facilities, the Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU)
- Implemented Next Generation Solvent with demonstrated decontamination factors >60,000 for Cesium (>99.99 Cesium removal)
- Placed ARP/MCU in operational standby for final SWPF tie-ins (June 2019)

Piloted and proved the technology for the Salt Waste Processing Facility
Tank Closure Cesium Removal (TCCR) : Demonstrating New Technology to Improve Tank Closure

- Supplemental salt waste treatment capability to accelerate tank closures
- At-tank ion exchange cesium removal process
  - Demonstration effort to treat Tank 10
- Contract Award to Operational Facility: 2.5 Years
- Successfully processed >200,000 gallons
3H Evaporator: The Infrastructure

- 3H Evaporator operations shut down in February 2016 after a leak was detected
- Repaired and then restored in July 2018
- Since return to service, 3H has recovered > 1 million gallons of space
- Spare/Replacement vessel being fabricated as contingency
Saltstone Production Facility: Building Capacity
Saltstone Disposal Units: Before

SDU 3A  SDU 3B

SDU 5A  SDU 5B

SDU 2A  SDU 2B

SDU 6

SDU 6

Construction Complete July 2017
Placed into Service August 2018

- Began operating first mega-volume SDU
- EM Project of the Year
- DOE Award of Excellence
Saltstone Disposal Units: And in the Future

SDU 9
SDU 6
SDU 7
SDU 10
SDU 8
SDU 11
SDU 12
Challenge Ahead
1. Salt Solution Receipt Tanks completed in 2011
2. Initial Tie-ins of SWPF completed 12/2016
3. Install Jumpers in 511-S to support SWPF
4. Tank 49 B-5 Riser Feed Pump installed 06/2019
5. Complete Final Tie-ins of SWPF Feed Line
6. Complete Final Tie-ins of SWPF DSS Line
# Waste Tank Status

**Savannah River Site — Waste Tank Levels**  
*APPROVED for Unlimited (Release to Public)*

<table>
<thead>
<tr>
<th>Tank</th>
<th>Level</th>
<th>Status</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 F</td>
<td>(I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 F</td>
<td>(I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 F</td>
<td>(I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 F*</td>
<td>(I)</td>
<td>Closed</td>
<td>12/19/2013</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>5 F*</td>
<td>(I)</td>
<td>Closed</td>
<td>12/19/2013</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>6 F*</td>
<td>(I)</td>
<td>Closed</td>
<td>9/23/2015</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>7 F</td>
<td>(I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 F*</td>
<td>(I)</td>
<td>Closed</td>
<td>4/28/2016</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>9 H</td>
<td>(I)</td>
<td>Closed</td>
<td>12/10/1997</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>10 H</td>
<td>(I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 H*</td>
<td>(I)</td>
<td>Closed</td>
<td>9/5/2012</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>12 H*</td>
<td>(I)</td>
<td>Closed</td>
<td>9/5/2012</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>13 H</td>
<td>(II)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 H</td>
<td>(II)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 H*</td>
<td>(II)</td>
<td>Closed</td>
<td>7/28/1997</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>16 H*</td>
<td>(II)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 F*</td>
<td>(IV)</td>
<td>Closed</td>
<td>12/10/1997</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>18 F*</td>
<td>(IV)</td>
<td>Closed</td>
<td>9/5/2012</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>19 F*</td>
<td>(IV)</td>
<td>Closed</td>
<td>7/28/1997</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>20 F*</td>
<td>(IV)</td>
<td>Closed</td>
<td>9/5/2012</td>
<td>Filled w/ Grout</td>
</tr>
<tr>
<td>21 H</td>
<td>(IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 H</td>
<td>(IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23 H</td>
<td>(IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 H</td>
<td>(IV)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29 H</td>
<td>(III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 H</td>
<td>(III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 H</td>
<td>(III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32 H</td>
<td>(III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33 F</td>
<td>(III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>44 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47 F</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51 H</td>
<td>(III A)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend**
- Unusable Space
- Usable Space
- Low-Level Waste
- Aluminum-Rich Leachate
- DWPF Recycle
- Evaporable Supernate
- Concentrated Supernate
- Saltcake
- Dissolved Salt Solution
- Salt Batch Prep & Feed
- Precipitate
- Sludge
- Sludge Batch Prep & Feed

Shaded background indicates tank has identified leak sites

* BWRE Complete on these tanks

**Total Volume (millions of gallons)**
- 39.0 12/16/01
- 34.0 8/11/98
- 35.3 6/30/19

---

**SAVANNAH RIVER SITE • AIKEN, SC • www.SRRRemediation.com • We do the right thing.**
Now

Feed Tank

49

SWPF

Blend Tank

21

3M Gallons of Salt Feed Per Year

Hub Tanks

42/43

23

35

8

Source Tanks

Legend
Green = Salt
Red = Concentrate
Orange = Leachate
After SWPF Startup

6M Gallons of Salt Feed Per Year

Legend
Green = Salt
Red = Concentrate
Orange = Leachate

Source Tanks
23
35
39
37
26
41

Blend Tanks
21
41

Hub Tanks
8
26

Feed Tank
49

SWPF

SAVANNAH RIVER SITE • AIKEN, SC • www.SRRemediation.com • We do the right thing.
9M Gallons of Salt Feed Per Year

Legend
Green = Salt
Red = Concentrate
Orange = Leachate