Salt Waste Processing Facility
Project Status and Path Forward
Pam Marks, Federal Project Director
Salt Waste Processing Facility
September 2018
SWPF Project Overview
Salt Waste Processing Facility (SWPF)

This critical facility will:

- Reduce radioactive waste volume requiring vitrification;
- Utilize the same actinide and cesium removal unit processes as Interim Salt Processing Facilities (Actinide Removal Project/Modular Caustic Side Solvent Extraction Unit);
- Process over 90% of Tank Farm liquid radioactive waste (~100 Mgal after dissolution); and
- Have a nominal capacity of 6 – 8 Mgal/year (or better!)
Legend:
- ARP: Actinide Removal Process
- DWPF: Defense Waste Processing Facility
- MCU: Modular Caustic Side Solvent Extraction Unit
- SWPF: Salt Waste Processing Facility

SWPF
- Designed to process more than 6 million gallons per year
- Cs Decontamination factor > 40,000
- Technology is very mature
- No open Defense Nuclear Facilities
- Safety Board issues

H-Canyon Receipts → Tanks Closed and Closed → Recycle

Salt Waste → Sludge Waste → Glass Waste Storage

Radionuclides → ARP → Saltstone Disposal Facility

Decontaminated Waste Stream → SWPF (In testing)
SWPF Process Overview

F and H Area Tank Farms

Alpha Strike Process

Cesium Removal Process

Alpha Finishing Process

Saltstone Facility

Concentrated Sr-90/Actinides Sludge

Ds Enriched Strip Effluent

Concentrated Sr-90/Actinides Sludge

Decontaminated Waste Stream
### SWPF Facility Statistics

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area</td>
<td>~140,000 sq.ft</td>
</tr>
<tr>
<td>Basemat</td>
<td>8 ft. thick</td>
</tr>
<tr>
<td>Concrete</td>
<td>~40,000 cubic yards</td>
</tr>
<tr>
<td>Pipe</td>
<td>~23 miles</td>
</tr>
<tr>
<td>Welds</td>
<td>~74,560</td>
</tr>
<tr>
<td>Wire and Cable</td>
<td>~816,690 LF</td>
</tr>
<tr>
<td>Rebar</td>
<td>~4,600 tons</td>
</tr>
<tr>
<td>Actuated Valves</td>
<td>~1,000</td>
</tr>
<tr>
<td>Manual Valves</td>
<td>~3,000</td>
</tr>
<tr>
<td>Instruments</td>
<td>~1,500</td>
</tr>
<tr>
<td>Tanks</td>
<td>85</td>
</tr>
<tr>
<td>Pumps</td>
<td>116</td>
</tr>
</tbody>
</table>
Parsons is the contractor for the SWPF project (design, construction, testing & commissioning, and operations for one year)

Current workforce of ~460

Additionally, there are 40 staff and 10 craft members working on Next Generation Solvent (NGS)
SWPF Testing & Commissioning Status
## Testing & Commissioning Program: Safety Management Programs

<table>
<thead>
<tr>
<th>MSA*-1</th>
<th>MSA*-2</th>
<th>MSA*-3</th>
<th>CD-4</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Testing (Water)</td>
<td>Cold Commissioning (Chemical)</td>
<td>Contractor ORR / DOE ORR***</td>
<td>Hot Commissioning</td>
</tr>
</tbody>
</table>

- Conduct of Testing
- Conduct of Operations/Procedures
- Cognizant System Engr. Program
- Configuration Management
- Quality Assurance
- Maintenance
- Work Planning and Control
- Industrial Safety, Environmental Protection

- Chemical Safety/Industrial Hygiene
- Fire Protection
- Training and Qualification
- Waste Management
- Performance Testing (with simulant)

- Emergency Management
- Nuclear Safety (DSA/TSR/SER)**
- Radiation Protection

- Performance Testing
- Radioactive Shielding
- Removal Efficiency
- Waste Acceptance Criteria
- Environmental Testing

*MSA – Management Self Assessment

**Documented Safety Analysis/Technical Safety Requirements/Safety Evaluation Report

***MSA-3 and ORR include integration with LW contractor
Testing and Commissioning Approach

- **System Turnover**
  - Calibration, Grooming and Alignment
    - Component level verification, setup, and tuning to support SOTs

- **SOTs**
  - **ISOTs**
    - Integrated System Operational Tests
      - Confirmation of integrated system performance requirements

- **IWRs**
  - Integrated Water Runs
    - Confirmation of plant performance requirements using water. Operations proficiency

- **CC**
  - Cold Commissioning with Chemical Simulant
    - Chemical processing confirmation of integrated system performance requirements for waste removal efficiency

- **ORRs**
  - Contractor and DOE ORRs

- **HC**
  - Hot Commissioning
    - Confirmation of processing using radioactive waste

- **CD-4 (Project Completion)**

-- Completed Activities
Valve Controller Issues
Initial Identification of Valve Controller Issue

- Valve controllers successfully tested during Calibration, Grooming, and Alignment (CG&A)
- During start-up testing, various performance issues were encountered with the Westlock EPIC valve controllers, which were initially attributed to human error
- The performance issues were generally manifested as intermittent loss of communication between the valve controller and the BPCS (Basic Process Control System) that resulted in the valve going to its failed state position and/or losing the ability to be repositioned by the BPCS
- A Post Incident Review of a tank overflow of water due to a controller issue lead to Operations initiating a tracking log of controller issues
- The tracking log revealed that the vast majority of the controller issues were limited to the Westlock EPIC model controller
- The identification of the EPIC controller issue resulted in an evaluation and technical report of the issue by Parsons, Westlock, and DeltaV technical experts
SWPF Valve Stack-up consists of three components:
- The Valve
- The Air Operated Actuator
- The Westlock Positioner/Controller (Operated from the control room via computer (DeltaV software)
SWPF Air Operated Valves (con’t)

- Approximately 700 SWPF valves positioned by one of three types of Westlock Positioner:
  - ✓ FPAC Positioners (~75) – After initial troubleshooting all operating reliably
  - ✓ ICOT Positioners (~150) – After control board upgrades, all operating reliably
  - X EPIC Positioners (~450) – Continue to experience temporary loss of communication and valve control with a number of these positioners

- On 3/16/18, Parsons issued a Westlock Controller evaluation technical paper after on-site consultation with Westlock and DeltaV technical experts. The paper concluded that the EPIC controller issues, in conjunction with Westlock deeming the product line no longer serviceable, indicated replacement was warranted.
On 4/16/18, Parsons issued Letter Reference Number: 00-700-26486, *Impacts of Realized Risk Associated with Westlock Controllers and Recommended Path Forward*. In this letter, three options were presented to address the controller issue:

- **Option 1 – Phased Partial Replacement Approach** whereby a subset of EPIC valve controllers would be replaced to allow chemical introduction and systemization of the CSSX System. The remaining controllers would be replaced opportunistically.
- **Option 2 - Campaign Approach** to replace all EPIC controllers with ICOT or FPAC controllers, prior to introduction of chemicals into the plant.
- **Option 3 – Parallel Full replacement Approach** where EPIC controllers are replaced only as they fail to function or when they can be opportunistically replaced.

Option 2 was selected by Parsons as the safest approach and an approach which would provide significant collateral benefits to the operational posture of the SWPF.

DOE has concurred with this approach.
Switching all EPIC controllers to reliable ICOT/FPAC controllers requires the following:

- Engineering Design Changes
- Procurement of upgraded ICOT/FPAC controllers and installation materials
- BPCS software changes – required to support the functionality of the new controllers
- Work Packages:
  - Construction Work Packages for controller installation
  - Maintenance Work Orders for controller testing and tuning

Status of the EPIC Controller Replacement Program:

- Installation of replacement controllers commenced on 5/7/18
- All needed replacement controllers, including spares, have been received from the vendor
- As of 7/18/18, 185 controllers or ~41% of the total have been replaced and passed post maintenance testing
Path Forward (con’t)

- Next Steps Include:
  - Develop new Target CD-4 date:
    - FPD to review and approve Parson’s Baseline Change Proposal
    - Update Project Risk Register to reflect changes
  - Monitor replacement controller delivery/installation schedule
  - Negotiate contract modification
  - Implement Obsolescence Program

Note: The SWPF baseline CD-4 date of January 31, 2021 and the Total Project Cost of $2.3B approved by Deputy Secretary of Energy in August 2014 remains bounding. Impacts to both cost and schedule from the valve controller replacement are still well within the approved baseline.
Next Generation Solvent
Parsons has successfully conducted full scale Caustic Side Solvent Extraction system testing with NGS.

MCU hot pilot plant is currently successfully implementing NGS.

NGS testing indicates that significant SWPF plant throughput improvement is possible.

NGS throughput enhancements could significantly accelerate critical path salt waste processing thereby facilitating large life cycle cost savings.

Baseline Change Proposal approved on 1/8/18.

Waste Water Permit application to allow installation connections to tanks and was issued in late June 2018.

Building structural steel deliveries are complete and structural steel erection will be complete before the end of July 2018.

27.6% complete through April 2018.

Scheduled to Complete December 2018.
The SWPF Project is poised for continued success:

- Continued commitment to protection of the public, the worker, and the environment
- No significant technical or regulatory issues
- Consistent and strong management team – both DOE, Parsons, and SRR
- DOE, Parsons, SRR, SRNS, and SRNL working very well together for the integrated solution
- Savannah River Site uniquely positioned for a complete LW clean-up solution – once SWPF is operational all pieces will be in place