Salt Waste Processing Facility Baseline Status

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Savannah River Site Citizens Advisory Board Meeting
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Purpose

- Fulfill a 2015 Waste Management Committee Work Plan topic

- To brief the Citizens Advisory Board (CAB) on the status of the Salt Waste Processing Facility (SWPF) Project.
### Acronyms

- **ARP** – Actinide Removal Process
- **ASME** – American Society of Mechanical Engineers
- **CAB** – Citizens Advisory Board
- **CD-0** – Critical Decision 0, Approve Mission Need
- **CD-1** – Critical Decision 1, Approve Alternative Selection and Cost Range
- **CD-2** – Critical Decision 2, Approve Performance Baseline and Critical Decision 3A, Approve Limited Construction / Long Lead Procurements
- **CD-3** – Critical Decision 3, Approve Start of Construction
- **CD-4** – Critical Decision 4, Approve Start of Operations or Project Completion
- **DWPF** – Defense Waste Processing Facility
- **DSS Line** – Decontaminated Salt Solution
- **LW** – Liquid Waste
- **MCU** – Modular Caustic –Side Cesium Extraction Unit
- **NGS** – Next Generation Solvent
- **ORR** – Operation Readiness Review
- **SRNL** – Savannah River National Laboratory
- **SWPF** – Salt Waste Processing Facility
- **WTL** – Waste Transfer Line
Salt Waste Processing Facility

This critical facility will:

- Reduce radioactive waste volume by safely separating high-activity fraction from low-activity fraction of the radioactive liquid salt waste stored in underground tanks at the Savannah River Site and re-turning high-activity waste fraction for vitrification at the Defense Waste Processing Facility (DWPF).

- Utilize the same radioactive waste removal processes as Interim Salt Processing Facilities (Actinide Removal Process/ Modular Caustic – Side Cesium Extraction Unit (ARP/MCU) – Pilot Facility)

- Process over 90% of Tank Farm liquid radioactive waste
  - 97 million gallons after adding liquid to waste (dissolution) to facilitate processing

- Have a nominal capacity of 7.3 million gallons per year

Parsons is the contractor for the SWPF project [design, construction, commissioning and operation for one year]
F and H Area Tank Farms

SWPF

Qualified Waste Batch

Decontaminated Salt Solution

Alpha Strike Process

Cesium Removal Process

Alpha Finishing Process

Saltstone Facility

Concentrated Sr-90/Actinides Sludge

Cs Enriched Strip Effluent

Concentrated Sr-90/Actinides Sludge

SWPF Process

DWPF
Savannah River Site Liquid Waste System

**LEGEND:**
- **Inter-Area Line** – Transfers waste between F- and H-Area Tank Farms
- **WT Line** – Waste Transfer Line transfers waste from Tank Farms to SWPF for processing then from SWPF to DWPF
- **DSS Line** – Decontaminated Salt Solution Line transfers waste from SWPF to Saltstone

- **Saltstone Processing & Disposal Facility**
- **Salt Waste Processing Facility**
- **Defense Waste Processing Facility**
- **F-Tank Farm**
- **H-Tank Farm**
- **Inter-Area Line**
Waste Transfer Line Installation

April 2014

September 2015
SWPF Laboratory

- SWPF Laboratory provides full capability to support plant operations for both Waste Acceptance compliance and process chemistry control.
- Laboratory occupies approximately 8,000 square feet of floor space.
- A shielded hot cell with 4 work-stations provides capability for sampling and processing high curie content samples.
- 11 glove-box/radio-hood lines contain analytical equipment for organic, inorganic and radiochemistry analysis needs.
- A fully contained transfer system allows safely moving samples from the hot cell to any the glove-box/radio-hood lines and between lines as needed.
- A co-located repair area is included to maintain hot cell manipulators.
**System Turnover**

- **CG&A**
  - Calibration, Grooming and Alignment
    - Component level verification, setup, and tuning to support SOTs.

- **SOTs**
  - System Operational Testing
    - Confirmation of testable system attributes.

- **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 using chemical simulants for waste removal efficiency including *design capacity performance testing*.

- **ORRs**
  - Contractor and DOE ORRs

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

- **CD-4**
Liquid Waste Scope Required to Start SWPF

**Blend and Feed**
- Provide raw salt solution (RSS) feed for SWPF
- Equip one existing tank with blending capability
- Equip one existing tank as the SWPF Feed Tank
- Provides transfer piping for RSS transfers to SWPF

**East (ETL) and West (WTL) Transfer Lines**
- Tie-ins of new underground SWPF piping to existing Liquid Waste piping
- ETL tie-in to provide path from SWPF to H-Tank Farm (HTF)
- WTL tie-ins provide path between SWPF, HTF, and DWPF
- Significant outage to execute scope
- Soil borings completed

**Laboratory Waste Handling**
- Improve method to remove higher curie waste and material from DWPF Lab
- Approved design input documents and issued Preliminary Material Handling Diagram
- Performed waste characterization calculation for future waste

**DWPF Modifications**
- Allow receipt of high activity effluent streams from SWPF
- Expanding glass composition to support MST Strikes at SWPF Complete Consolidated Hazards and Documented Safety Analyses
- Temperature interlock and automated shut off of key equipment within 511-S
Near Term Priorities

- Construction Completion
  - System Turnovers from Construction to Testing
  - Declaration and Acceptance of Construction Completion
- Preparations to initiate System Testing / Commissioning
  - Development and Approval of System Test Procedures
  - Management Self Assessment to ensure Readiness to Test
  - Operations Staffing / Training
- Alignment of DOE Oversight for Testing and Commissioning
Looking to the Future

- High degree of technical confidence
- Maintain safety, cost and schedule performance
- Integrate NGS and High Sodium processing to enhance throughput
- Optimize facility operability
- Maintain integration with the Liquid Waste Program
- Minimize Liquid Waste lifecycle costs – full solution to SRS Tank Closure

Testing on Full-Scale Equipment at Technology Center in Aiken
The SRS is poised for success with a complete Liquid Waste solution path

- **DOE-SR** has established a sound and integrated clean-up strategy
- **SRR** has demonstrated the capability to clean and close tanks, prepare and make glass at high capacity, and safely prepare and transfer waste feeds
- **SRNL** has supported success through technology innovation, technology deployment and operations optimization
- **Parsons** is ready to deliver the technically mature and high capacity SWPF that is the keystone to the next major DOE-EM clean-up success