U.S. DEPARTMENT OF ENERGY

SRMC SAVANNAH RIVER MISSION COMPLETION®
Integrated Mission Completion Contractor

Defense Waste Processing Facility Optimizations

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Citizens Advisory Board
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Acronyms

- DWPF – Defense Waste Processing Facility
- FY – Fiscal Year
- LW – Liquid Waste
- MFT – Melter Feed Tank
- MST/SS – Mono Sodium Titanate Sludge Solids
- PRFT – Precipitate Reactor Feed Tank (repurposed to store sludge solids from SWPF)
- SE – Strip Effluent
- SEFT – Strip Effluent Feed Tank
- SEHT – Strip Effluent Hold Tank (located at SWPF)
- SME – Slurry Mix Evaporator
- SRAT – Sludge Receipt and Adjustment Tank
- SRMC – Savannah River Mission Completion (current Liquid Waste Contractor)
- SRS – Savannah River Site
- SSRT – Sludge Solids Receipt Tank (located at SWPF)
- SWPF – Salt Waste Processing Facility

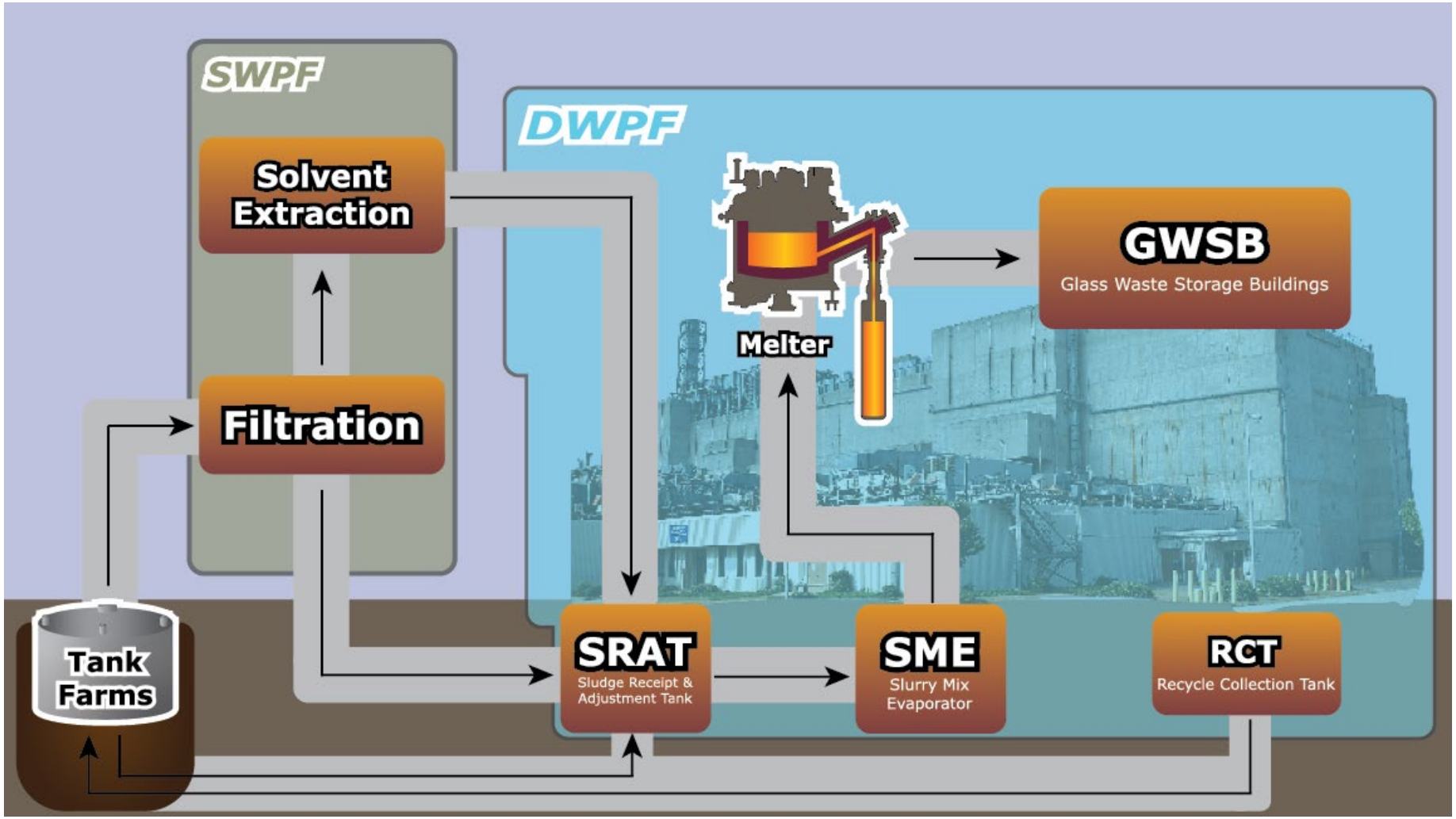
Liquid Waste Overview Video

- https://video.wixstatic.com/video/b25c55_a35a6bbfccef44f39c91714e82a8d3a9/1080p/mp4/file.mp4

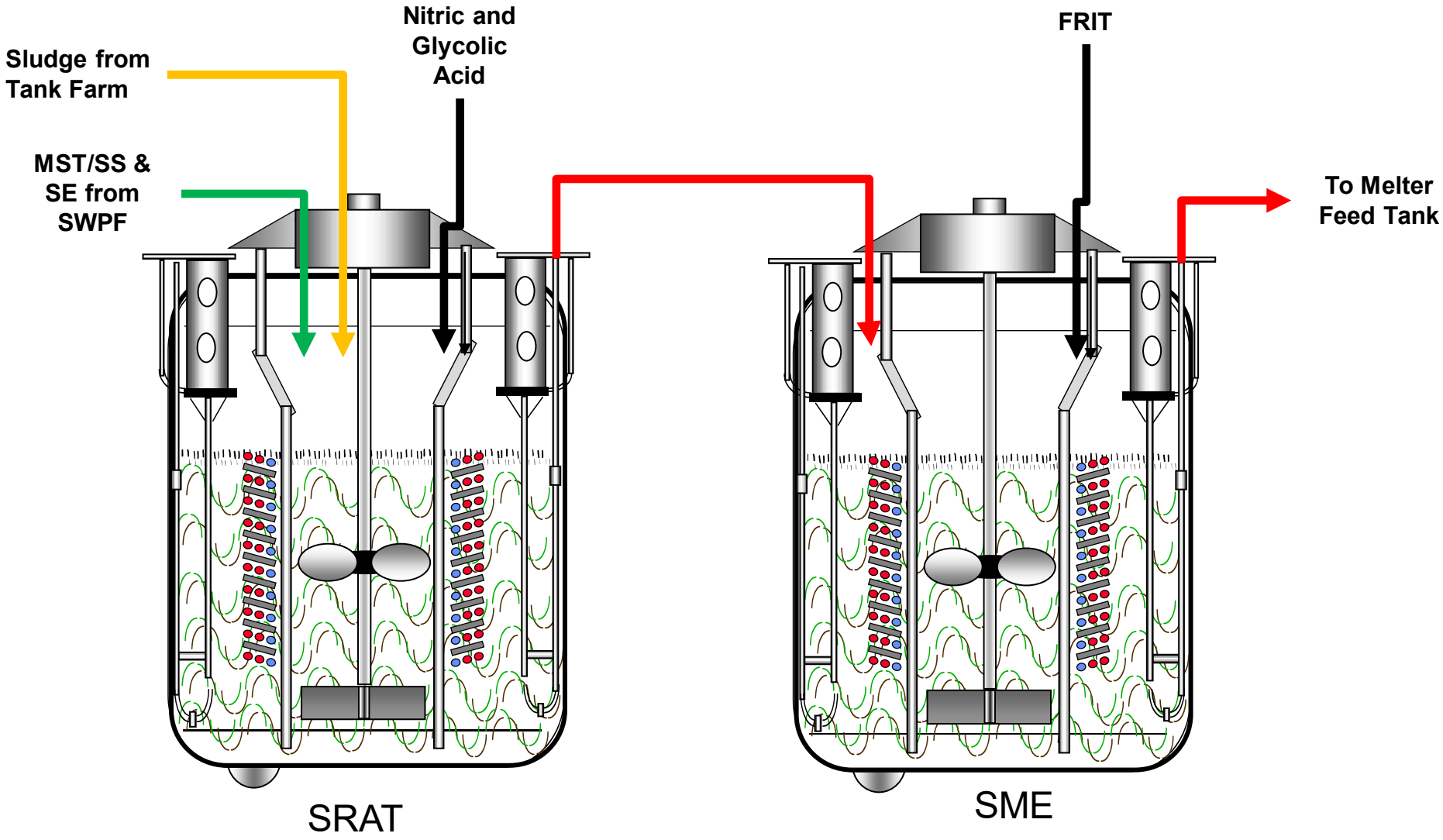
DWPF Supports the Liquid Waste Mission

Safely and Permanently Immobilize Radioactive Liquid Waste using Vitrification Process

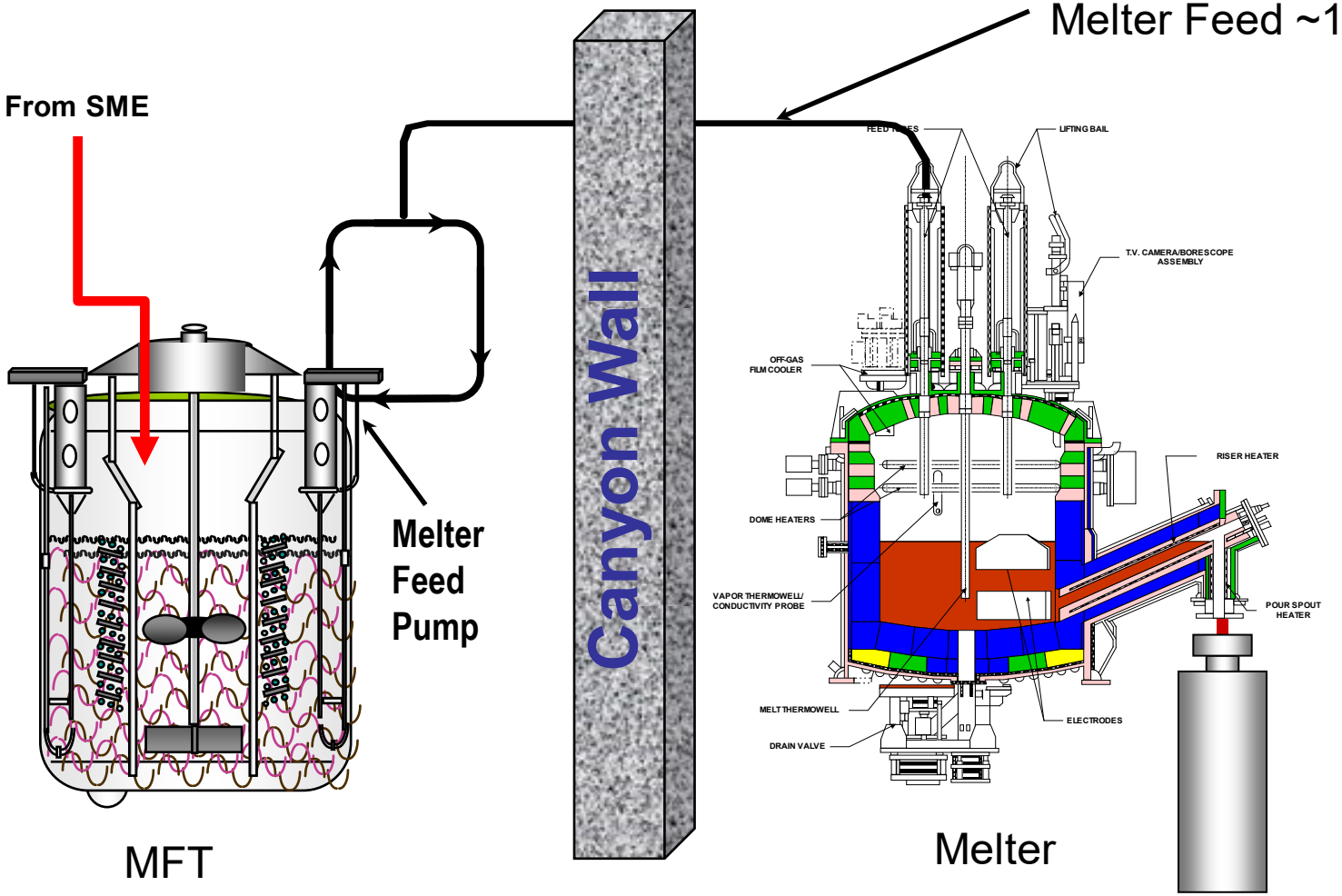
DWPF Process Overview



DWPF Process Overview – Chemical Process

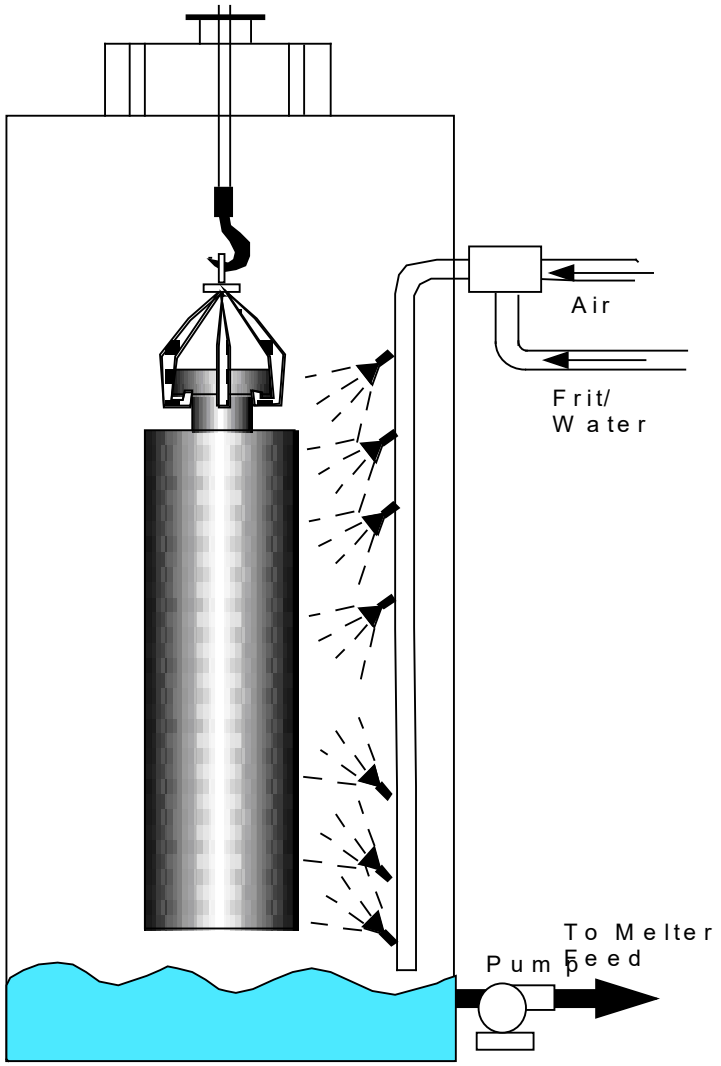


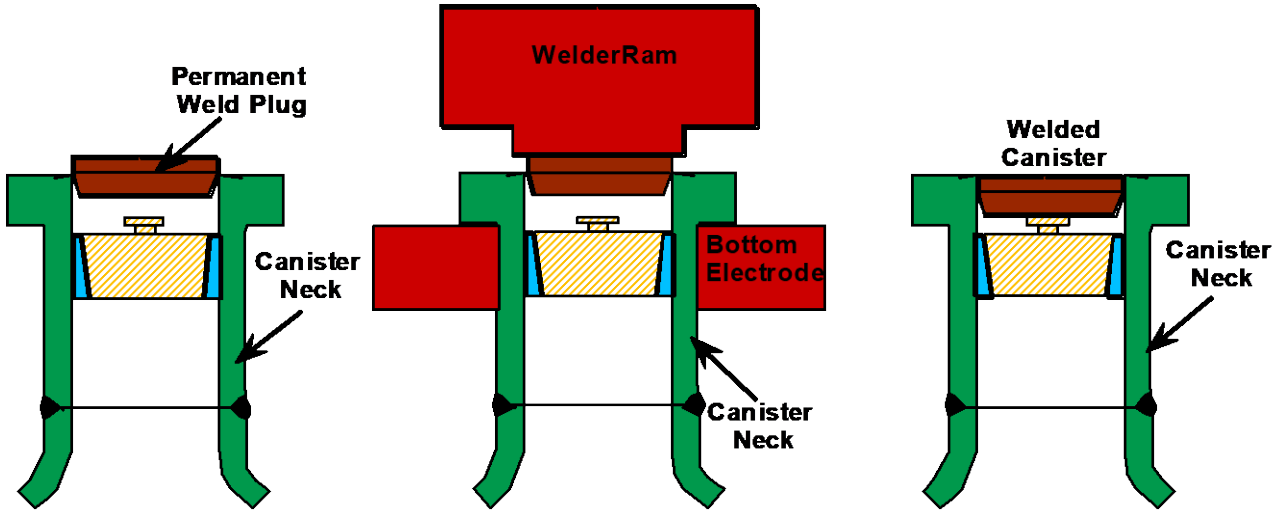
DWPF Process Overview - Melter



Melter uses electricity to heat the waste/frit mixture to 2100 degrees Fahrenheit

DWPF Process Overview – Canister Handling



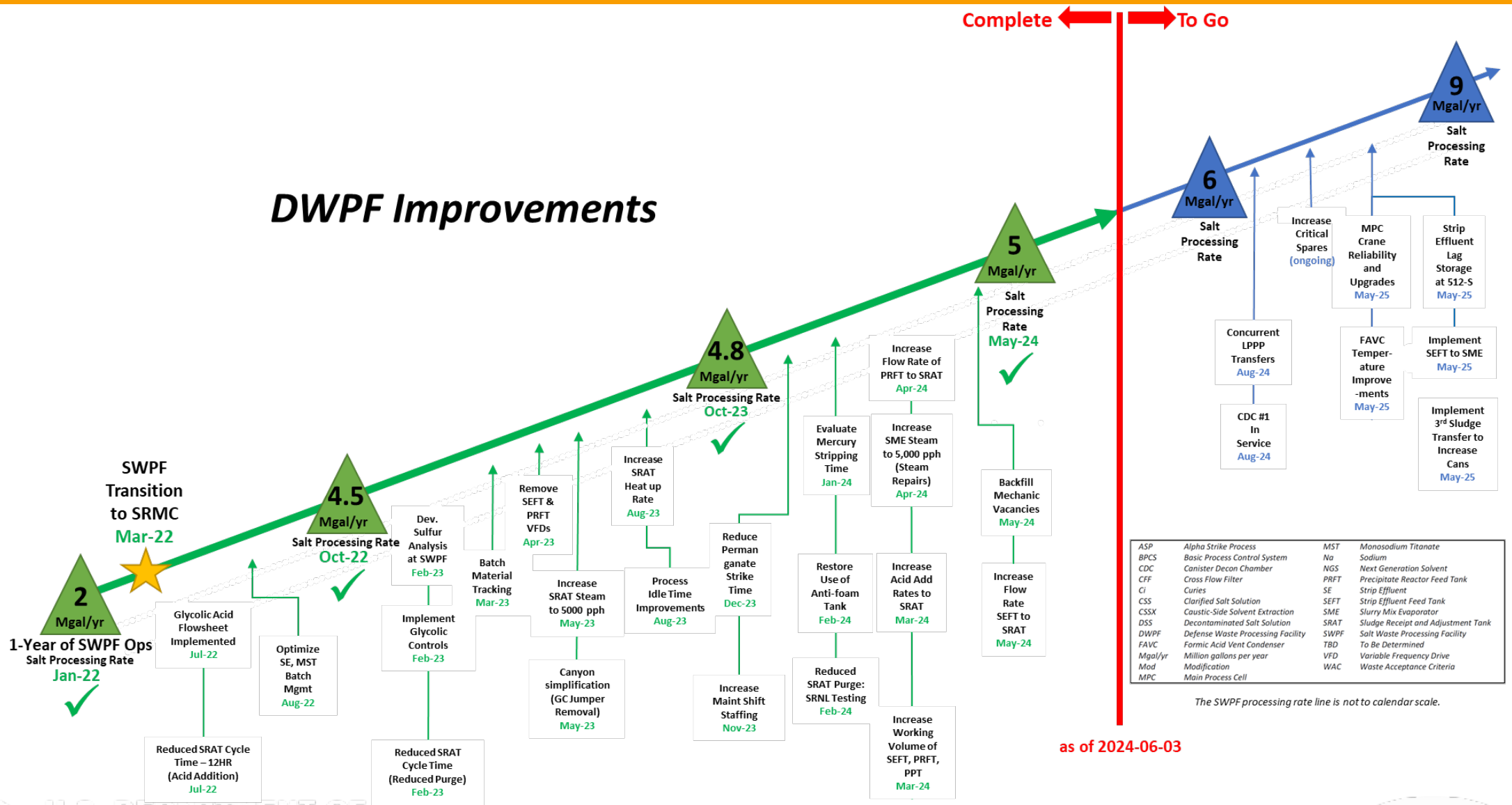


- A temporary plug is installed into the canister
- Surface contamination is removed by spraying (blasting) the canister with a mixture of frit and water
- A permanent plug is welded into the canister

Glass Waste Storage Buildings

- ~4400 of ~8000 canisters needed to complete the mission have been poured
- GWSB 1 can temporarily store ~4500 canisters (modifications to allow double stacking are complete)
- GWSB 2 can temporarily store ~2300 canisters (modifications to allow double stacking are in progress)

"Climb to 9"


Complete
To Go
DWPF Improvements
2 Mgal/yr
1-Year of SWPF Ops
Salt Processing Rate
Jan-22
SWPF Transition to SRMC
Mar-22
4.5 Mgal/yr
Salt Processing Rate
Oct-22
4.8 Mgal/yr
Salt Processing Rate
Oct-23
5 Mgal/yr
Salt Processing Rate
May-24
6 Mgal/yr
Salt Processing Rate
9 Mgal/yr
Salt Processing Rate
Glycolic Acid Flowsheet Implemented Jul-22
Optimize SE, MST Batch Mgmt Aug-22
Reduced SRAT Cycle Time – 12HR (Acid Addition) Jul-22
Dev. Sulfur Analysis at SWPF Feb-23
Implement Glycolic Controls Feb-23
Reduced SRAT Cycle Time (Reduced Purge) Feb-23
Batch Material Tracking Mar-23
Remove SEFT & PRFT VFDs Apr-23
Increase SRAT Steam to 5000 pph May-23
Canyon simplification (GC Jumper Removal) May-23
Increase SRAT Heat up Rate Aug-23
Process Idle Time Improvements Aug-23
Reduce Permanganate Strike Time Dec-23
Increase Maint Shift Staffing Nov-23
Evaluate Mercury Stripping Time Jan-24
Restore Use of Anti-foam Tank Feb-24
Reduced SRAT Purge: SRNL Testing Feb-24
Increase Flow Rate of PRFT to SRAT Apr-24
Increase SME Steam to 5,000 pph (Steam Repairs) Apr-24
Increase Acid Add Rates to SRAT Mar-24
Increase Working Volume of SEFT, PRFT, PPT Mar-24
Backfill Mechanic Vacancies May-24
Increase Flow Rate SEFT to SRAT May-24
Concurrent LPPP Transfers Aug-24
CDC #1 In Service Aug-24
Increase Critical Spares (ongoing)
MPC Crane Reliability and Upgrades May-25
FAVC Temper-ature Improve-ments May-25
Strip Effluent Lag Storage at 512-S May-25
Implement SEFT to SME May-25
Implement 3rd Sludge Transfer to Increase Cans May-25
ASP Alpha Strike Process
BPCS Basic Process Control System
CDC Canister Decon Chamber
CFF Cross Flow Filter
Ci Curies
CSS Clarified Salt Solution
CSSX Caustic-Side Solvent Extraction
DSS Decontaminated Salt Solution
DWPF Defense Waste Processing Facility
FAVC Formic Acid Vent Condenser
Mgal/yr Million gallons per year
Mod Modification
MPC Main Process Cell
MST Monosodium Titanate
Na Sodium
NGS Next Generation Solvent
PRFT Precipitate Reactor Feed Tank
SE Strip Effluent
SEFT Strip Effluent Feed Tank
SME Slurry Mix Evaporator
SRAT Sludge Receipt and Adjustment Tank
SWPF Salt Waste Processing Facility
TBD To Be Determined
VFD Variable Frequency Drive
WAC Waste Acceptance Criteria
The SWPF processing rate line is not to calendar scale.
as of 2024-06-03

DWPF Optimizations

S – Safety (Reducing Risk)

- Transitioned from use of Formic Acid to Glycolic Acid – Complete

R – Reliability (Plant Reliability)

- Buying additional spare pumps, agitators, motors, vessels – On-going
- Replacing Main Process Cell Crane control system and cameras – April 2025 Outage
- Modified Glass Waste Storage Building 1 for double stacking – Complete
- Modifying Glass Waste Storage Building 2 for double stacking – On-going

M – Mutual Respect (Power As One)

- Optimizations at DWPF support collaboration with other Liquid Waste facilities to achieve the mission – On-going

C – Continuous Improvement (Optimizations)

- Increased SRAT and SME throughput by increasing steam flow rates, increasing acid addition rates and increasing SE and MST/SS addition rates – Complete
- Increase SE flexibility by providing additional storage – April 2025 Outage
- Increase SE flexibility to add to either the SRAT or SME – April 2025 Outage

Summary

- DWPF safely and permanently immobilizes radioactive liquid waste
- Optimizations have been completed to increase throughput rate to support 9 Mgal/yr of SWPF processing
- Remaining improvements increase DWPF availability
  - Additional spares increase reliability
  - Flexibility in SE processing options
- DWPF capability supports the mission needs