



U.S. DEPARTMENT OF
ENERGY

*Office of Environmental Management
Savannah River Site*

Salt Waste Processing Initiatives

Patricia Suggs

Salt Processing Team Lead

Assistant Manager for Waste Disposition Project



EM *Environmental Management*

safety ❖ performance ❖ cleanup ❖ closure

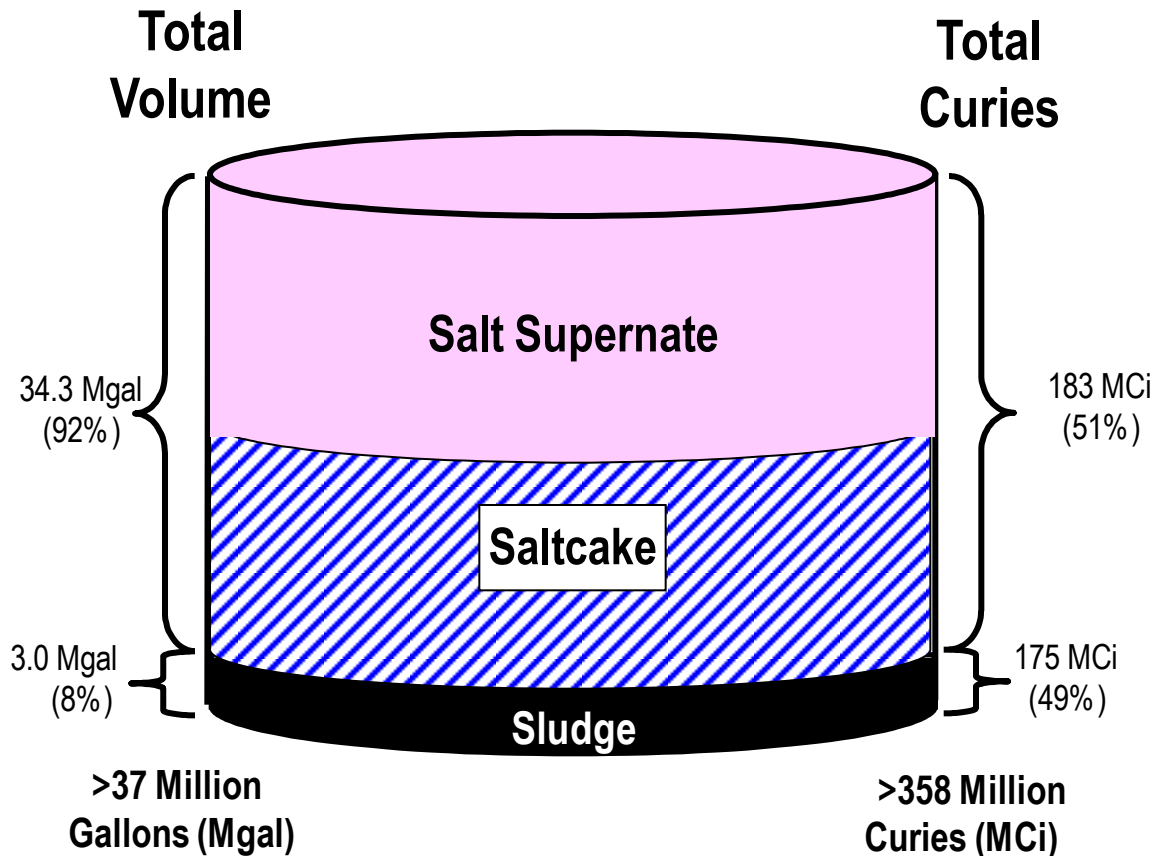
www.em.doe.gov

Overview

- Current SRS Liquid Waste System status
- Opportunity to accelerate salt processing – transformational technologies
 - Rotary Microfiltration (RMF) and Small Column Ion Exchange (SCIX)
 - Actinide Removal Process/Modular Caustic Side Solvent Extraction (ARP/MCU) extension with next generation extractant
 - Salt Waste Processing Facility (SWPF) performance enhancement
 - Saltstone enhancements
- Life-cycle impacts and benefits



SRS Liquid Waste

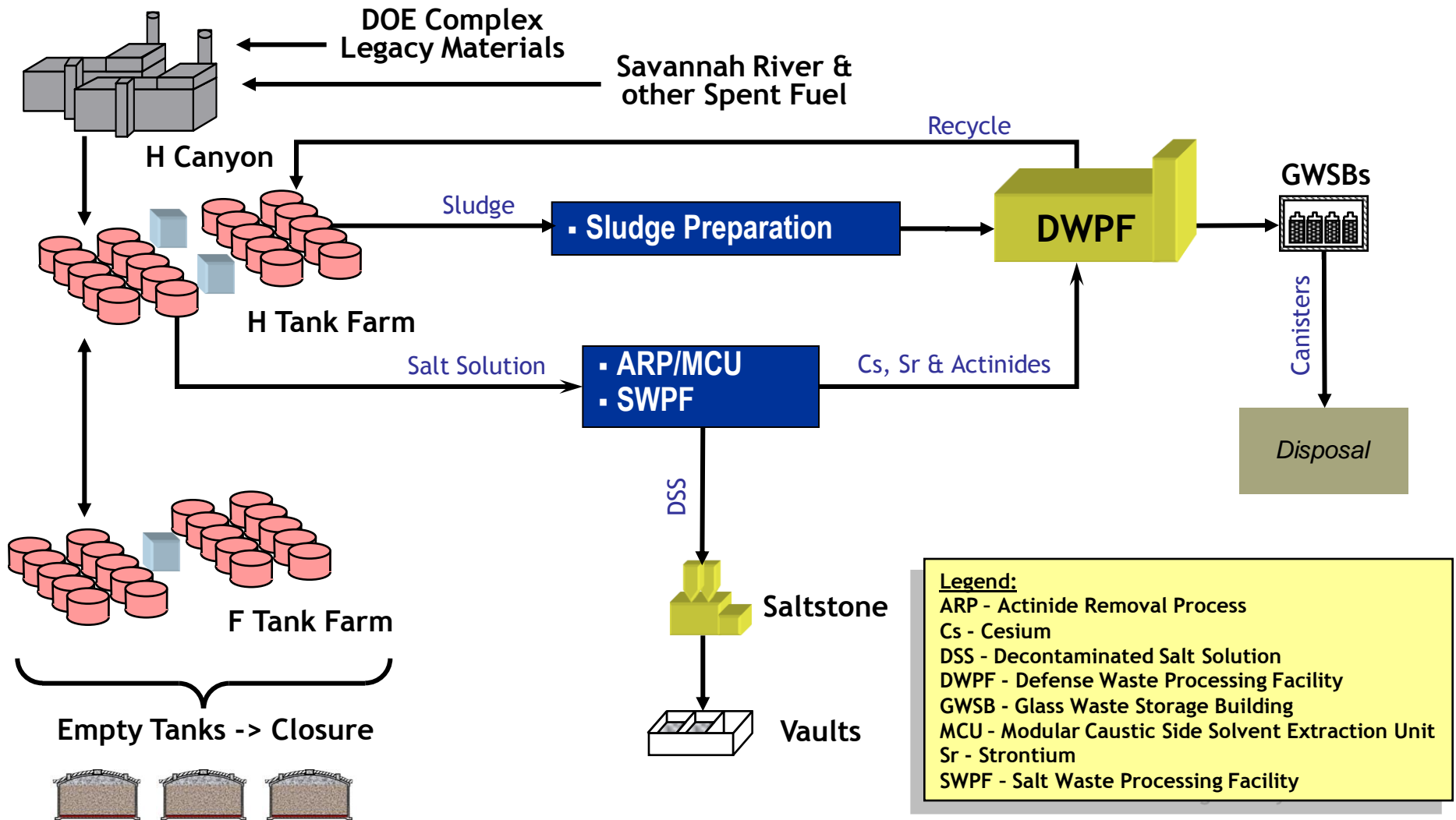


51 Waste Tanks

- 24 “Old-Style” tanks
 - 2 operationally closed
 - 15 in closure process
- Minimal reuse of “Old-Style” tanks
- Storage / processing in “New-Style” tanks
- Objective is to empty, clean and close all tanks to reduce risk and meet commitments
- Sludge processing since 1996 - over 3,000 canisters of waste vitrified
- Salt waste processing is the key enabler for tank closure



SRS Liquid Waste System Current Configuration

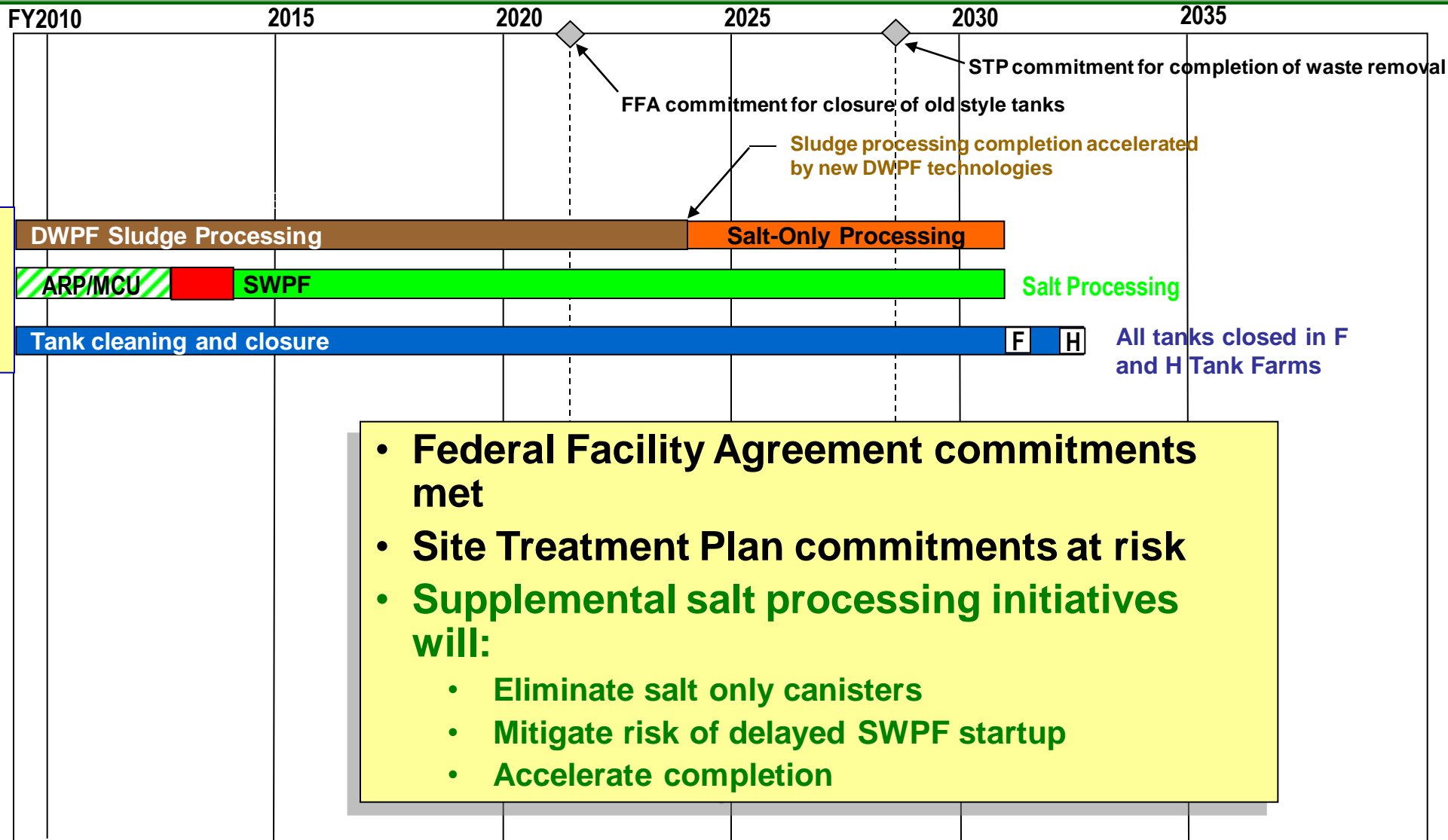


SRS Salt Processing Status

- ARP/MCU started operations in 2008
 - Original design target
 - Throughput: 1 million gallons per year (Mgal/yr)
 - Decontamination Factor (DF): 12
 - Current ARP/MCU operations
 - Throughput: 1.0 Mgal/yr
 - DF: 200
 - Purpose:
 - Bridge the gap prior to startup of SWPF
 - Pilot plant to inform SWPF operations
- Saltstone currently operating to support ARP/MCU processing
- SWPF
 - Needed to complete processing of salt waste
 - Project remains on schedule and within cost
 - Construction: ~30% complete
 - Overall project: ~50% complete
 - Current liquid waste planning basis assumes mid-2014 startup
 - Expected nominal operations
 - Throughput: 6 Mgal/yr
 - DF: 40,000



Result of Processing Within Current Configuration

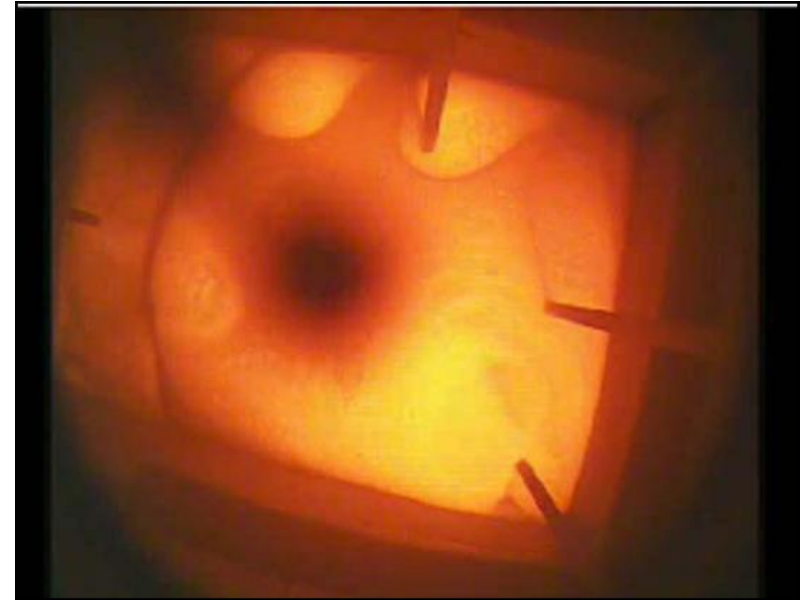


- Federal Facility Agreement commitments met
- Site Treatment Plan commitments at risk
- Supplemental salt processing initiatives will:
 - Eliminate salt only canisters
 - Mitigate risk of delayed SWPF startup
 - Accelerate completion



Sludge Processing Accelerated with Technology

- Melt Rate increased Sept 2010
 - Four bubblers installed
 - No longer Melt Rate limited
 - > 50 can/year increase
- Future technology insertions 2014
 - Streamline feed preparation
 - Reduce water additions

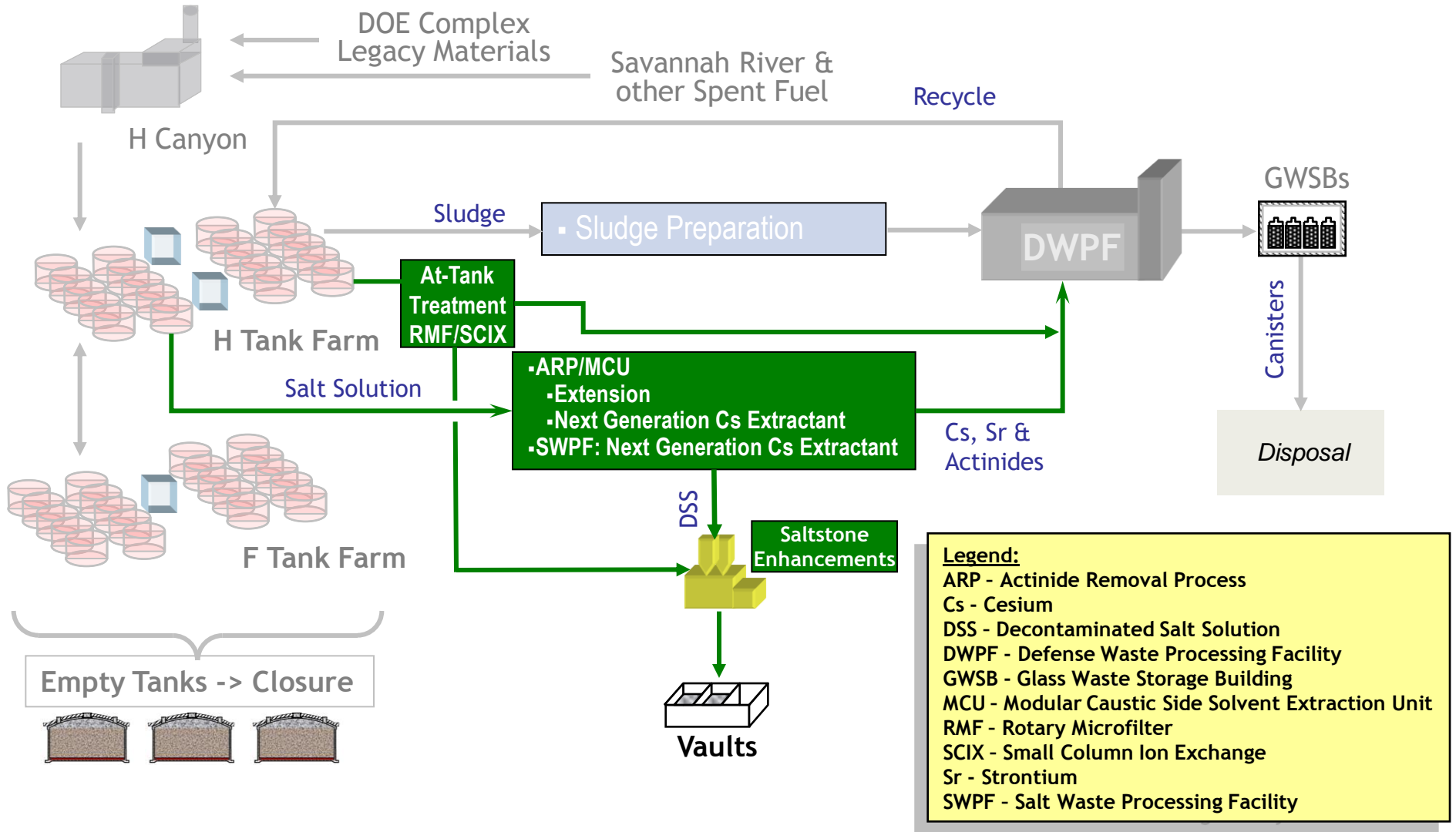


EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

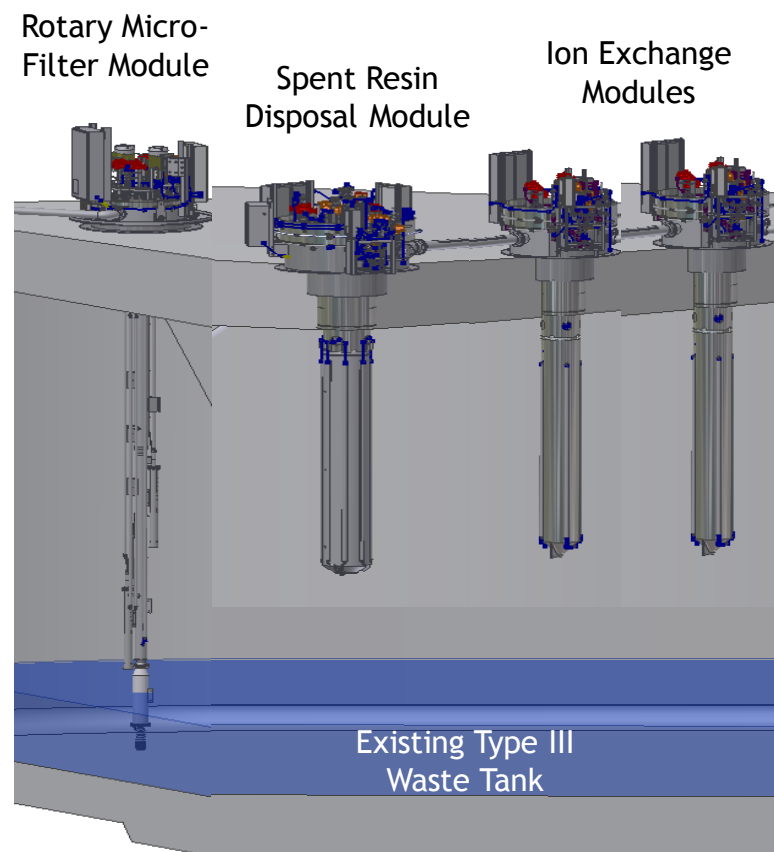
SRS Salt Processing Initiatives



SRS Salt Processing Initiatives

RMF/SCIX

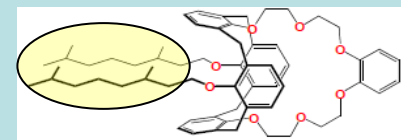
- Deploy transformational at-tank treatment technologies
 - Rotary Microfilter
 - Small Column Ion Exchange
 - Spent Resin Disposal
- Provide additional salt processing capability
- Support accelerated SRS waste retrieval and tank closures
- Leverage synergy between SRS and Hanford
- Operational Expectations
 - Throughput: 2.5 Mgal/yr
 - DF: ~40,000 (equivalent to SWPF)
 - Low level output to Saltstone for disposal



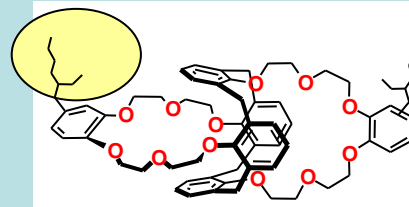
SRS Salt Processing Initiatives

NGS in ARP/MCU

- Extend operations
 - Provide flexibility to process salt waste if SWPF is delayed
 - Regulatory permitting in place
- Enhance Performance:
Next Generation Solvent (NGS)
 - Higher solubility isomer of BOBCalix
 - Enhanced stripping methodology
 - DF: ~40,000, equivalent to current SWPF design basis
 - Fewer radionuclides sent to Saltstone Disposal Facility
 - Demonstrate significantly increased throughput
 - Prove technology for introduction into SWPF



MAXCalix



BEHBCalix

- Substitution of groups remote from Cs⁺ ion binding site
- Enhanced scrub/strip methodology
- Combination of increased solubility and enhanced stripping methodology yields much higher DF



SRS Salt Processing Initiatives

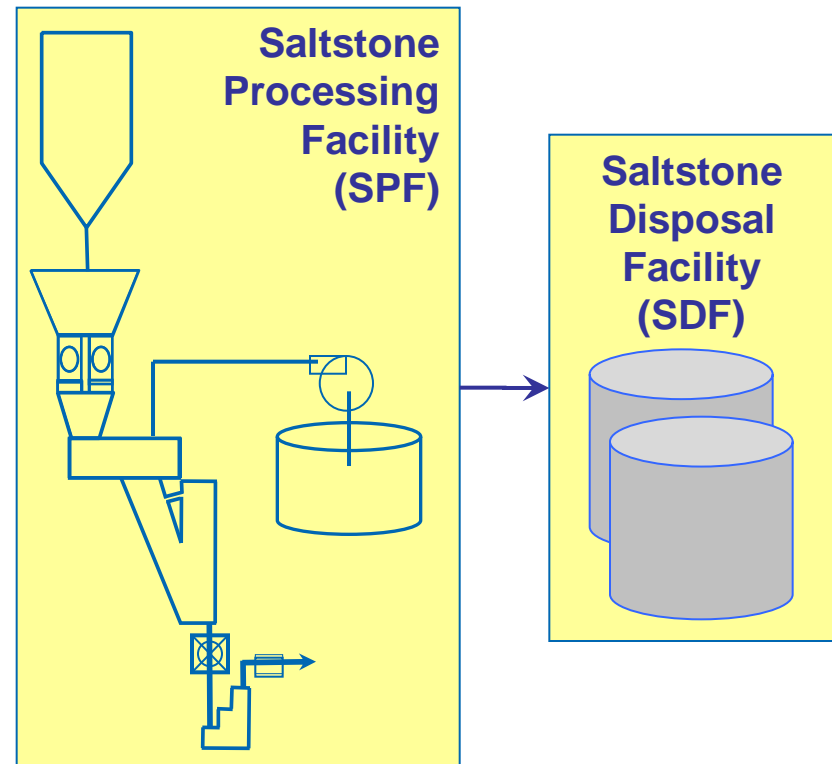
NGS in SWPF

- Expected nominal operations
 - Throughput: 6 Mgal/yr
 - DF: 40,000
- NGS deployed in SWPF...
 - Increase throughput: 7.2 Mgal/yr
 - Same DF: 40,000
- Allows SWPF to operate at 20% higher throughput with minimal design/hardware changes
- Shortens planned SWPF operating life by 20%
- Yields significant life-cycle benefits

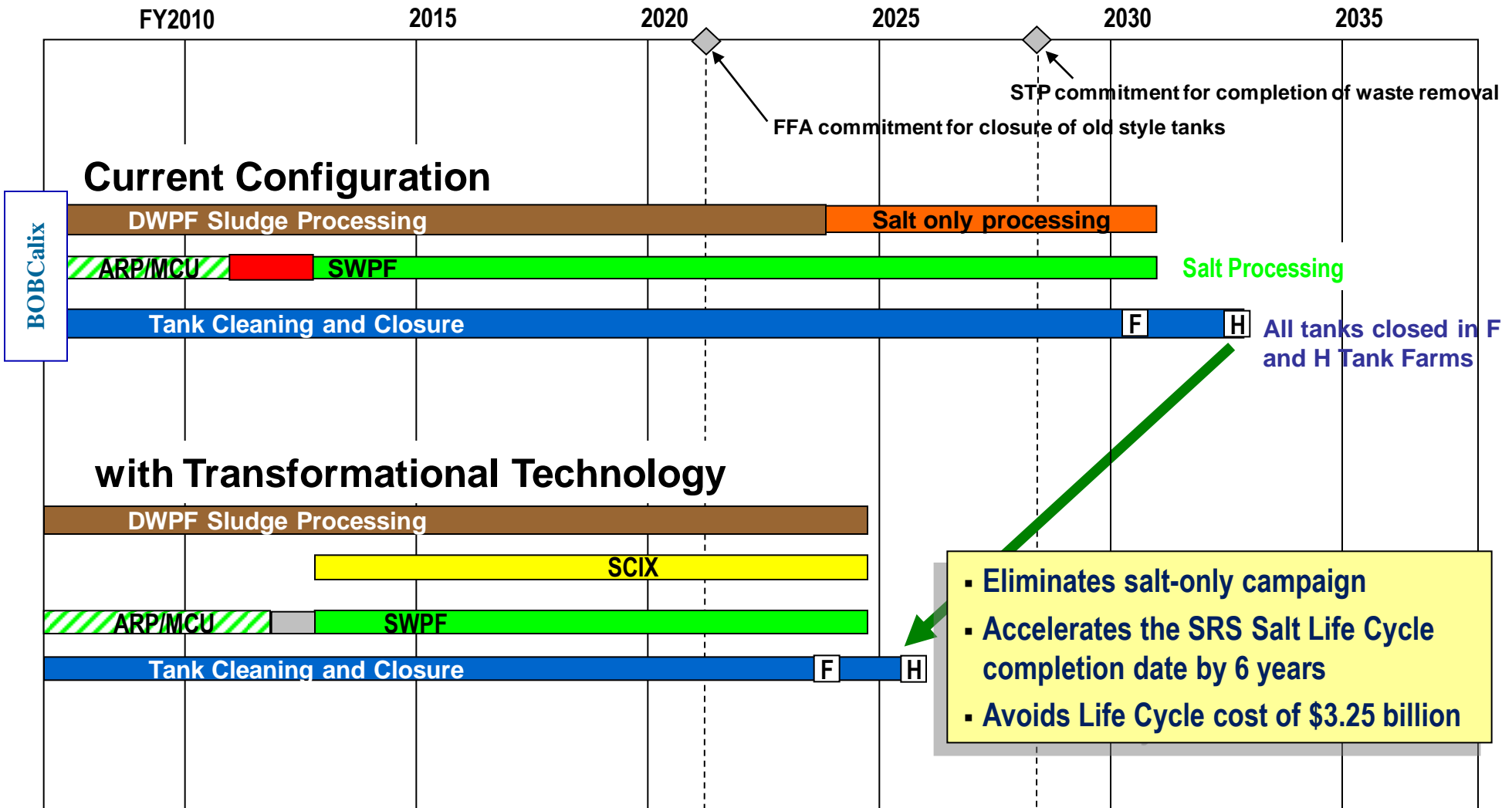


Saltstone Capacity Enhancements

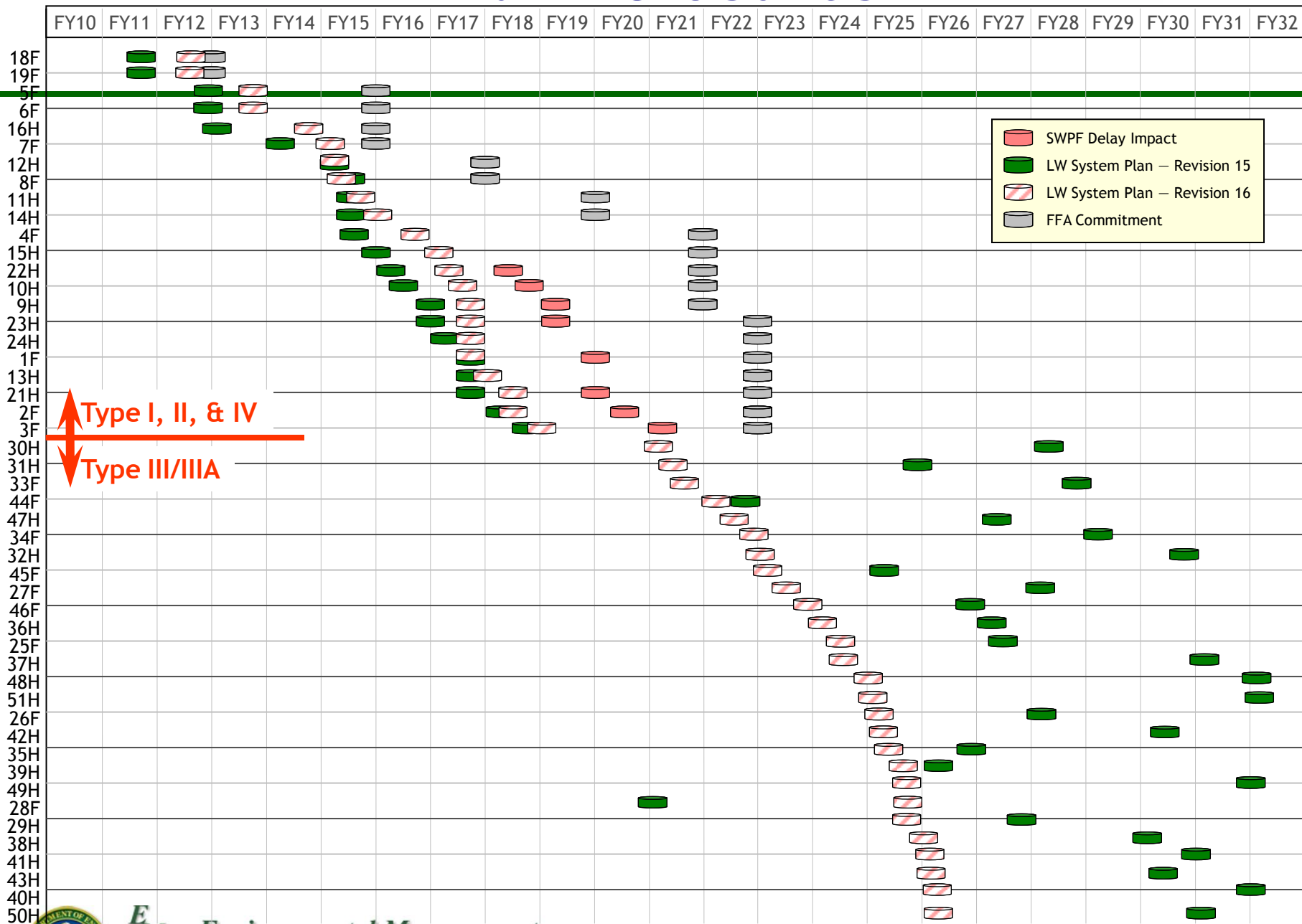
- Enhancements needed to meet the required capacity with supplemental salt processing initiatives deployed
- Equipment Upgrades
 - Dry Feed Control System
 - Salt feed pump
 - Hopper redesign
 - Air compressors
 - Grout mixture optimization
- Support 24/7 operations



Results



Tank Closures



Backup Slides

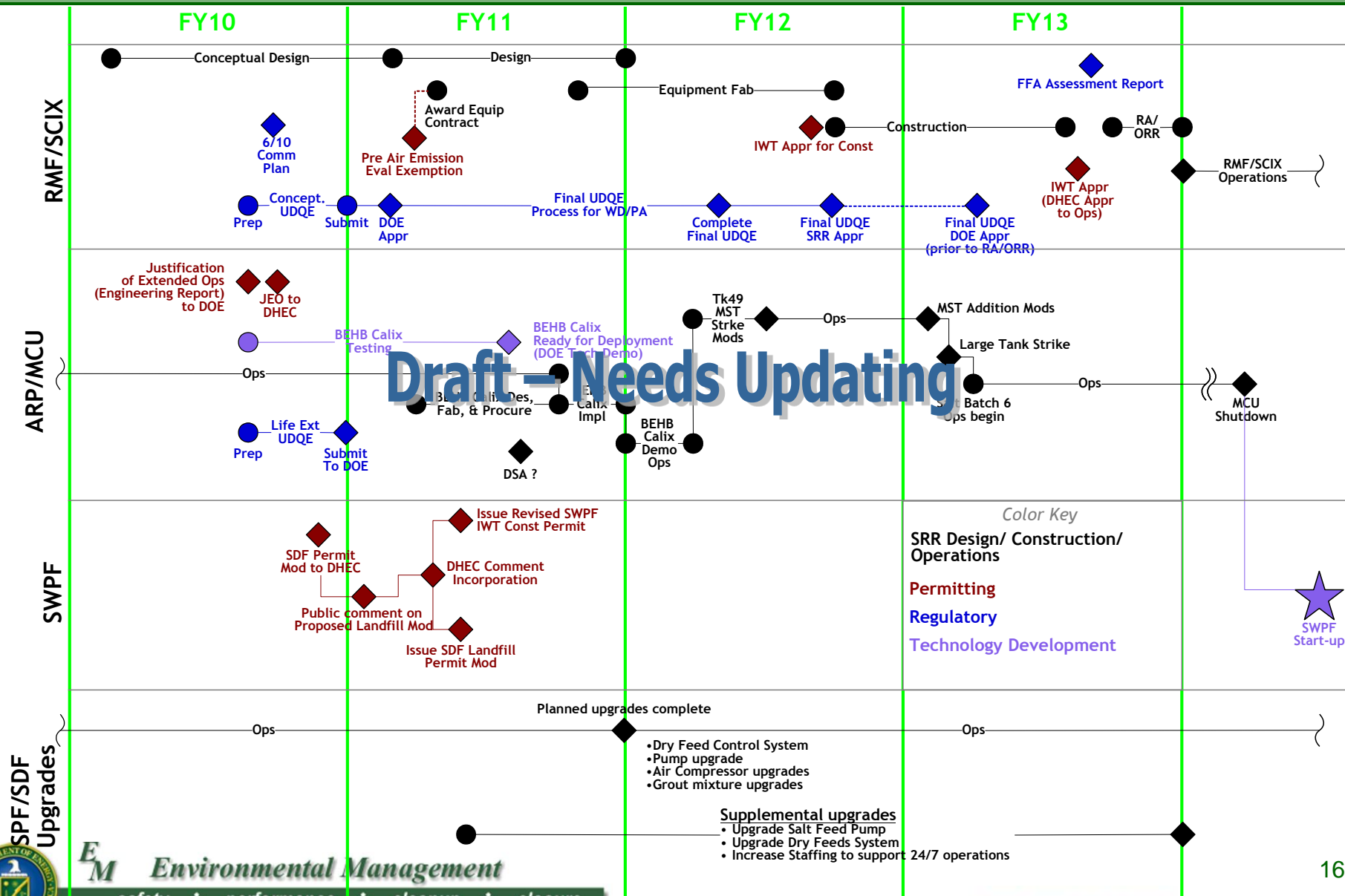


EM *Environmental Management*

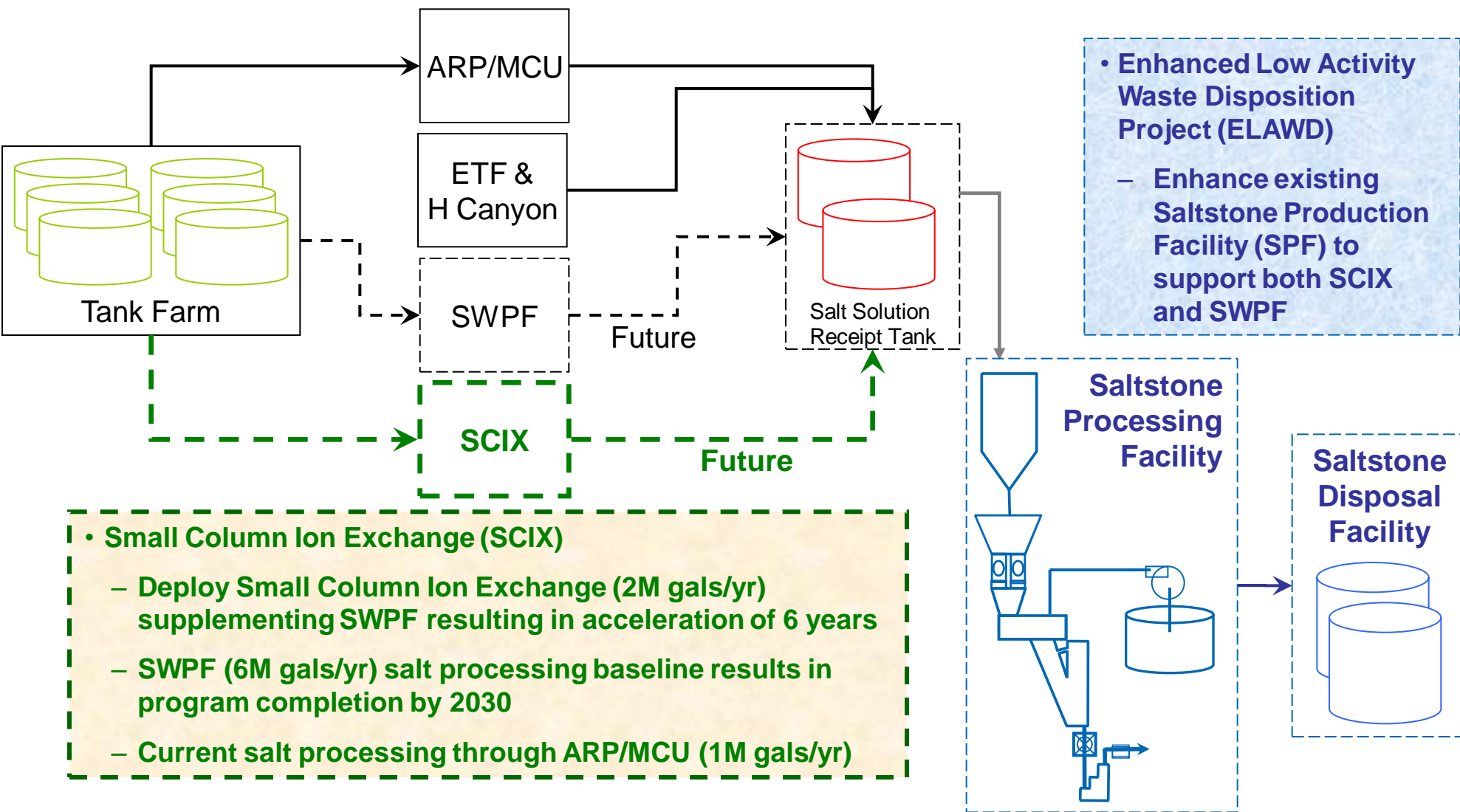
safety ❖ performance ❖ cleanup ❖ closure

www.em.doe.gov

Salt Processing Initiatives Execution Strategy

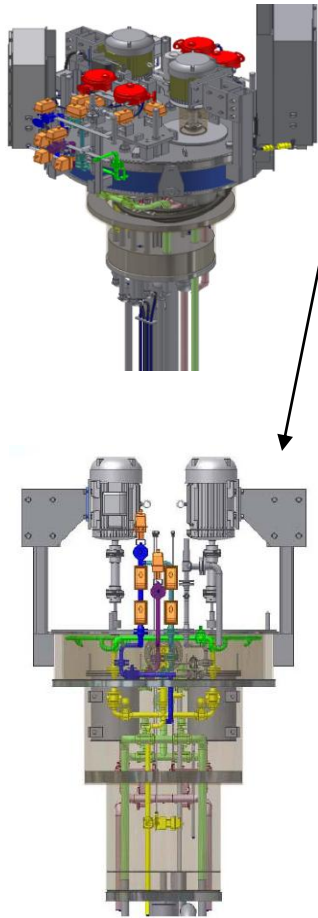


ACCELERATE SALT PROCESSING

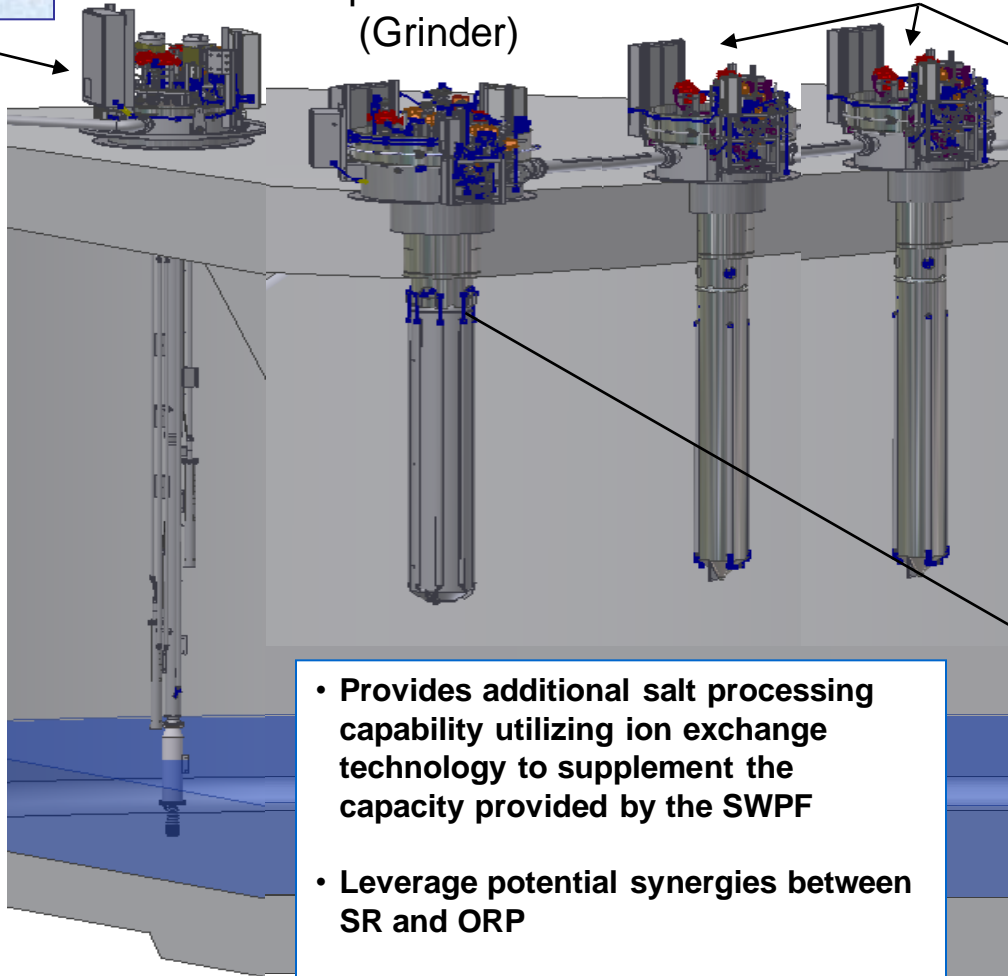


MODULAR SALT PROCESSING *Transformational Technologies*

**Transformational Technology:
Filter Module**

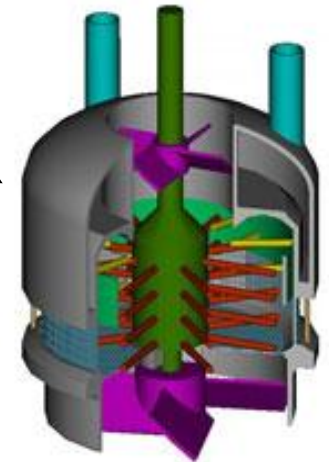
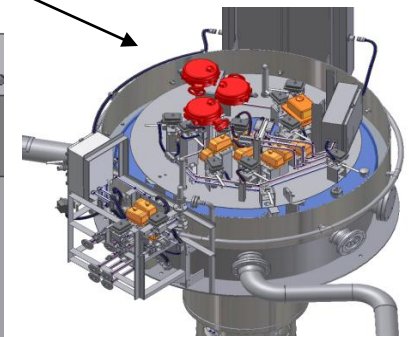


**Spent Resin
Disposal Module
(Grinder)**



**Transformational Technology:
Small Column Ion Exchange**

2 columns



- Provides additional salt processing capability utilizing ion exchange technology to supplement the capacity provided by the SWPF
- Leverage potential synergies between SR and ORP
- Start operation in 2013



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure