



U.S. DEPARTMENT OF  
**ENERGY**



# Liquid Waste System Overview

*Presented to the Citizen's Advisory Board*

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Waste Disposition Programs Division

*Full Citizen's Advisory Board Meeting*

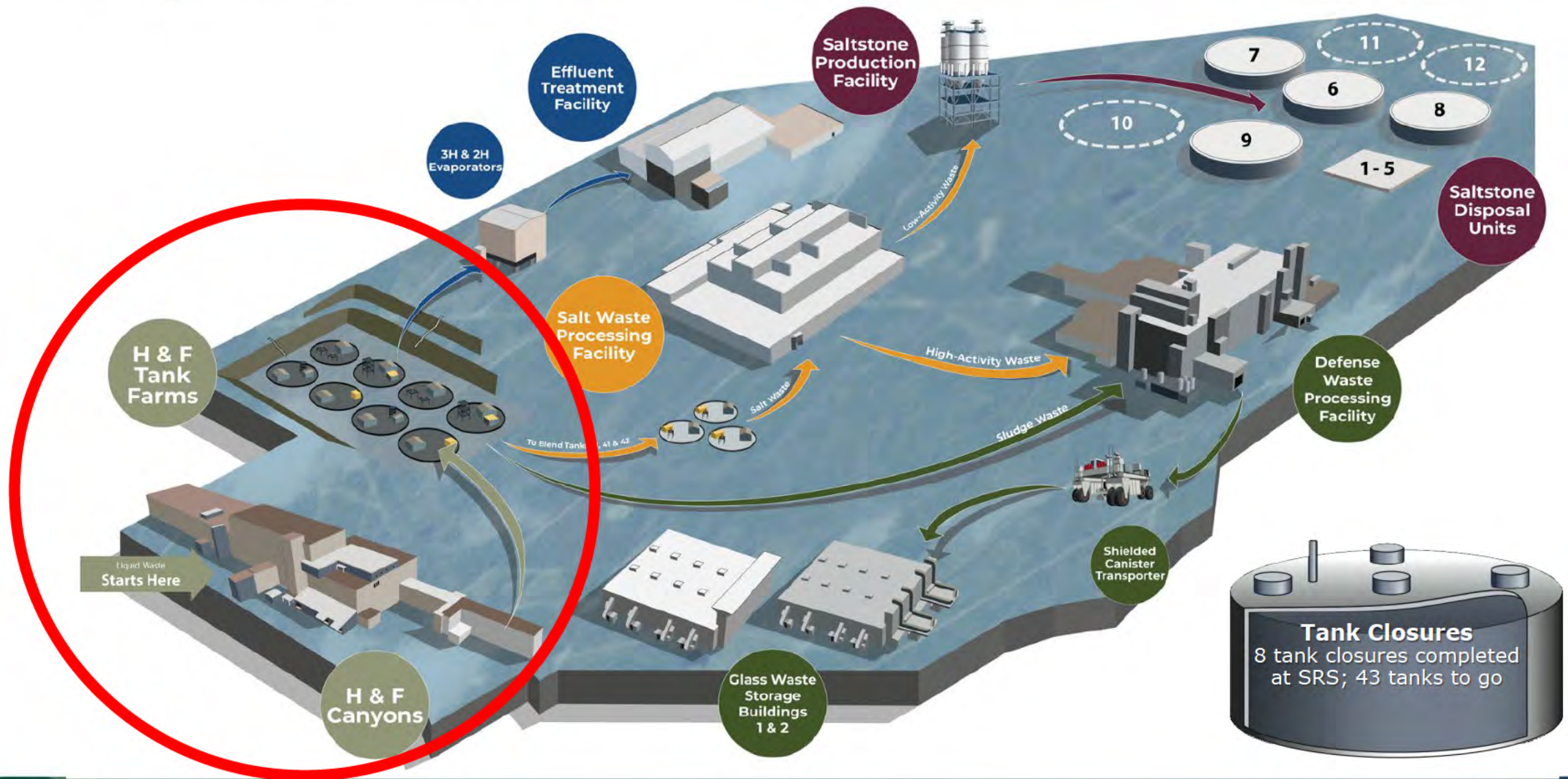
*March 13 & 14, 2023*

# History of SRS Liquid Waste

- During the 1950s, SRS began to produce materials used in nuclear weapons.
- 5 reactors were built to produce these nuclear materials.
- Irradiated materials were moved from the reactors to one of the two chemical separations plants, known as F-Canyon and H-Canyon.
- In the canyons, the irradiated fuel and target assemblies were chemically processed to separate useful products from waste.
- In addition to providing special nuclear materials for the atomic weapons program, SRS also produced isotopes for medical, research, and NASA missions.
- The waste now sits in waste tanks located in two waste tank farms, F-Tank Farm and H-Tank Farm.

**Our Mission: treat and dispose of radioactive waste and operationally close both liquid waste tank farms at SRS in a manner that safely, efficiently, and effectively protects workers, the public, and the environment.**

# SRS Liquid Waste Facilities

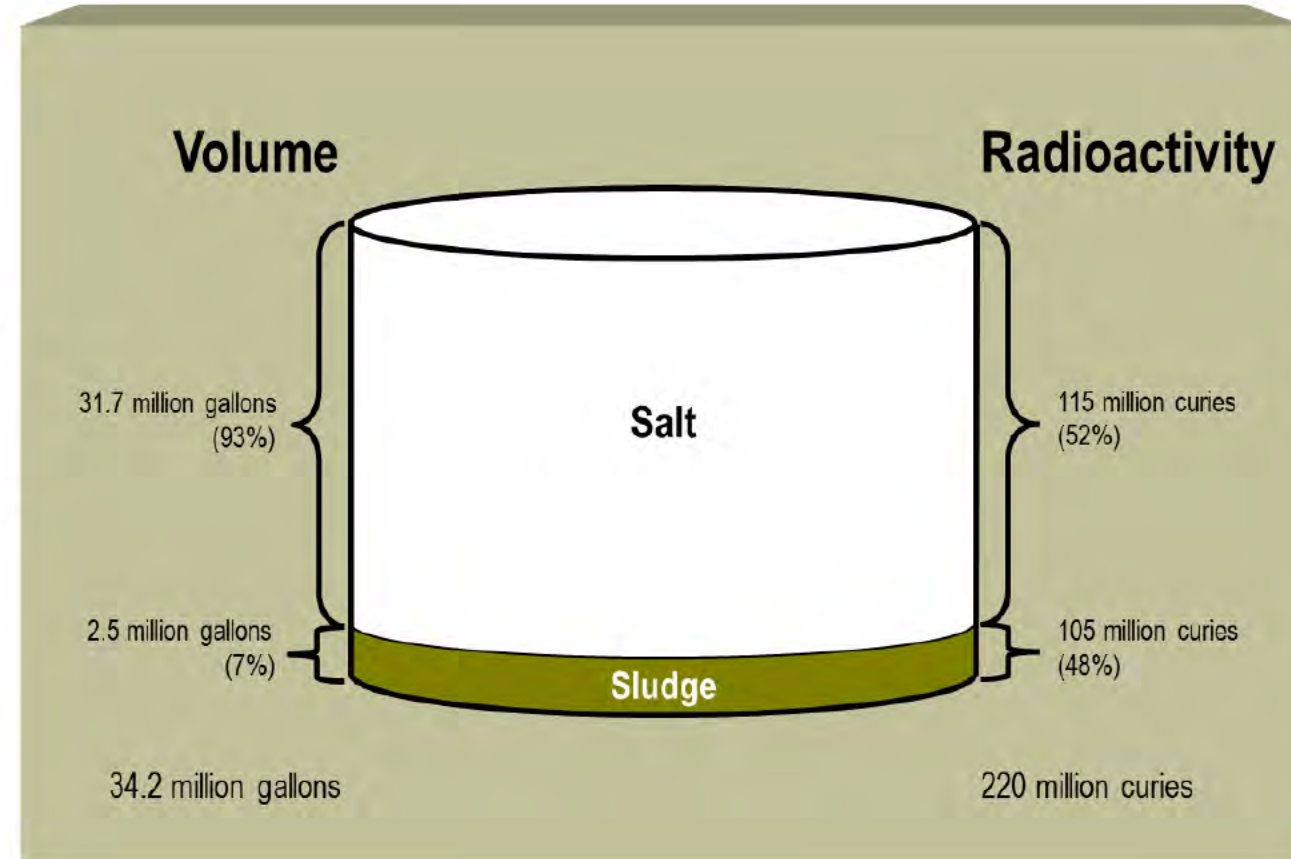




F Tank Farm

# H-Area & F-Area Tank Farms

- 51 tanks total; 8 have been closed
- Each tank has a different composition of waste
- 4 different styles of tanks; 3 old-style (non-compliant) and 1 new-style (compliant)
- Priority tanks for waste removal are tanks located in the water table



# Waste Retrieval

- Processing 1.0 gallon of settled sludge increases new style tank inventory by 1.3 gallons.
- One tank full of saltcake (1.3 million gallons) dissolves into more than 3 tanks full of dissolved salt.

## Storing Waste



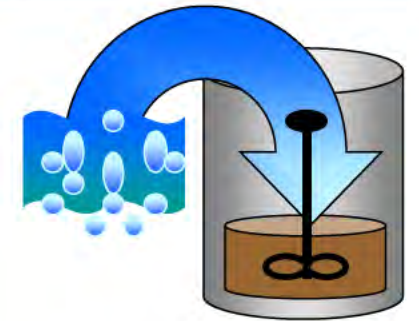
16 Older Style  
27 New Style



8 Closed Tanks (Older Style)

51 Total

## Removing Waste from Tanks



Water and Liquid Waste

Is focused on the Old Style Tanks first as space in new style tanks allows.

# Where does the waste go?

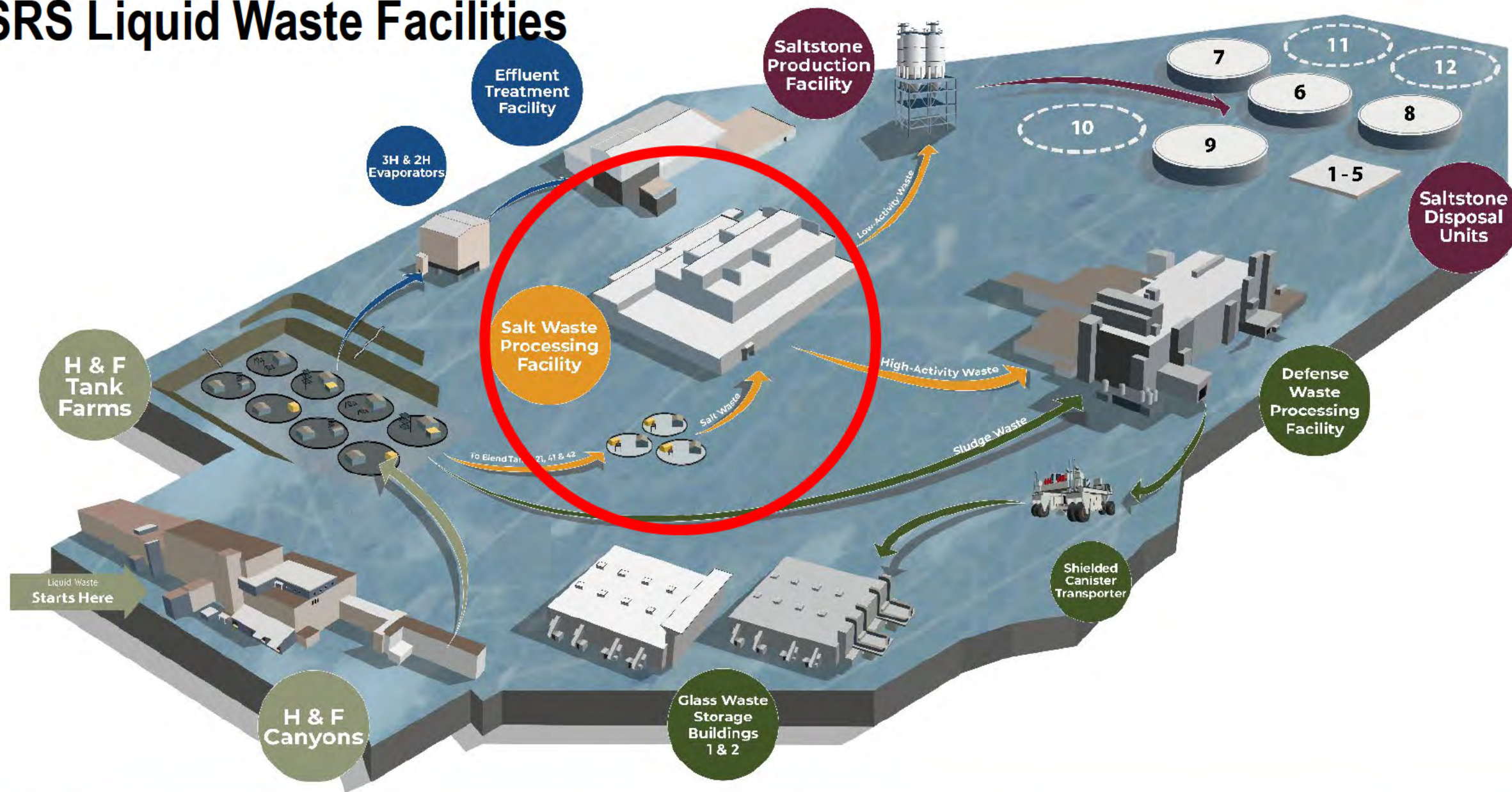


**Salt Waste Processing  
Facility (SWPF)**



**Defense Waste  
Processing Facility  
(DWPF)**

# SRS Liquid Waste Facilities

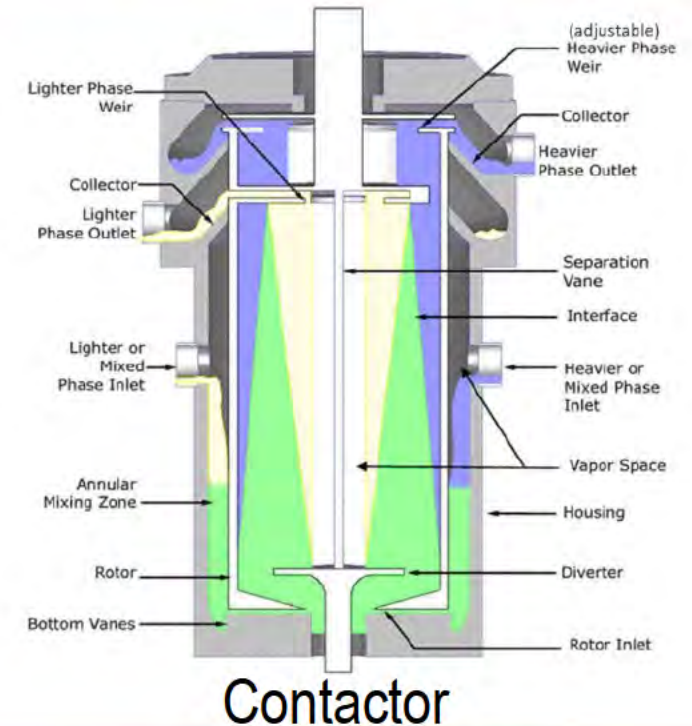




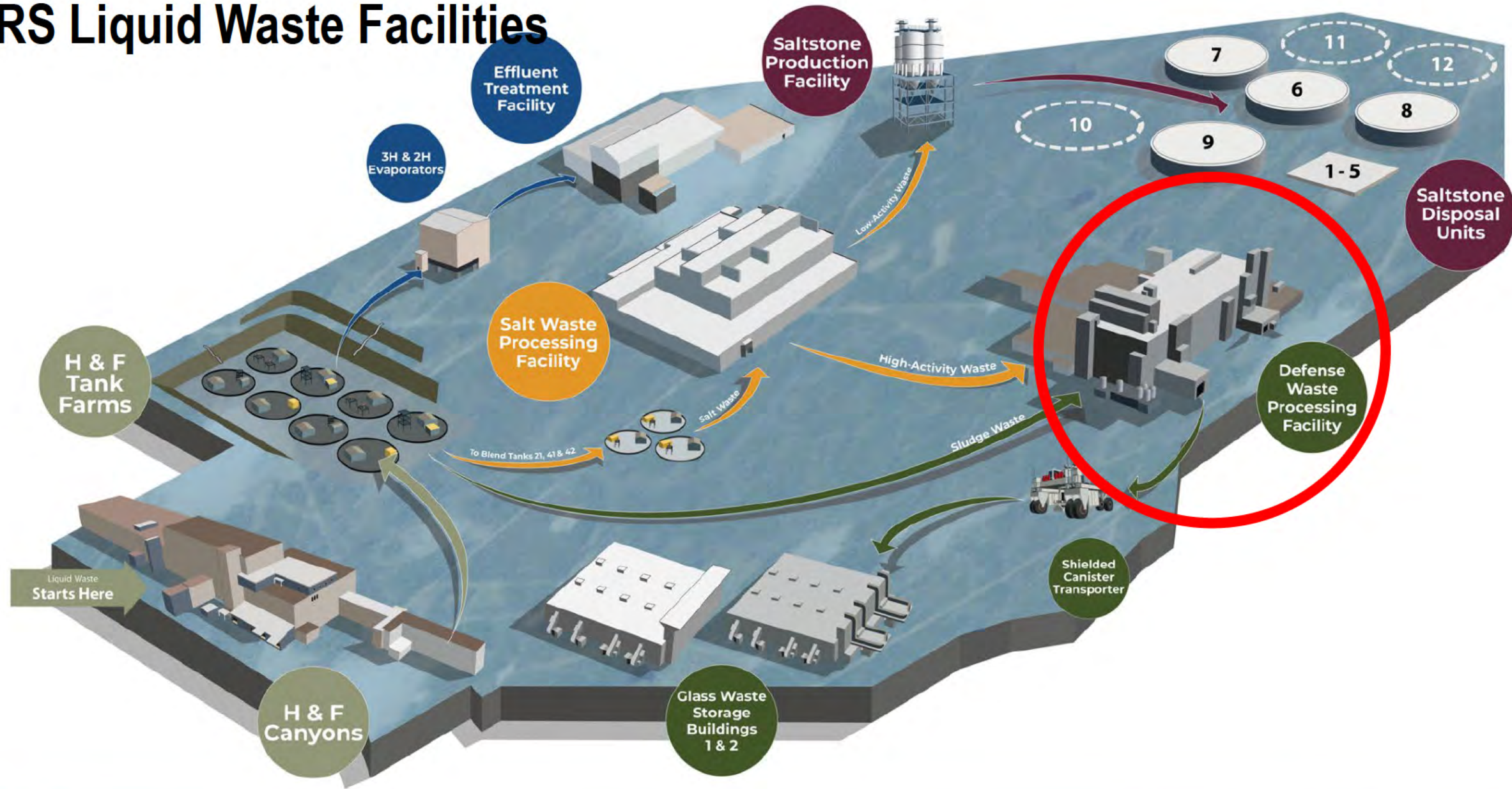
Salt Waste Processing Facility

# Salt Waste Processing Facility (SWPF)

- Began “hot” commissioning in October 2020
- Processes the salt waste through two methods
  - 1<sup>st</sup>: Filtration: waste is pushed through filters to remove radioactive solids
  - 2<sup>nd</sup>: Extraction: waste is spun through centrifugal contactors to separate the cesium-laden material from the aqueous solution
- The concentrated high activity waste is sent to the Defense Waste Processing Facility
- The decontaminated salt solution is sent to the Saltstone Production Facility



# SRS Liquid Waste Facilities





# Two Disposition Paths



Glass Waste Canisters



Saltstone Disposal Units

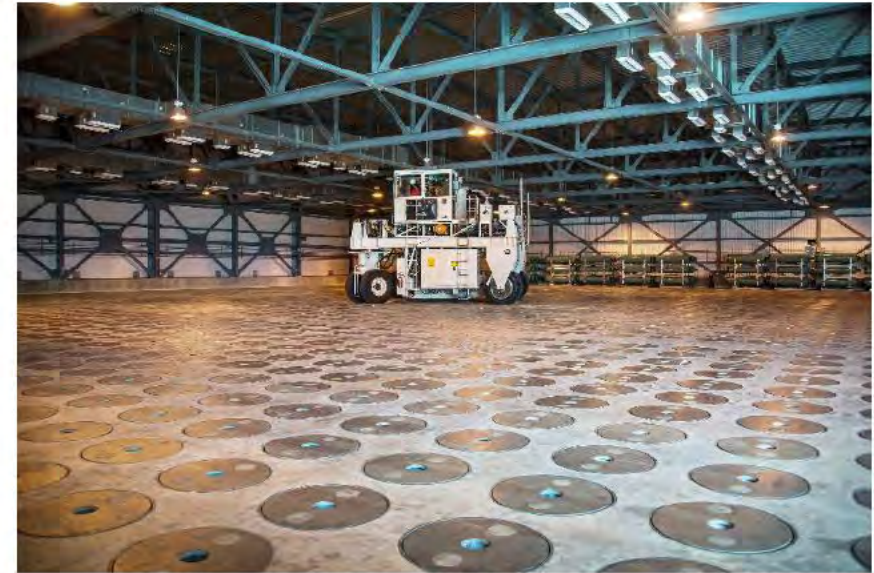
# SRS Liquid Waste Facilities



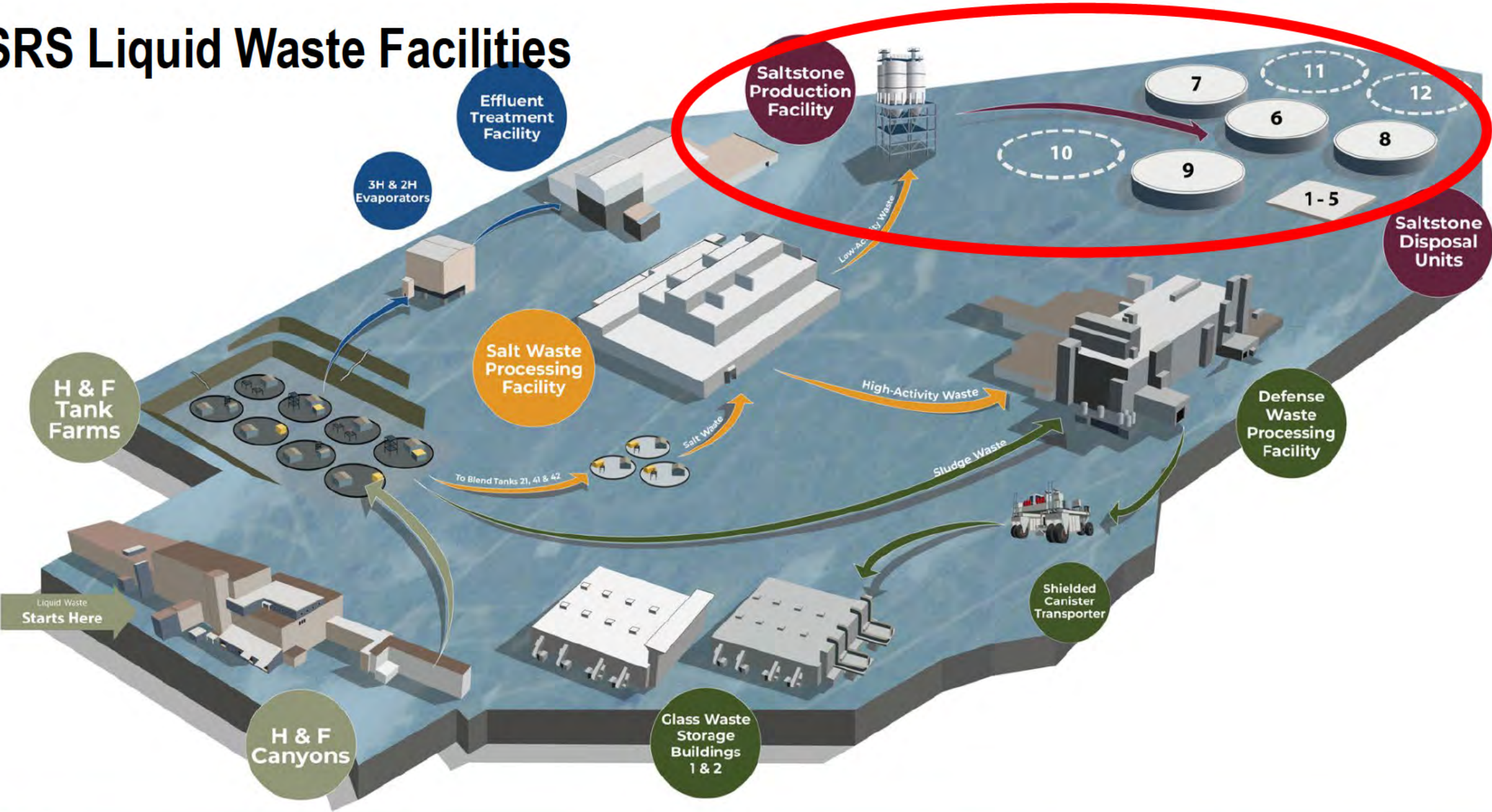


# Glass Waste Storage

- Two glass waste storage buildings
- After implementation of double-stacking, the glass waste storage buildings will be able to accommodate over 9,000 canisters until ultimate disposal.

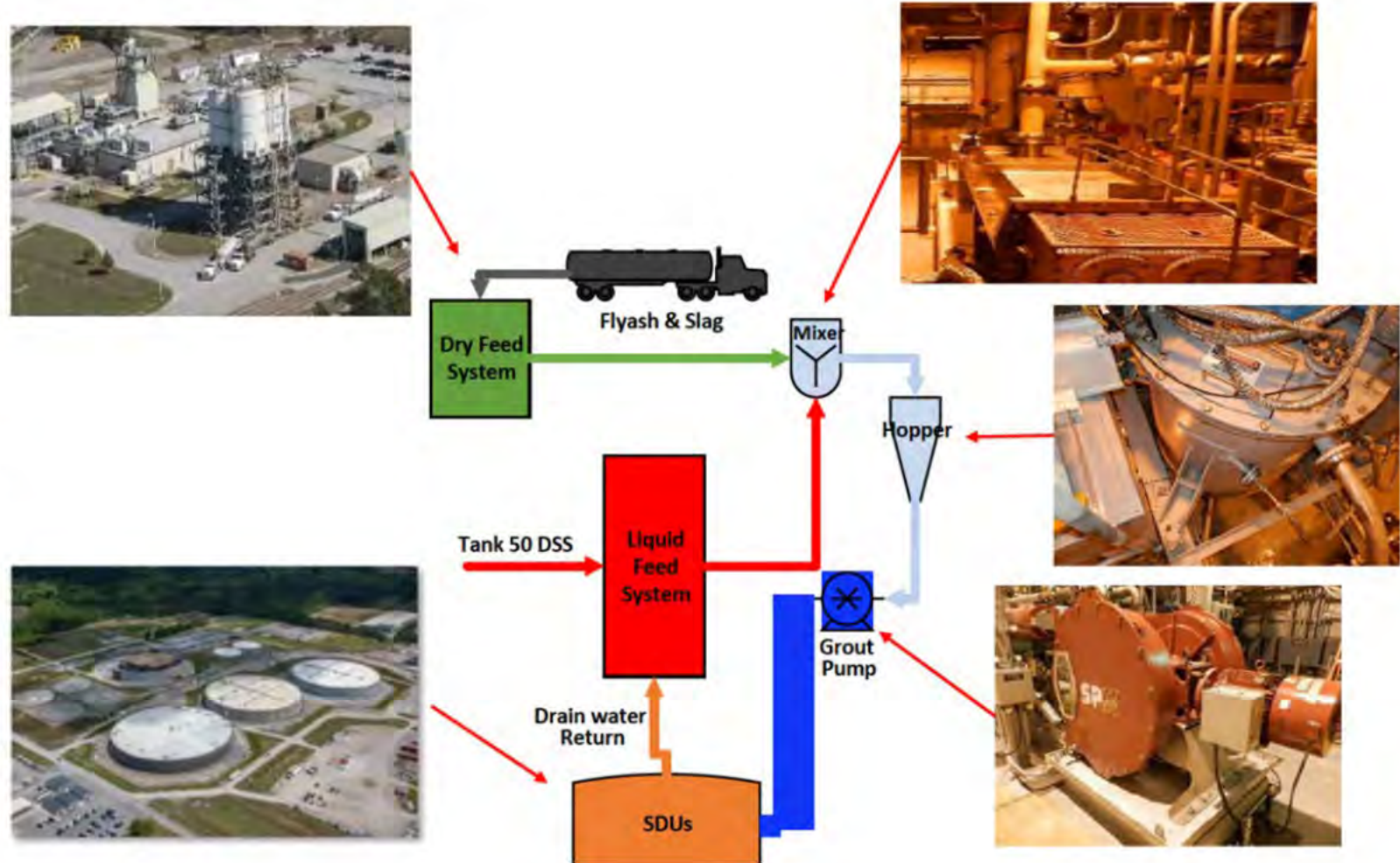


# SRS Liquid Waste Facilities



# Saltstone Production Facility

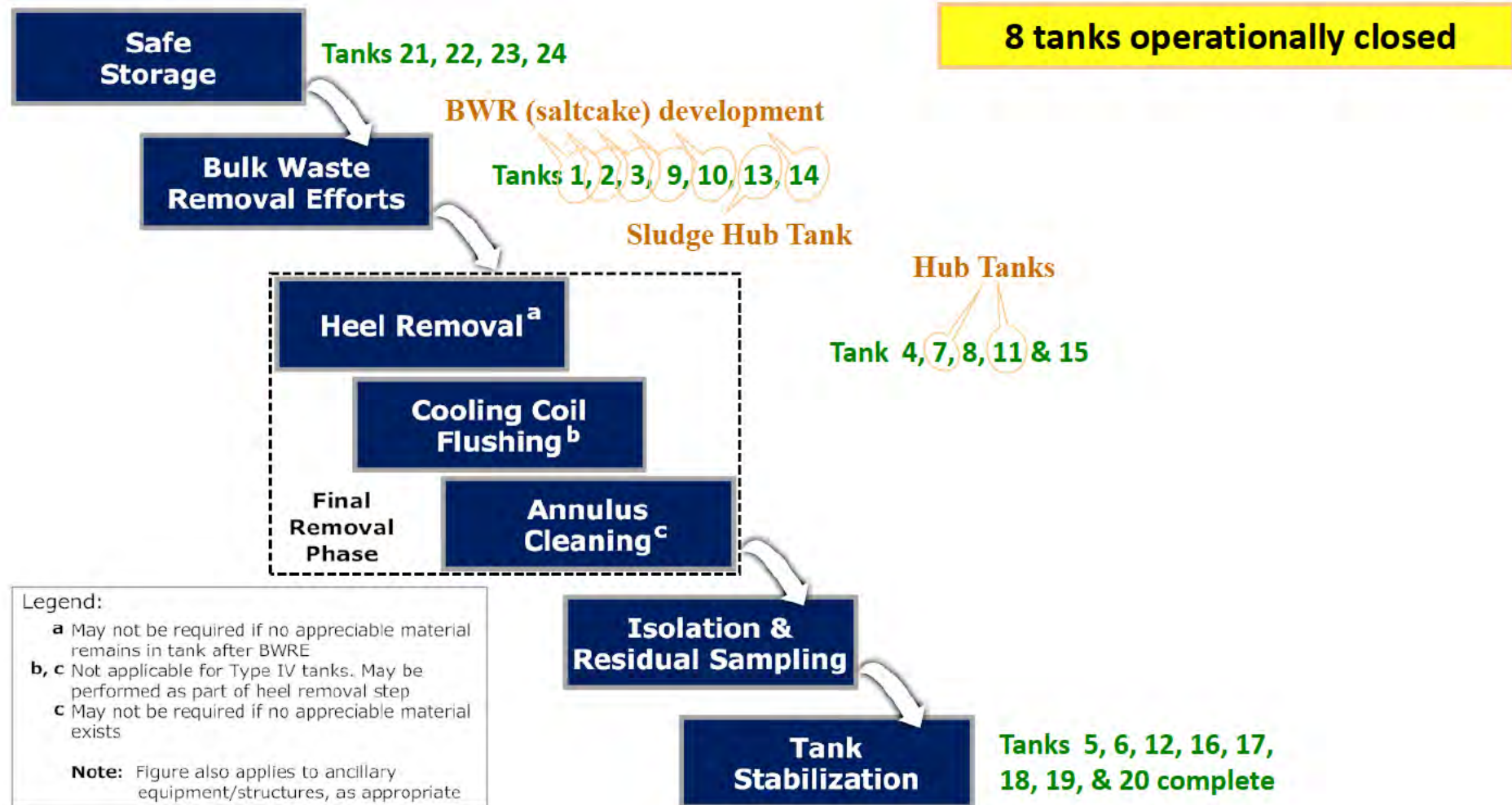
- The Saltstone Production Facility receives the decontaminated salt solution from the Salt Waste Processing Facility and the Effluent Treatment Facility
- Grout is made by mixing this solution with fly ash and slag
- This grout is pumped into the Saltstone Disposal Units, where it solidifies into a monolithic, non-hazardous, solid form.

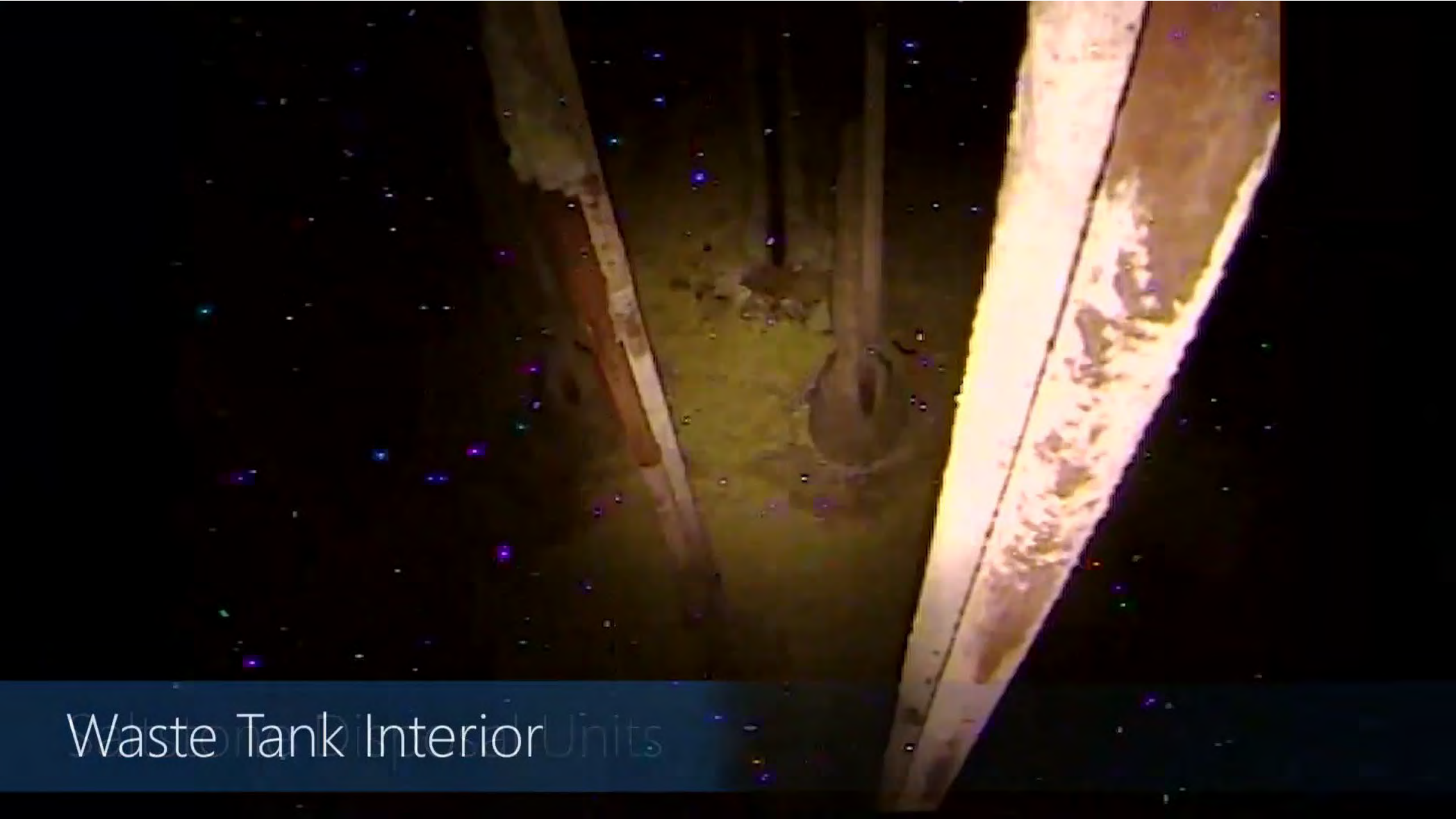




Saltstone

# Tank Closure Progression





Waste Tank Interior Units

# SRS Liquid Waste Facilities

## SRS Liquid Waste Program Integration



# SRS Liquid Waste Contract in Perspective



- Savannah River Mission Completion is responsible for eliminating radioactive liquid waste produced from Cold War era nuclear weapons production
- Contract awarded October 2021; Assumed operations February 27, 2022
- Current workforce of ~3,700 employees (including subcontractors)

# Start by Partnering for Success

## With the contractor

- On April 13, 2022, the Department of Energy – Savannah River (DOE-SR) and the SRMC leadership teams established the SRS Liquid Waste Program Partnering Agreement.
- DOE-SR and SRMC formally agreed upon the vision, mission, objectives, values, behaviors, issue resolution process, logistics, and counterpart relationships that form the basis for the agreement.

## With the regulating agencies

- DOE-SR, SC Department of Health and Environmental Control, and the Environmental Protection Agency reviewed, negotiated, and agreed upon revisions to the SRS Federal Facility Agreement.
- The revised agreement outlined a set of shared SRS Liquid Waste Program values and goals, including but not limited to maintaining transparency amongst one another, reducing risk to the environment by removing waste and closing tanks, and completing waste removal and subsequent grouting of all waste tanks and ancillary structures with a risk-based priority order.
- These revisions ensure regulatory requirements align to allow the liquid waste facilities to operate as efficiently and effectively as possible, with an emphasis on risk-reduction.

## Schedule for Remaining Non-Compliant Tanks

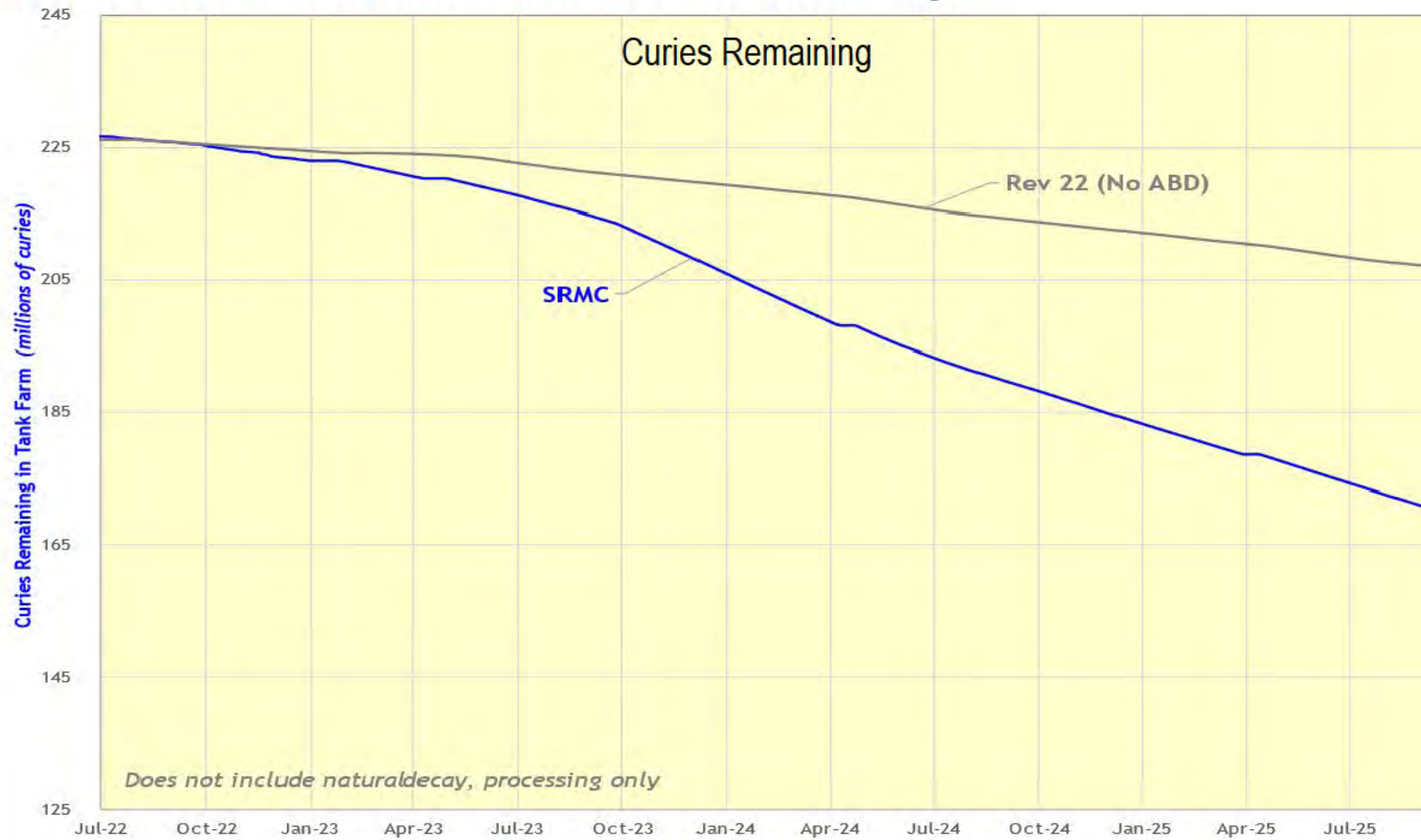
Milestone Date	Preliminary Cease Waste Removal (# of Tanks)	Operational Closure (# of Tanks)
12/31/2023	0	0
12/31/2024	1	0
12/31/2025	3	0
12/31/2026	2	0
12/31/2027	2	0
12/31/2028	0	3
12/31/2029	2	0
12/31/2030	1	2
12/31/2031	0	3
12/31/2032	0	1
12/31/2033	0	2
12/31/2034	1	0
12/31/2035	1	0
12/31/2036	1	1
12/31/2037	2	4
Total	16	16

# Task Order Strategy

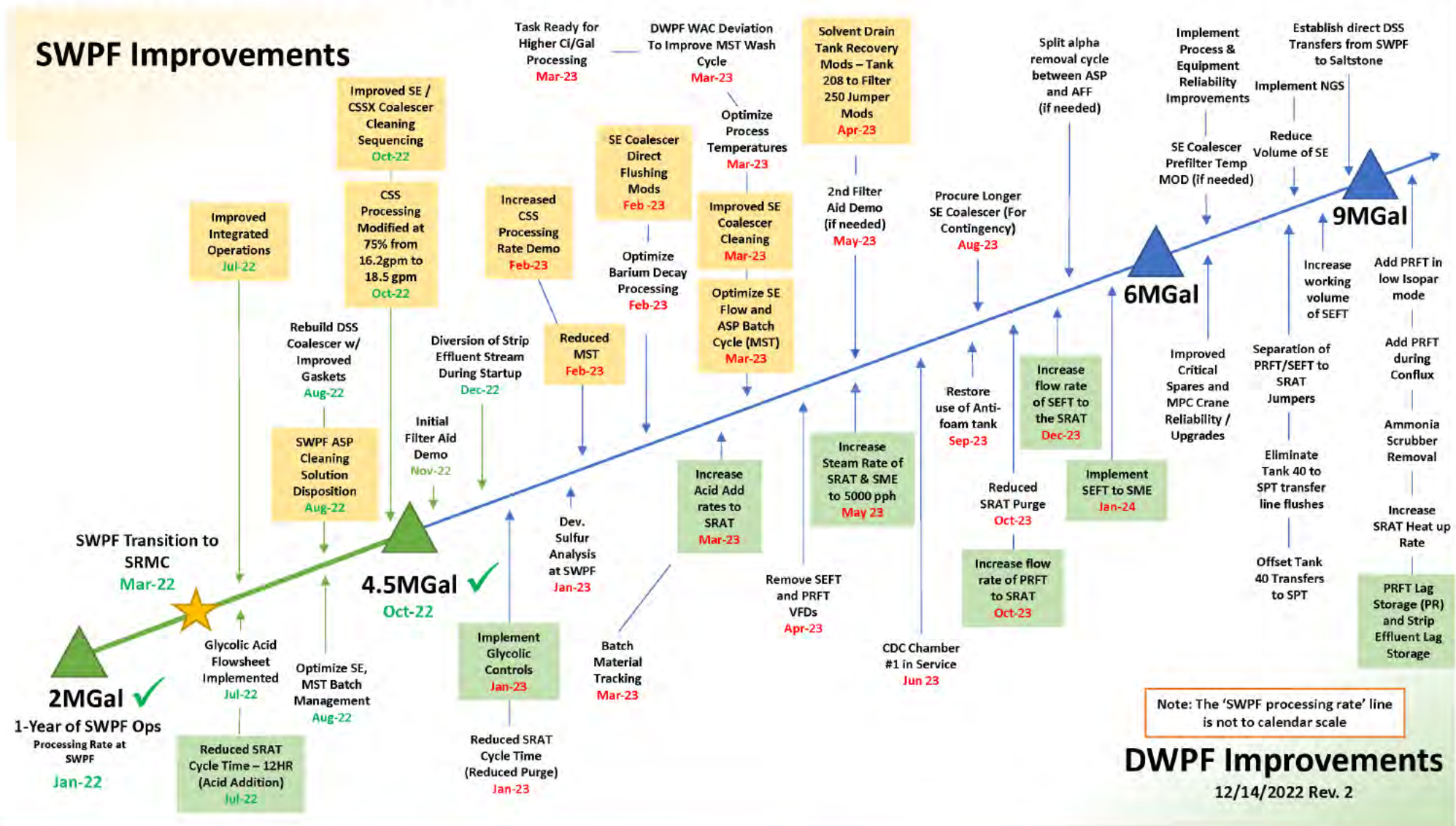
- **The End-State Contracting Model focuses on accelerating cleanup, while reducing financial risks and environmental liability to the government, and fairly sharing risk between the government and contractor to achieve desired end states.**

# The Path Forward – Curie Reduction

- Focus on the goal of risk-reduction by removing curies at an accelerated pace.
- What is a curie? A curie is a unit of radioactivity.



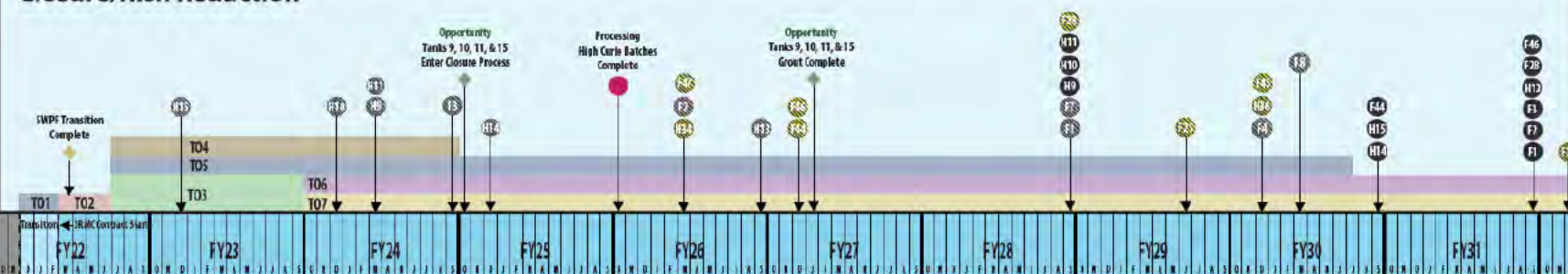
# The Path Forward - Improvements



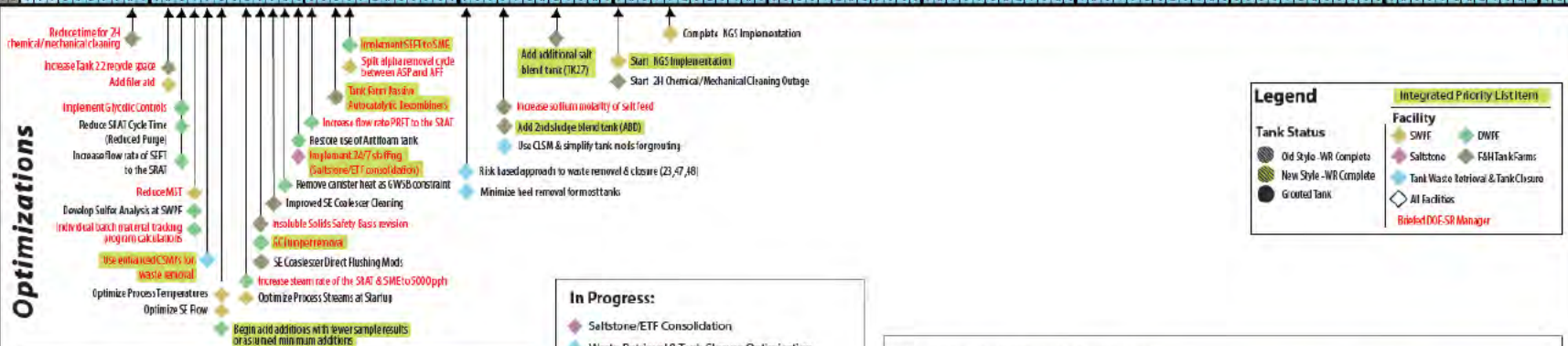
# The Path Forward - Optimizations

## SRMC Optimization Plan - Base

### Closure/Risk Reduction



### Optimizations



Completed Items:	
Implement Glycolic Flowchart	Use 3rd salt blend tank
Optimize use of existing maintenance facilities in LWO: rebuild SWPF contactors in 2004; rebuild SWPF manipulators in DWPF	7 day coverage implemented
Add first frit drop if canisters not ready	Cement free grout implemented
Higher Cl/gal processing	Mixer Phase I upgrades complete & being evaluated
2 shift ops	Super SRATs implemented
ASP Cleaning Solution Disposition	Optimize SE, MST batch management
Initiate Accelerated Closure Strategy (Tanks 9-11)	Reduce DSS cycle times implemented
Implement higher Curie Salt feed batches	Increase recycle beneficial reuse for salt batching
DBD Model Caps Closed	Enhanced mixing jets with greater cleaning radius implemented
Resume SWPF processing (deliberate ops)	Recovery of CSSX solvent
Initiate Waste Retrieval & Tank Closure Optimization Initiatives	PR in service (feasibility study)
	PPT working volume
	Initiate Waste Retrieval & Tank Closure Design Products Optimization

In Progress:
Saltstone/ETF Consolidation
Waste Retrieval & Tank Closure Optimization Initiatives - Design Product Optimizations
SFU Optimization
Dispose pumps (pump on a stick)
GC removal
Hg cert restoration
DSS alternate WDA compliance strategy
MPC Crane controls and cameras
Double stack GWSB 182
Implement canyon simplification
MPC Crane Reliability
Transfer Readiness
Salt Batch Readiness
ETAF Process
Increase critical spares
Maximize usage of DOE HLW interpretation
Infrastructure/Reliability Upgrades

Planning (DBD Model to Influence):
Hg removal pump
Ammonia scrubber removal (canyon simplification)
Separation of SEFT/PRFT to SRAT jumpers
Offset Tank 40 transfers to SPT
Eliminate Tank 40 to SPT transfer line flushes
Increase SRAT heat up rate
Add acid faster
Flexibility in Engineering calculations
Eliminate unnecessary lab work
Add PRFT during Conflux
Add PRFT in low isopar mode
Strip effluent lag storage (PR in service)
Increase working volume of SEFT
PRFT lag storage (PIT)
Add SWPF sample for soluble sulfur in MST/sludge and SE (this could allow additional additions of both to SRAT batch if soluble sulfur has been removed)
Improve decon methods (ice pinging, laser ablation, new REDC soak tank) to allow equipment rebuilds and reduce spare procurement costs
Establish direct DSS from SWPF to Saltstone
Reduce volume of SE
Isopar L destruction
Establish single control room for SWPF inter-transfers (SWPF)
Transfer line integrity strategy (Tank Farm)
Additional control room consolidation (Tank Farms)
Divert DWPF recycle direct to ETF & shutdown 2H evaporator
Future mixer upgrades depending on results of Phase I
Procure pre-blended dry feeds
Concentrate feed
Process Room
Streamlined Engineering Equipment
Accelerate transition for bulk waste removal to heel removal



## **Our Mission:**

**Treat and dispose of radioactive waste and operationally close both liquid waste tank farms at SRS in a manner that safely, efficiently, and effectively protects workers, the public, and the environment.**