Liquid Waste System Plan Rev 23

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SRMC SAVANNAH RIVER MISSION COMPLETION

BWXT

BWX Technologies, Inc.

amentum FLUOR

Acronyms

- ABD – Accelerated Basin Inventory
- D&D – Decontamination and Decommissioning
- DBD – Different by Design (SRMC teaming subcontractor)
- DWPF – Defense Waste Processing Facility
- FFA- Federal Facilities Agreement
- FTF – F Tank Farm
- FY – Fiscal Year
- g/m3 – Grams per Cubic Meter
- GPM – Gallons Per Minute
- HTF – H Tank Farm
- LW – Liquid Waste
- Mgal – millions of gallons
- NGS – Next Generation Sample
- PCWR – Preliminary Cease Waste Removal
- SDU – Saltstone Disposal Facility
- SE – Strip Effluent
- SEFT – Strip Effluent Feed Tank
- SME – Slurry Mix Evaporator
- SRAT – Sludge Receipt and Adjustment Tank
- SRMC – Savannah River Mission Completion (current Liquid Waste Contractor)
- SWPF – Salt Waste Processing Facility

Purpose of the Presentation

Fulfill Savannah River Site Citizens Advisory Board request for briefing on Revision 23 of the Liquid Waste System Plan

Summary

Rev 23 was approved by DOE in May 2023 and contains a single case that finishes the Liquid Waste Mission by the end of 2037 (Finish in 15) consistent with the FFA agreement Vision/Goals

- **Utilized the newly developed DBD model to identify improvements to accelerate mission completion to 2037**
- **Acceleration assumes implementation of a series of optimizations and improvements in processes**
- **There are opportunities to further accelerate tank closures**

Inputs and Assumptions

- **Priorities for Scenario Development (these are goals, not necessarily outcomes):**
  1. *Continual safe storage of LW in tanks and vitrified canisters in storage.*
  2. *Risk reduction through waste disposition, i.e., maximizing processing of waste and completing the Liquid Waste mission in 2037.*
  3. *Completion of waste removal from H-Tank Farm tanks in the water table (i.e., Type I and Type II tanks).*
  4. *Support Accelerated Basin De-inventory (ABD)*

- **Funding:**
  - Funding for the Liquid Waste program is provided from PBS-14C
  - Additional funding (other than PBS-14C) will be provided to support
    - *Fast Critical Assembly (FCA) disposition*
    - *Conversion of Tank 42 for sludge batch preparation service*

- **Accelerated Basin Deinventory (ABD)**
  - LW Plan is consistent with current ABD projections
  - Assume that ABD transfers will be supported only to the degree that they do not impact the overall LW mission (i.e. completion in 2037)
    - *The final ABD discard will be received no later than February 2034 to avoid mission impact*
  - Fissile loading in glass is allowed to exceed 2,500 g/m3 after Sludge Batch 11
  - Alleviate sludge processing constraint by converting Tank 42 to a sludge batch prep tank

Results

Key Milestone	Rev 23
Final Inter-area tranfer (FTF waste removal complete)	2032
Final Type I and II tanks complete operational closure	2032
Complete salt waste treatment through SWPF	2035
Complete sludge waste treatment through DWPF	2036
Date last LW facility turned over to D&D	2037
Total number of canisters produced	8,113
Salt Solution Processed	113 Mgal
Number of SDUs	12

SWPF Processing

Next Generation Solvent (NGS) is implemented in 2024 to enable processing at ~9 Mgal/yr starting in FY25

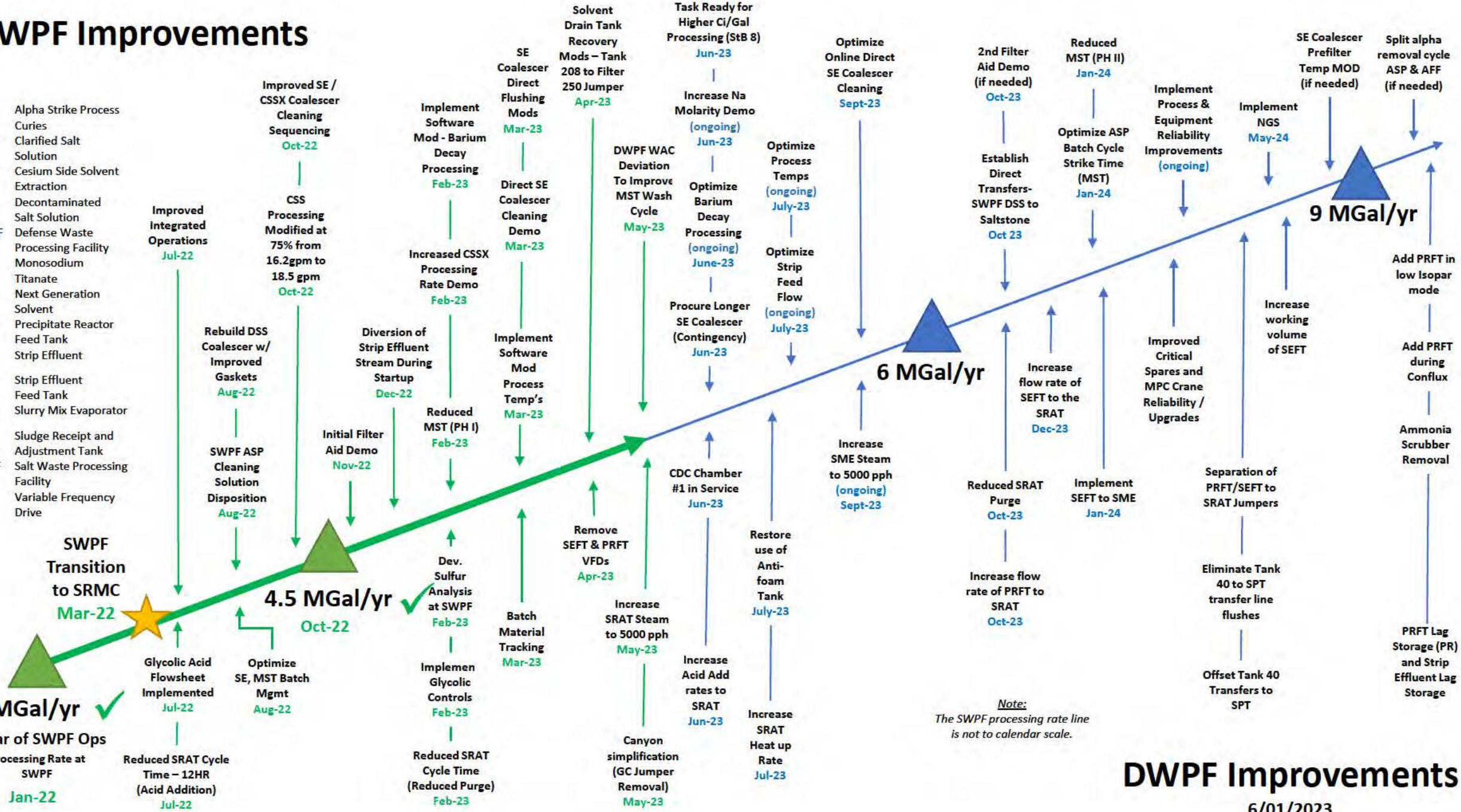
Fiscal Year	SWPF Production (Mgal)
FY23	4.75
FY24	5.80
FY25	8.31
FY26	8.83
FY27	8.85
FY28	6.65
FY29	5.93
FY30	8.92
FY31	9.12
FY32	8.78
FY33	9.00
FY34	8.88
FY35	3.13

Key Improvements

- **Improve filtration rate at SWPF**
- **Decrease monosodium titanate (MST) strike time and quantity of MST added**
- **Increase Solvent Extraction 100% throughput to 28 gpm from 21.6 gpm**
  - This will be achieved with the deployment of NGS.
- **Limit lost production at SWPF resulting from close coupling with DWPF through a combination of:**
  - Decreased strip effluent (SE) volume (enabled by NGS)
  - Increased DWPF plant availability
  - Accelerated strip effluent consumption in DWPF
  - Increased strip effluent consumption flexibility
    - *more strip effluent per Sludge Receipt and Adjustment Tank (SRAT) Batch*
    - *Strip Effluent Feed Tank (SEFT) to Slurry Mix Evaporator (SME)*
    - *Strip Effluent lag storage*
  - Increased MST/Sludge Solids (SS) consumption flexibility (volume of MST/SS per SRAT batch, availability of MST/SS lag storage)
- **Improve DWPF recycle management within DWPF through a combination of:**
  - Decrease/eliminate sample wait time
  - Decrease/eliminate permanganate strike time
  - Provide redundant Recycle Collection Tank capability

SWPF Improvements

ASP	Alpha Strike Process
Ci	Curies
CSS	Clarified Salt Solution
CSSX	Cesium Side Solvent Extraction
DSS	Decontaminated Salt Solution
DWPF	Defense Waste Processing Facility
MST	Monosodium Titanate
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
VFD	Variable Frequency Drive



Note:
The SWPF processing rate line is not to calendar scale.

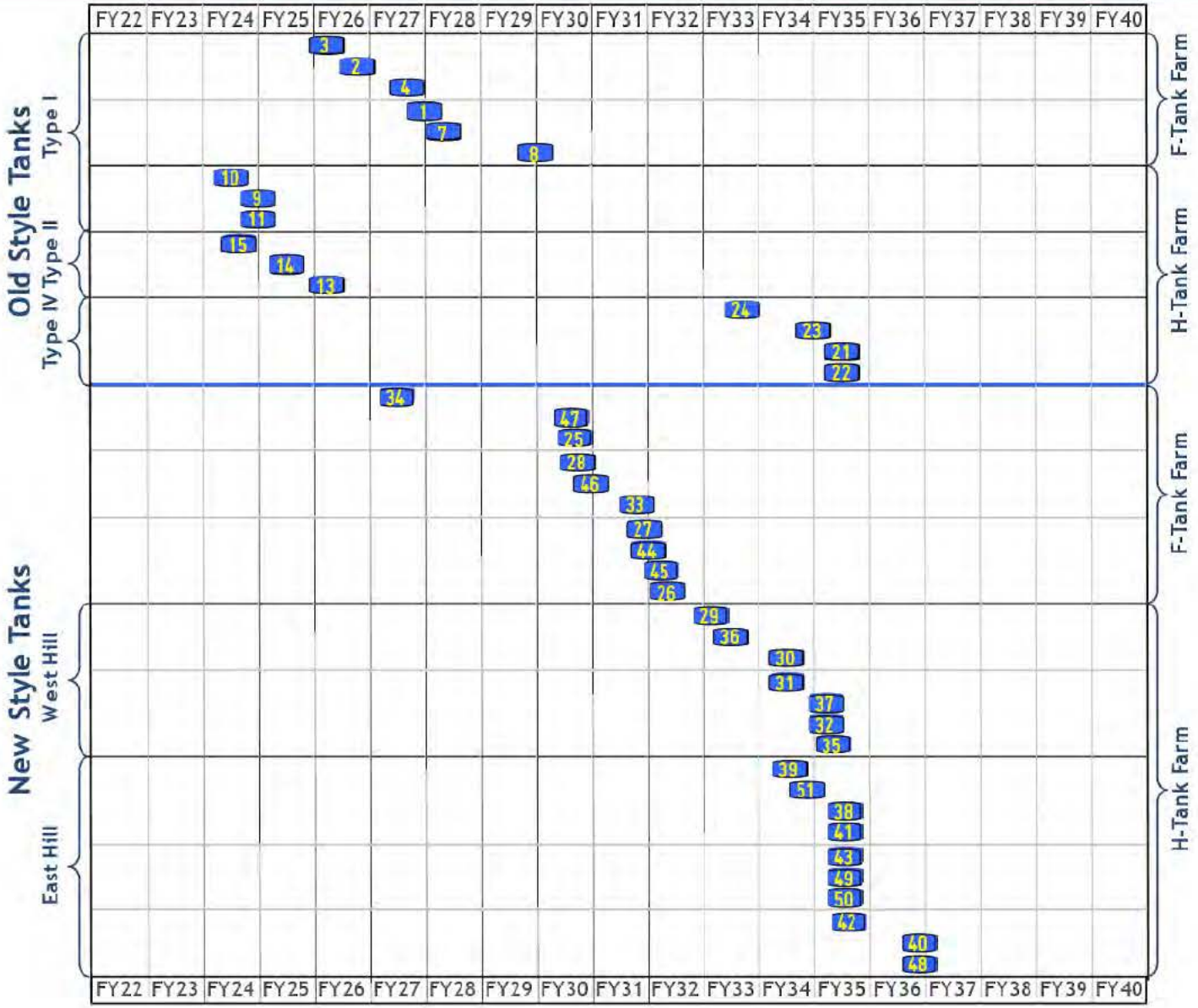
DWPF Improvements

6/01/2023

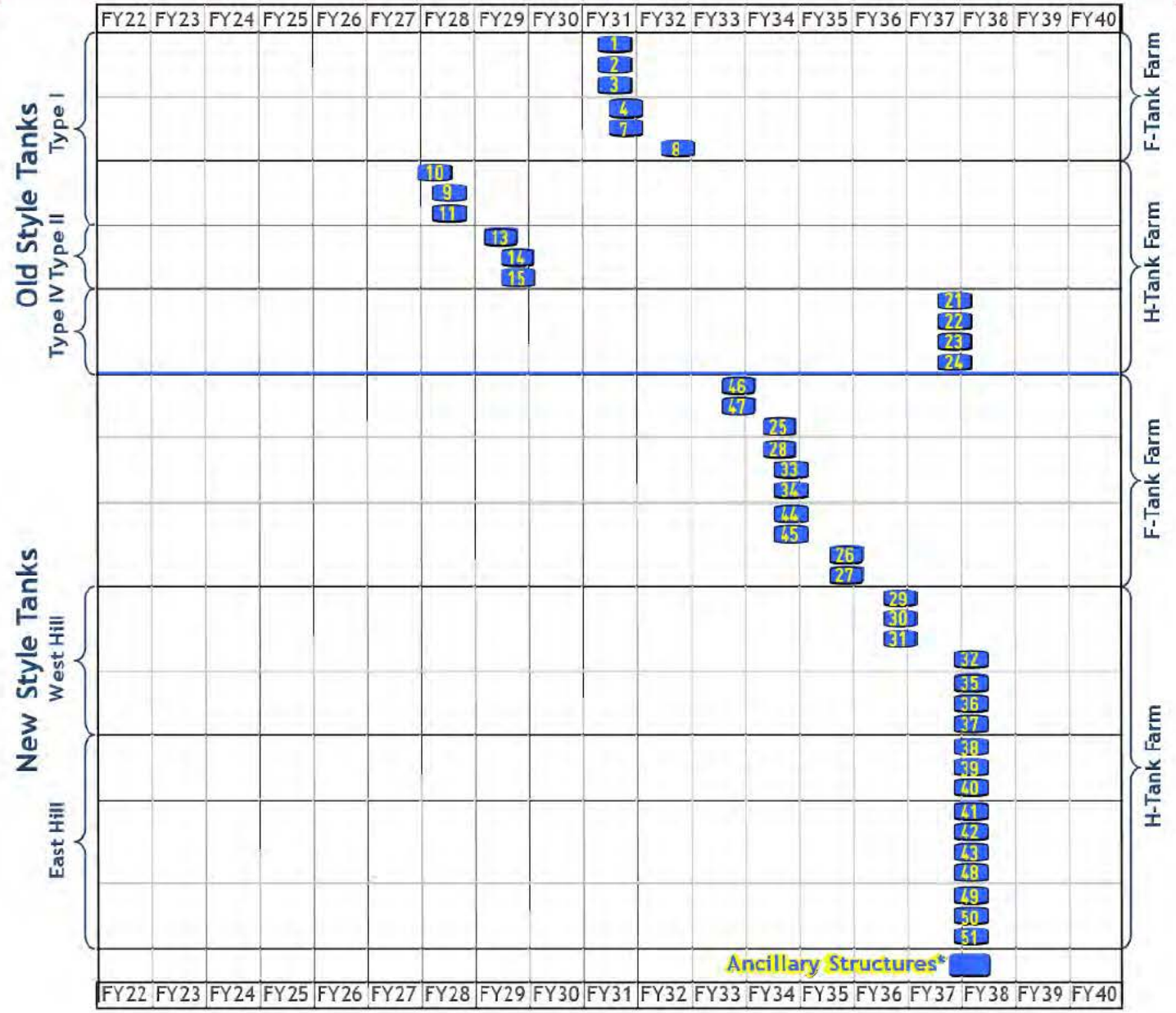
FFA Commitments

Schedule for Remaining Non-Compliant Tanks		
Milestone Date	Preliminary Cease Waste Removal (№ of Tanks)	Operational Closure (№ of Tanks)
12/31/2023	–	–
12/31/2024	1	–
12/31/2025	3	–
12/31/2026	2	–
12/31/2027	2	–
12/31/2028	–	3
12/31/2029	2	–
12/31/2030	1	2
12/31/2031	–	3
12/31/2032	–	1
12/31/2033	–	2
12/31/2034	1	–
12/31/2035	1	–
12/31/2036	1	1
12/31/2037	2	4

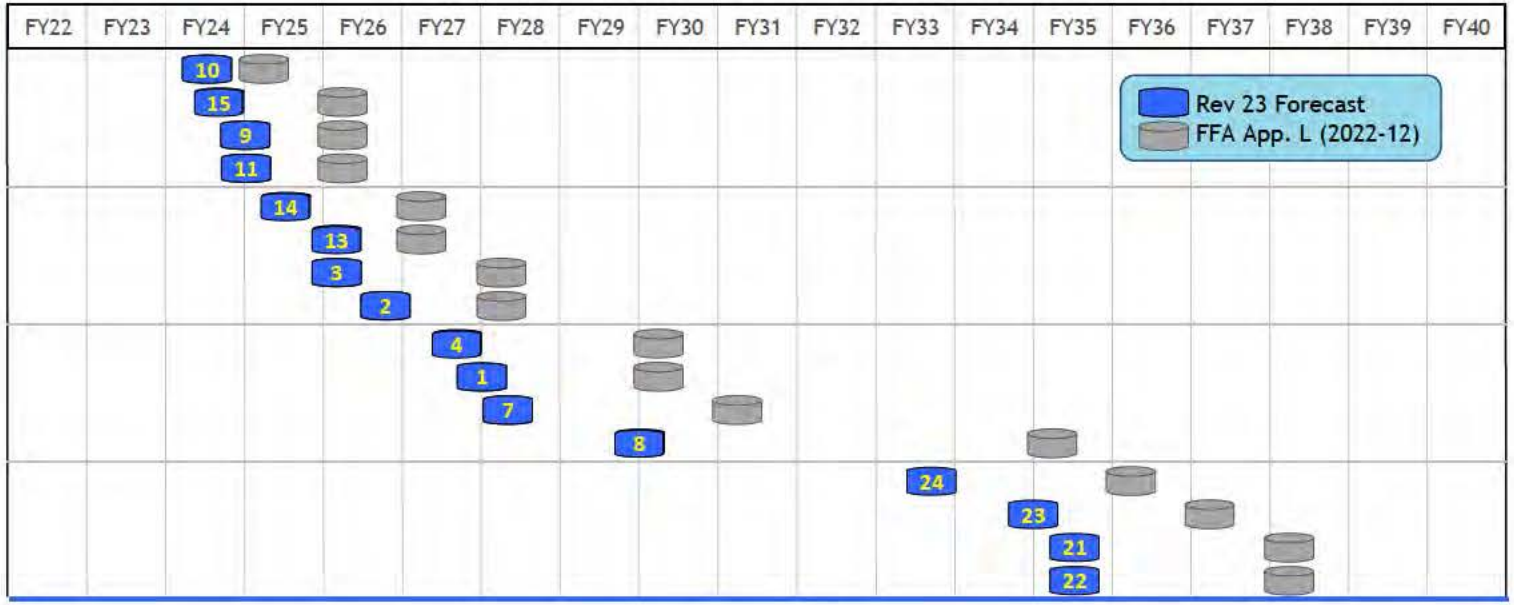
Results (Preliminary Cease Waste Removal)



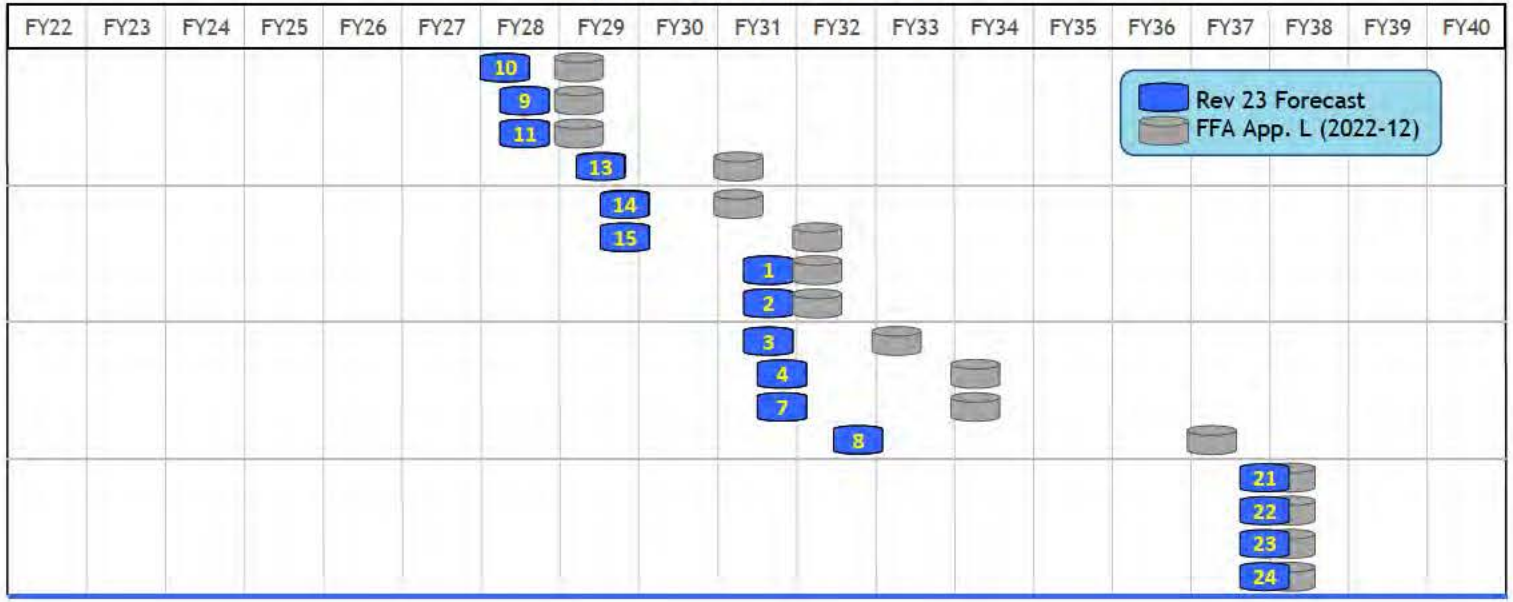
Results (Operational Closures)



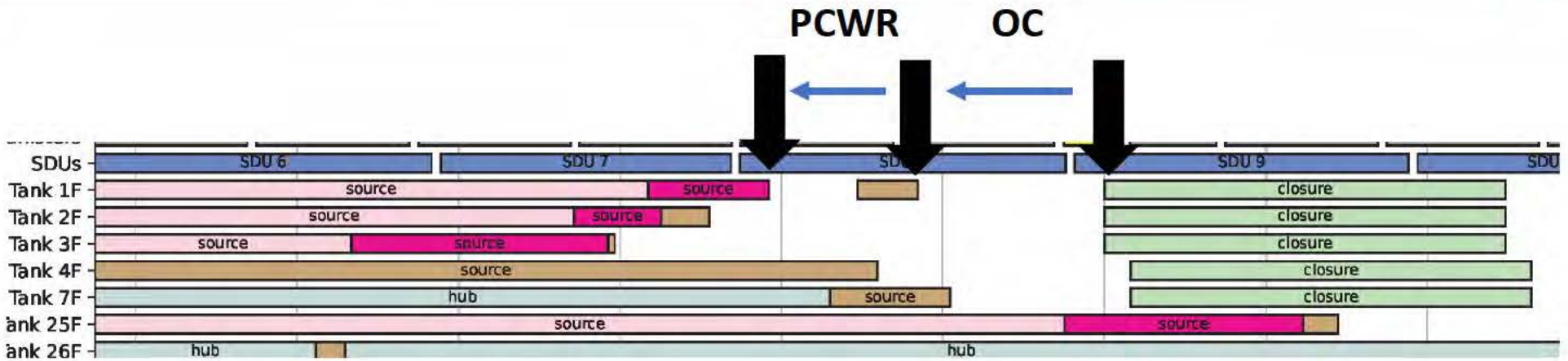
Preliminary Cease Waste Removal



Operational Closure

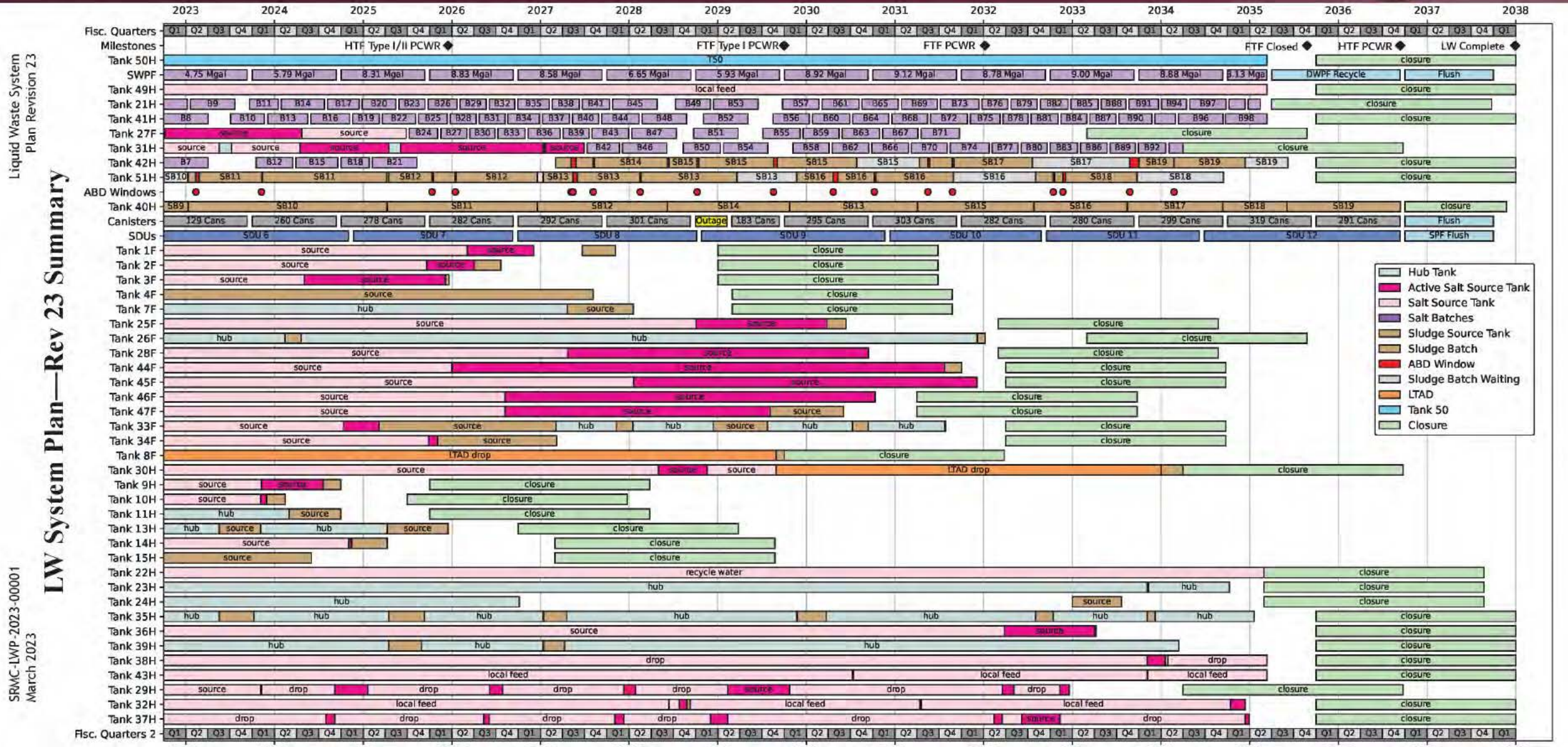


Opportunities to Accelerate Tank Closures



- Funding applied to risk reduction as priority
- Opportunities exist to accelerate Operational Closure of nearly all remaining tanks

Questions


Liquid Waste System Plan Revision 23
LW System Plan—Rev 23 Summary
SRMC-LWP-2023-00001
March 2023
Fisc. Quarters
Milestones
HTF Type I/II PCWR
FTF Type I PCWR
FTF PCWR
FTF Closed
HTF PCWR
LW Complete
Tank 50H
SWPF
Tank 49H
Tank 21H
Tank 41H
Tank 27F
Tank 31H
Tank 42H
Tank 51H
ABD Windows
Tank 40H
Canisters
SDUs
Tank 1F
Tank 2F
Tank 3F
Tank 4F
Tank 7F
Tank 25F
Tank 26F
Tank 28F
Tank 44F
Tank 45F
Tank 46F
Tank 47F
Tank 33F
Tank 34F
Tank 8F
Tank 30H
Tank 9H
Tank 10H
Tank 11H
Tank 13H
Tank 14H
Tank 15H
Tank 22H
Tank 23H
Tank 24H
Tank 35H
Tank 36H
Tank 39H
Tank 38H
Tank 43H
Tank 29H
Tank 32H
Tank 37H
Fisc. Quarters 2
Hub Tank
Active Salt Source Tank
Salt Source Tank
Salt Batches
Sludge Source Tank
Sludge Batch
ABD Window
Sludge Batch Waiting
LTAD
Tank 50
Closure