SWPF – Maximizing Risk Reduction by Optimizing Curie Strategy

Mike Borders

SRMC Optimization & Integration Director

May 2023

SRMC SAVANNAH RIVER MISSION COMPLETION

BWXT

BWX Technologies, Inc.

amentum FLUOR

SRMC-ESH-2023-00054

Agenda

- **Purpose of the presentation**
- **Risk Reduction Update**
  - High Curie Processing
- **Throughput Optimization**
  - Status Update
  - Plan
- **Risk Reduction of Old Style Tanks in the Water Table Update**

Purpose of the Presentation

- **Update the CAB on execution of SRMC's Risk Reduction Strategy (CAB brief - November 2022)**
- **Support CAB Recommendation to provide recommendations on the LW optimization priorities from a community perspective**

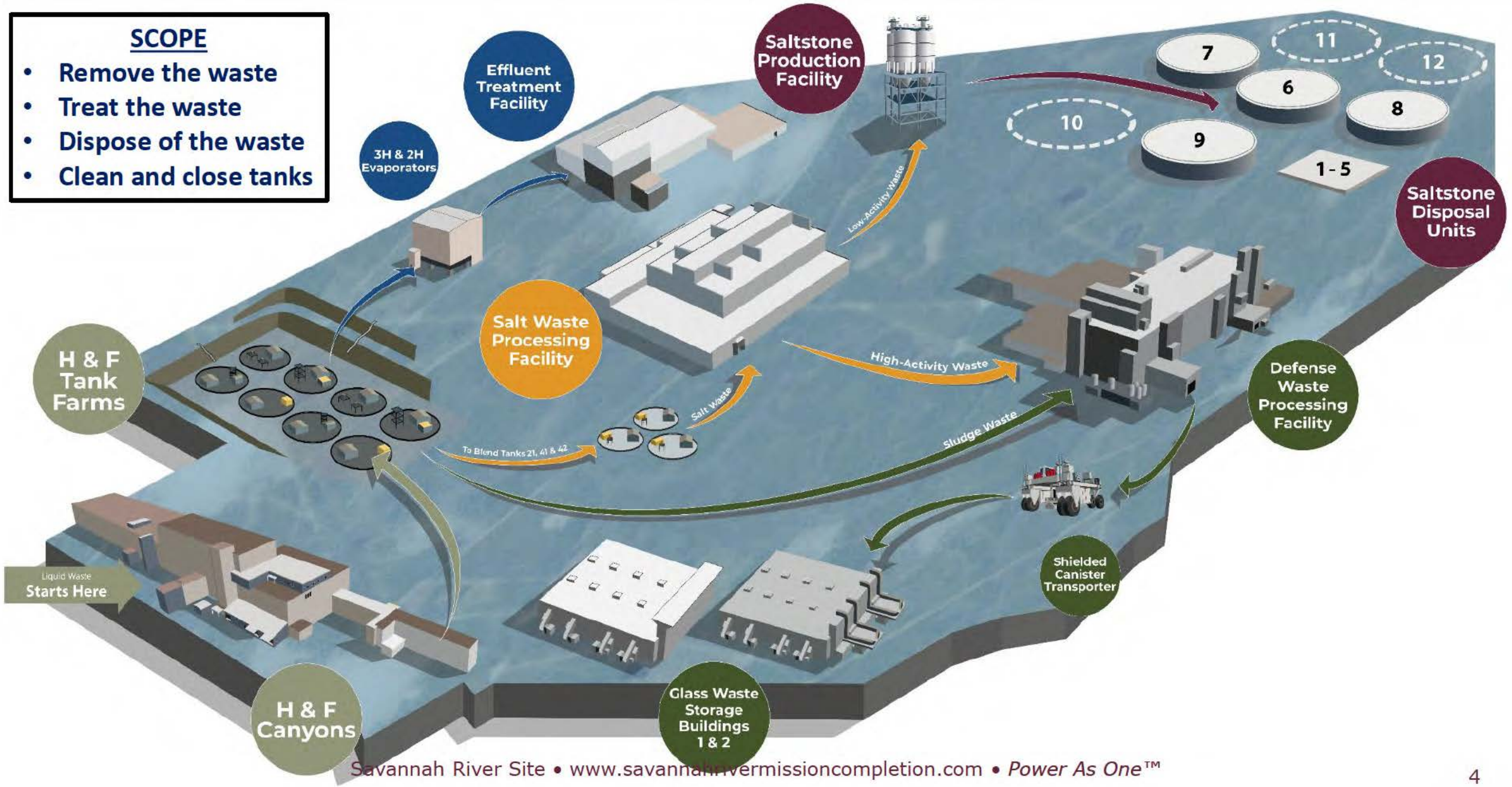
SWPF ASP Crossflow Filter

SWPF CSSX Centrifugal Contactors

SRS Liquid Waste Facilities

SCOPE

- Remove the waste
- Treat the waste
- Dispose of the waste
- Clean and close tanks



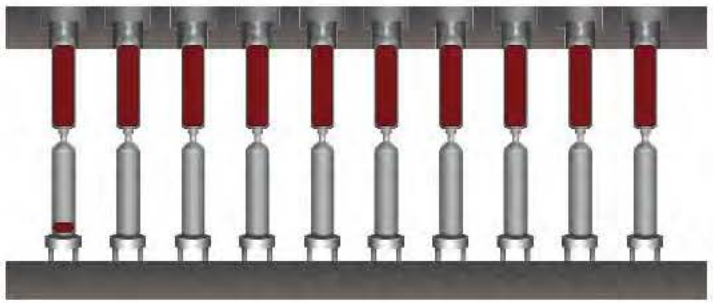
SRS Liquid Waste Progress to Date

Sludge batches processed: 9 of 19 projected

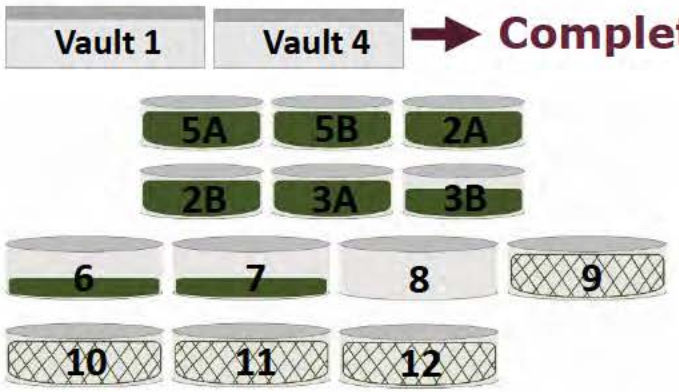
Salt batches processed: 7 of 102 projected

Tanks closed: 8 of 51

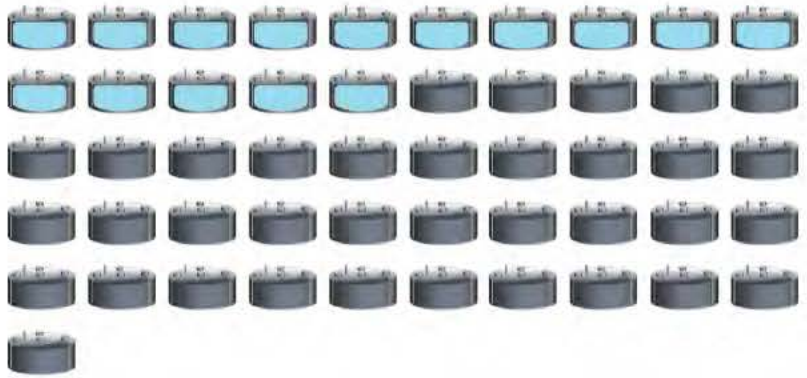
Canisters: 4,353 total of 8,113 projected



Saltstone Disposal Units



Tanks retrieved: Waste removal complete on 15 of 51 tanks



Focused on Risk Reduction

- **Focus High Curie 1st**
  - Focus on Risk/Curie Reduction
  - Focus on Optimizations & Increase Throughput
  - Optimize timing of Next Generation Solvent (NGS) Implementation

- **Focus on Getting Out of Old-Style Tanks in Water Table**

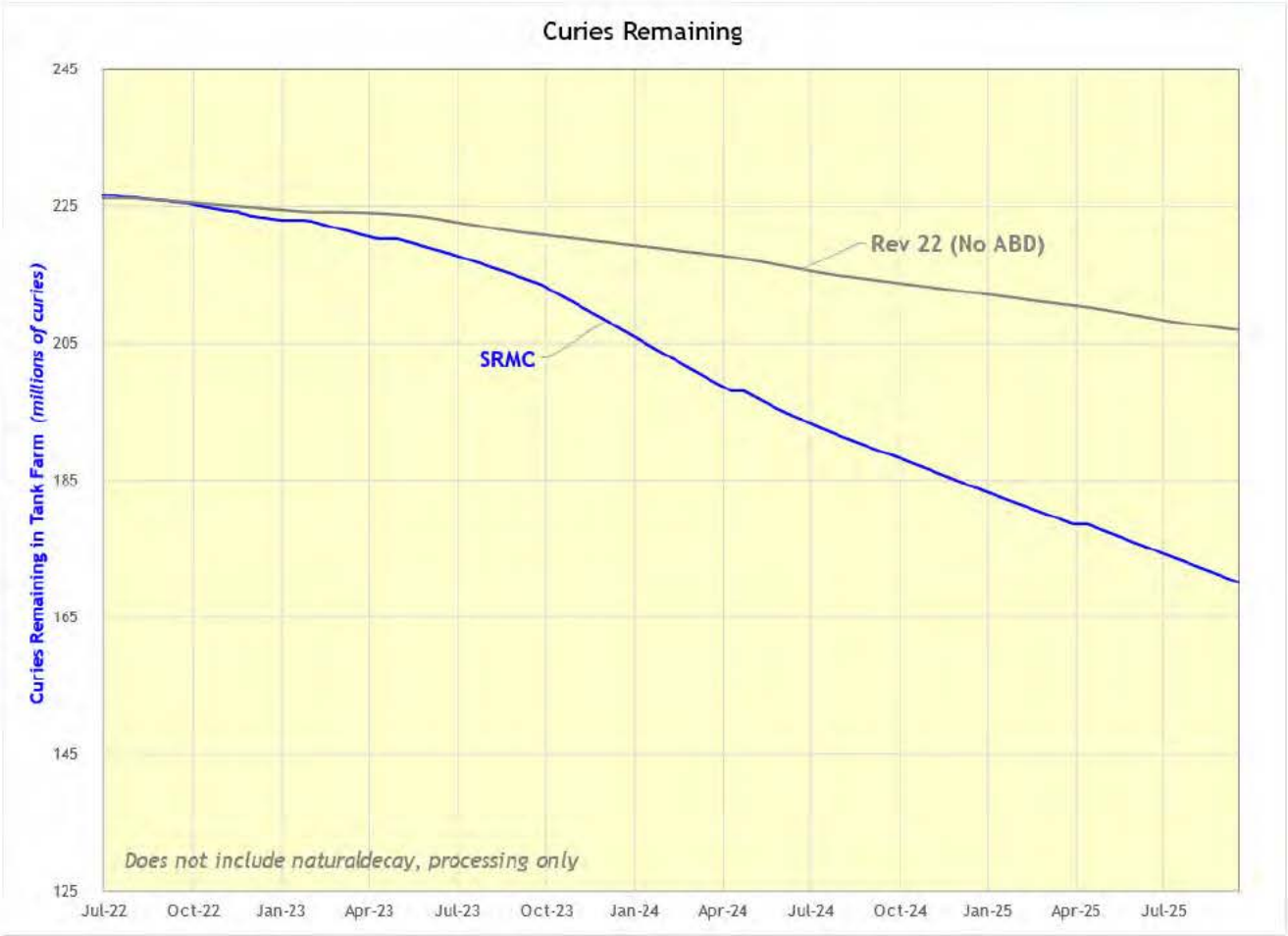
Removing Curies

- Previous plan showed curies removed on a steady pace
- That changed with the new strategy

Curies removed on an accelerated pace

Batch Preparation Details

Batch	Na (M)	Ci/gal	To TK 49
B5	6.9	2.5	*complete*
B6	7.5	2.0	*complete*
B7	6.4	1.6	*complete*
B8	6.9	2.5	5/2023
B9	6.9	2.3	8/2023
B10	6.9	2.5	11/2023
B11	6.9	2.2	1/2024
B12	6.9	1.8	3/2024
B13	7.0	1.5	5/2024
B14	7.0	1.3	7/2024
B15	7.0	1.7	9/2024
B16	7.0	1.4	11/2024
B17	6.9	1.5	1/2025
B18	7.0	1.5	3/2025
B19	6.9	1.4	6/2025



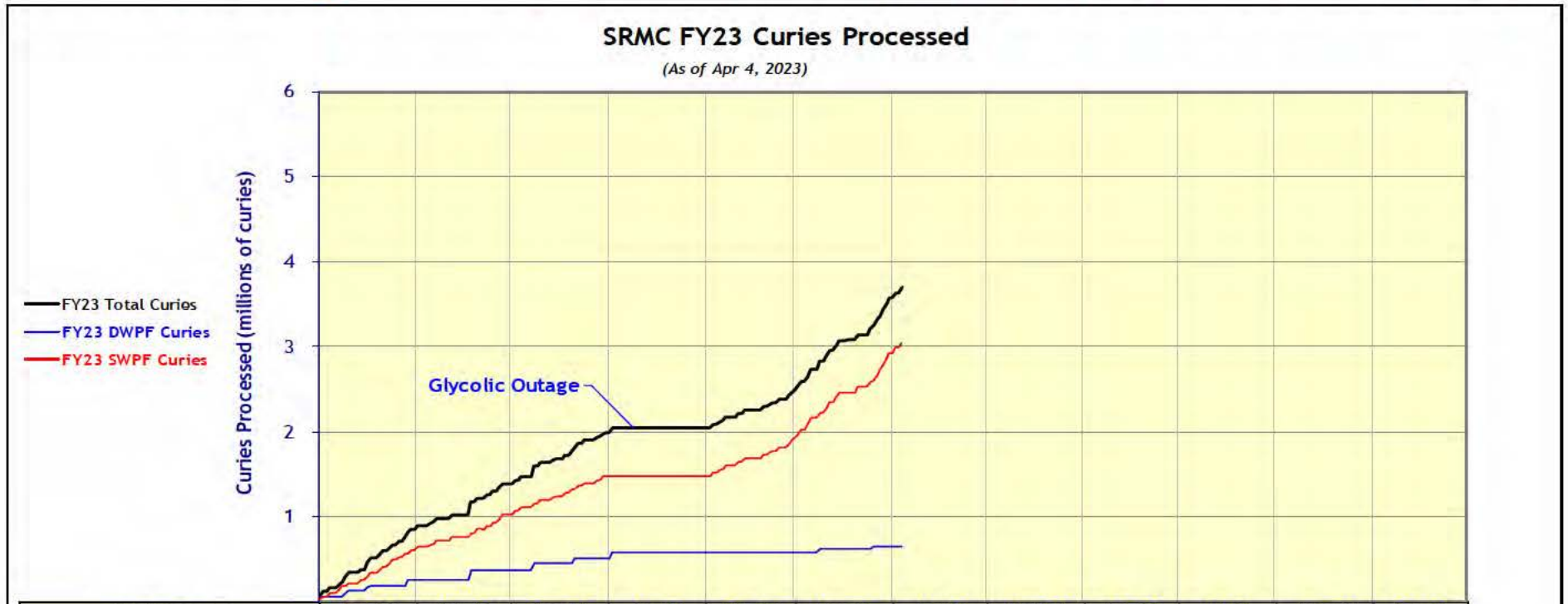
Curies/Gallon: ~0.5 > 1.3 – 2.5
Sodium Molarity: > 6.44

FY23 Curies Processed

Continuing to Drive Down Risk at Accelerated Pace

Record Salt Curies Processed in a Month

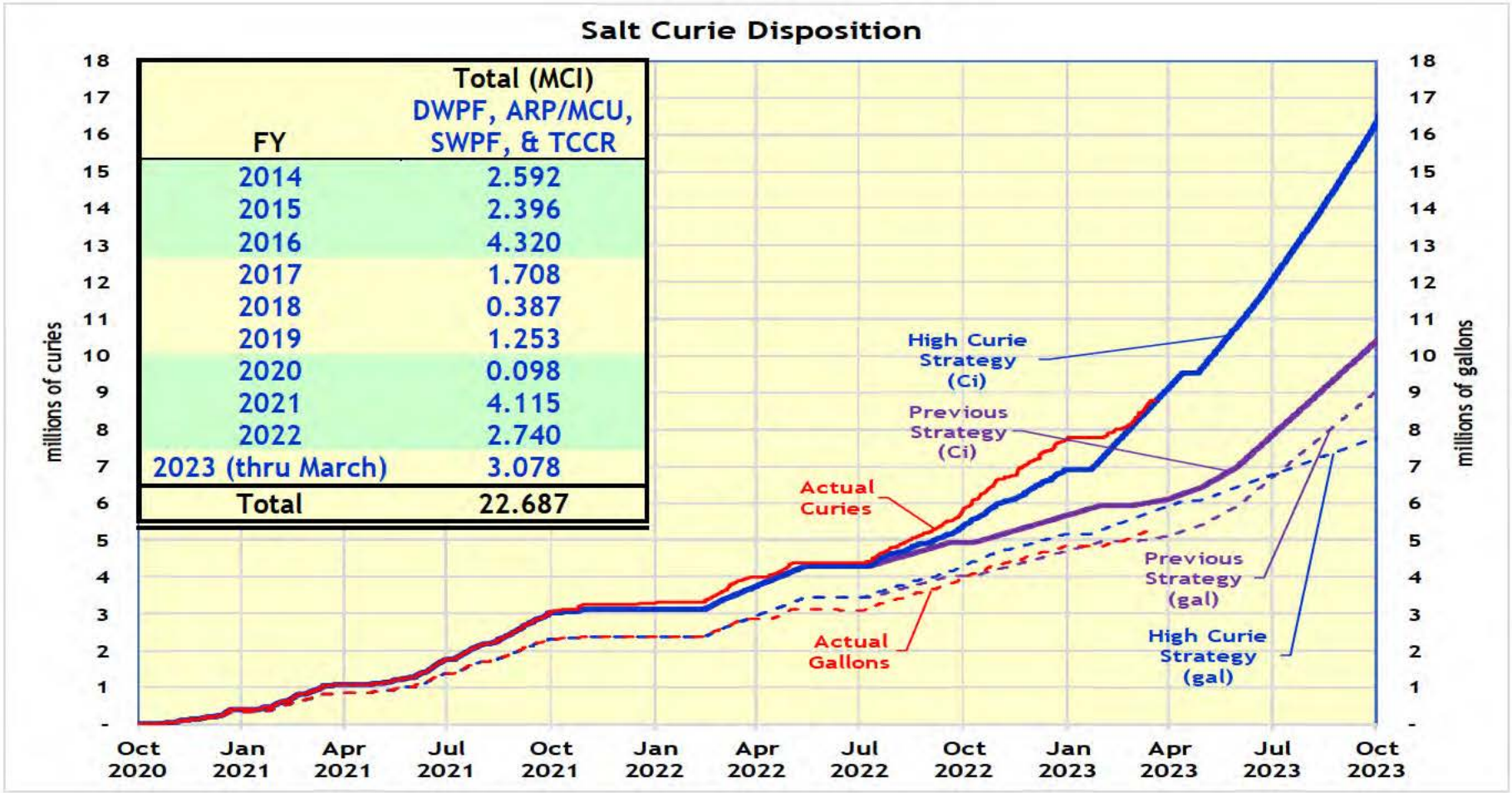
1,021,414 Ci (March 2023)



Cuires Processed	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Cumulative Total	853,622	1,381,023	1,980,121	2,042,133	2,466,911	[illegible]	3,699,353					
Cumulative DWPF	252,536	360,418	506,725	568,134	568,134	646,485	646,485					
Cumulative SWPF	601,085	1,020,606	1,473,396	1,473,999	1,898,[illegible]77	2,920,191	[illegible]052,869					
Monthly Total	853,622	527,401	599,098	62,013	424,[illegible]777	1,099,765	[illegible]32,678					
Monthly DWPF	252,536	107,881	146,308	61,409	-	78,351	-					
Monthly SWPF	601,085	419,520	452,790	604	424,777	1,021,414	[illegible]32,678					
Curies (week ending sum)	Jan 17	Jan 24	Jan 31	Feb 7	Feb [illegible]4	Feb 21	Feb 28	Mar 7	Mar 14	Mar 21	Mar 28	Apr 4
Total	-	-	604	124,970	85,[illegible]28	75,465	[illegible]38,614	257,911	287,383	122,706	232,747	331,695
DWPF	-	-	-	-	-	-	-	-	43,874	-	34,477	-
SWPF	-	-	604	124,970	85,728	75,465	138,614	257,911	243,510	122,706	198,270	331,695
Definition		Analysis / Action						Status				

Results of High Curie 1st Strategy

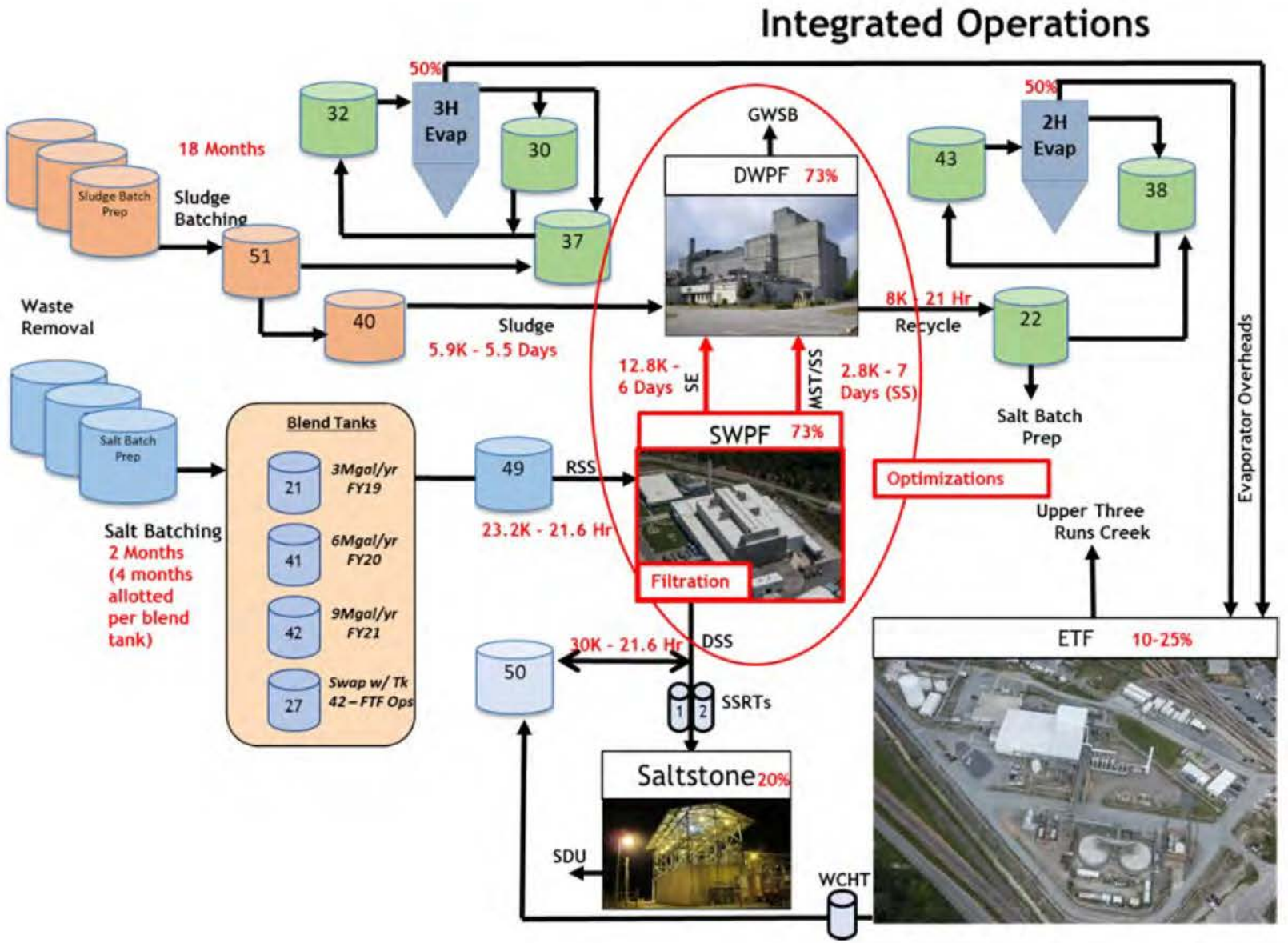
- **Current cumulative projection by end of FY23**
  - 7.6 Mgal vs
  - 9 Mgal
- **~6M more curies to be processed by Oct 2023 (~58% more)**



FY	Total (MCI) DWPF, ARP/MCU, SWPF, & TCCR
2014	2.592
2015	2.396
2016	4.320
2017	1.708
2018	0.387
2019	1.253
2020	0.098
2021	4.115
2022	2.740
2023 (thru March)	3.078
Total	22.687

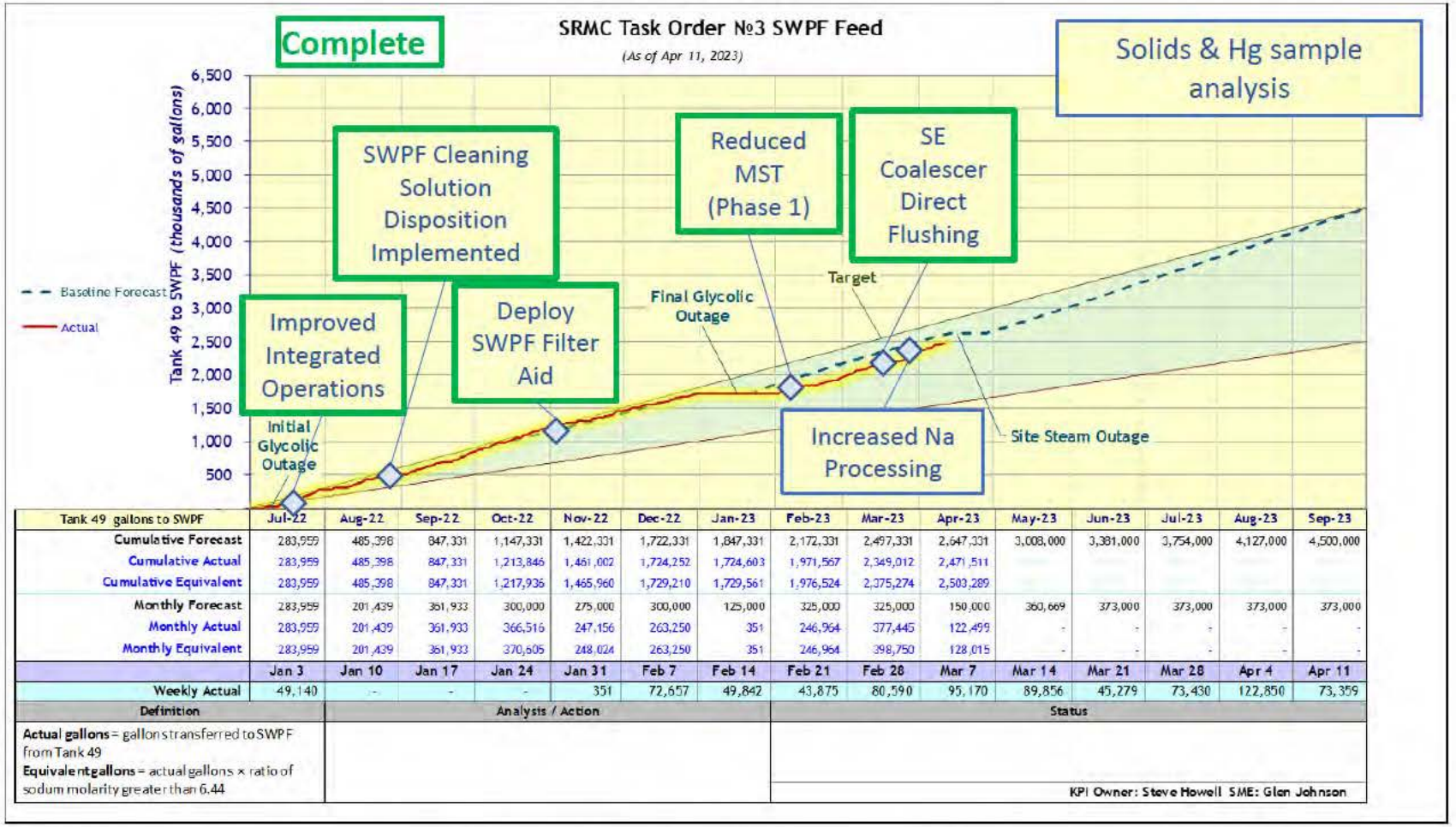
Optimization Focus – Integrated Operations

- **Increase Plant Availability**
- **Increase Plant Throughput**



SWPF Optimizations

- ✓ Increase process availability (solids fouling system)
- ✓ Focus on throughput ramp up (ASP Filtration current limiting rate)
- ✓ Implement NGS once filtration is no longer limiting
- ✓ Engineering Actions to Overwhelm Problems
- ✓ Chemistry Actions to Understand Problems



Tank 49 gallons to SWPF	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Cumulative Forecast	283,959	485,398	847,331	1,147,331	1,422,331	1,722,331	1,847,331	2,172,331	2,497,331	2,647,331	3,008,000	3,381,000	3,754,000	4,127,000	4,500,000
Cumulative Actual	283,959	485,398	847,331	1,213,846	1,461,002	1,724,252	1,724,603	1,971,567	2,349,012	2,471,511					
Cumulative Equivalent	283,959	485,398	847,331	1,217,936	1,465,960	1,729,210	1,729,561	1,976,524	2,375,274	2,503,289					
Monthly Forecast	283,959	201,439	361,933	300,000	275,000	300,000	125,000	325,000	325,000	150,000	360,669	373,000	373,000	373,000	373,000
Monthly Actual	283,959	201,439	361,933	366,516	247,156	263,250	351	246,964	377,445	122,499	-	-	-	-	-
Monthly Equivalent	283,959	201,439	361,933	370,605	248,024	263,250	351	246,964	398,750	128,015	-	-	-	-	-
	Jan 3	Jan 10	Jan 17	Jan 24	Jan 31	Feb 7	Feb 14	Feb 21	Feb 28	Mar 7	Mar 14	Mar 21	Mar 28	Apr 4	Apr 11
Weekly Actual	49,140	-	-	-	351	72,657	49,842	43,875	80,590	95,170	89,856	45,279	73,430	122,850	73,359

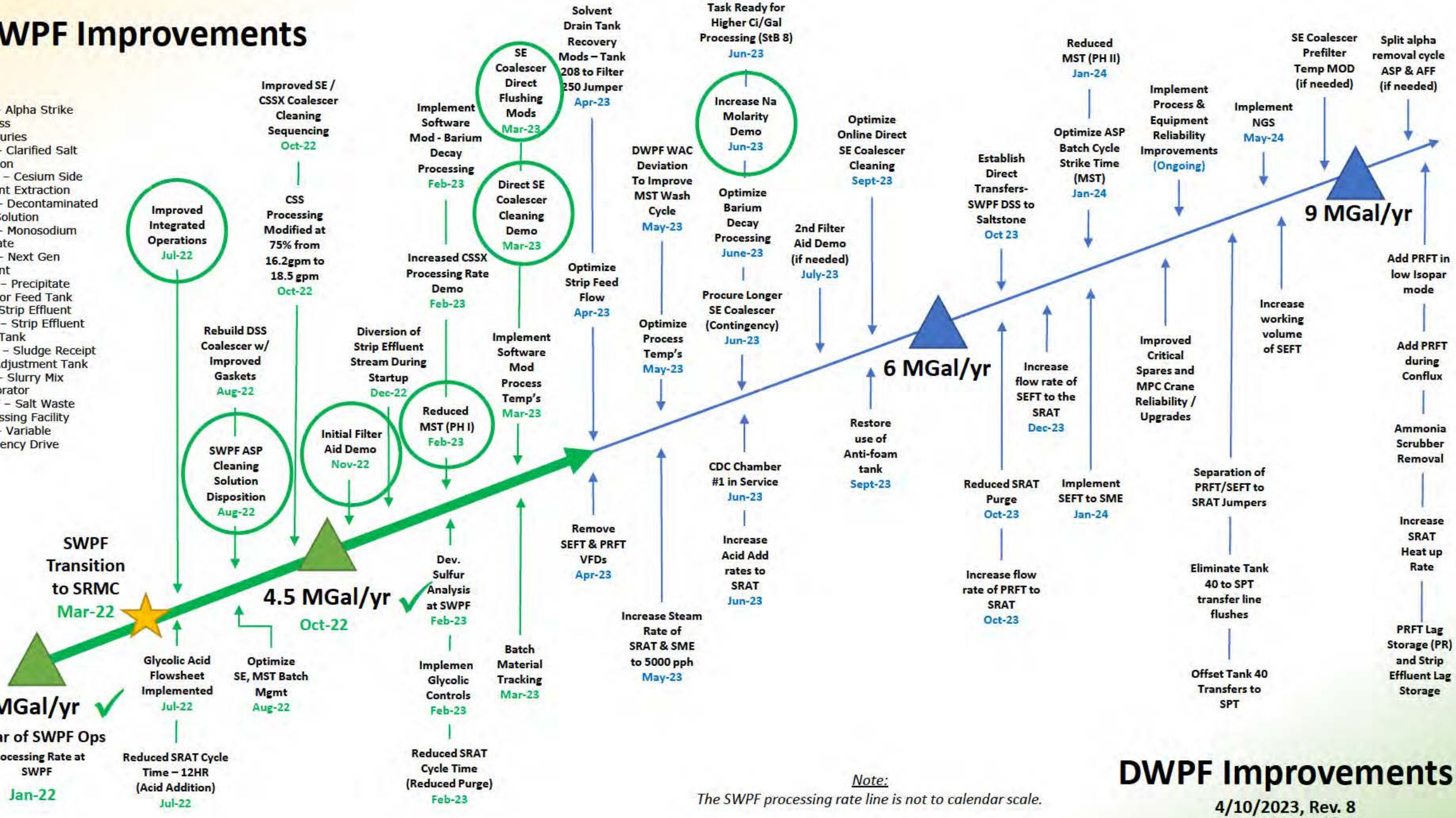
Definition	Analysis / Action	Status
Actual gallons = gallons transferred to SWPF from Tank 49 **Equivalent gallons** = actual gallons × ratio of sodium molarity greater than 6.44		KPI Owner: Steve Howell SME: Glen Johnson

MST – mono sodium titanate
NGS – next generation solvent

SWPF – Salt Waste Processing Facility
AFF – Alpha Finishing Facility

SWPF Improvements

ASP – Alpha Strike Process
Ci - Curies
CSS – Clarified Salt Solution
CSSX – Cesium Side Solvent Extraction
DSS – Decontaminated Salt Solution
MST – Monosodium Titanate
NGS – Next Gen Solvent
PRFT – Precipitate Reactor Feed Tank
SE – Strip Effluent
SEFT – Strip Effluent Feed Tank
SRAT – Sludge Receipt and Adjustment Tank
SME – Slurry Mix Evaporator
SWPF – Salt Waste Processing Facility
VFD – Variable Frequency Drive



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

DWPF Improvements

4/10/2023, Rev. 8

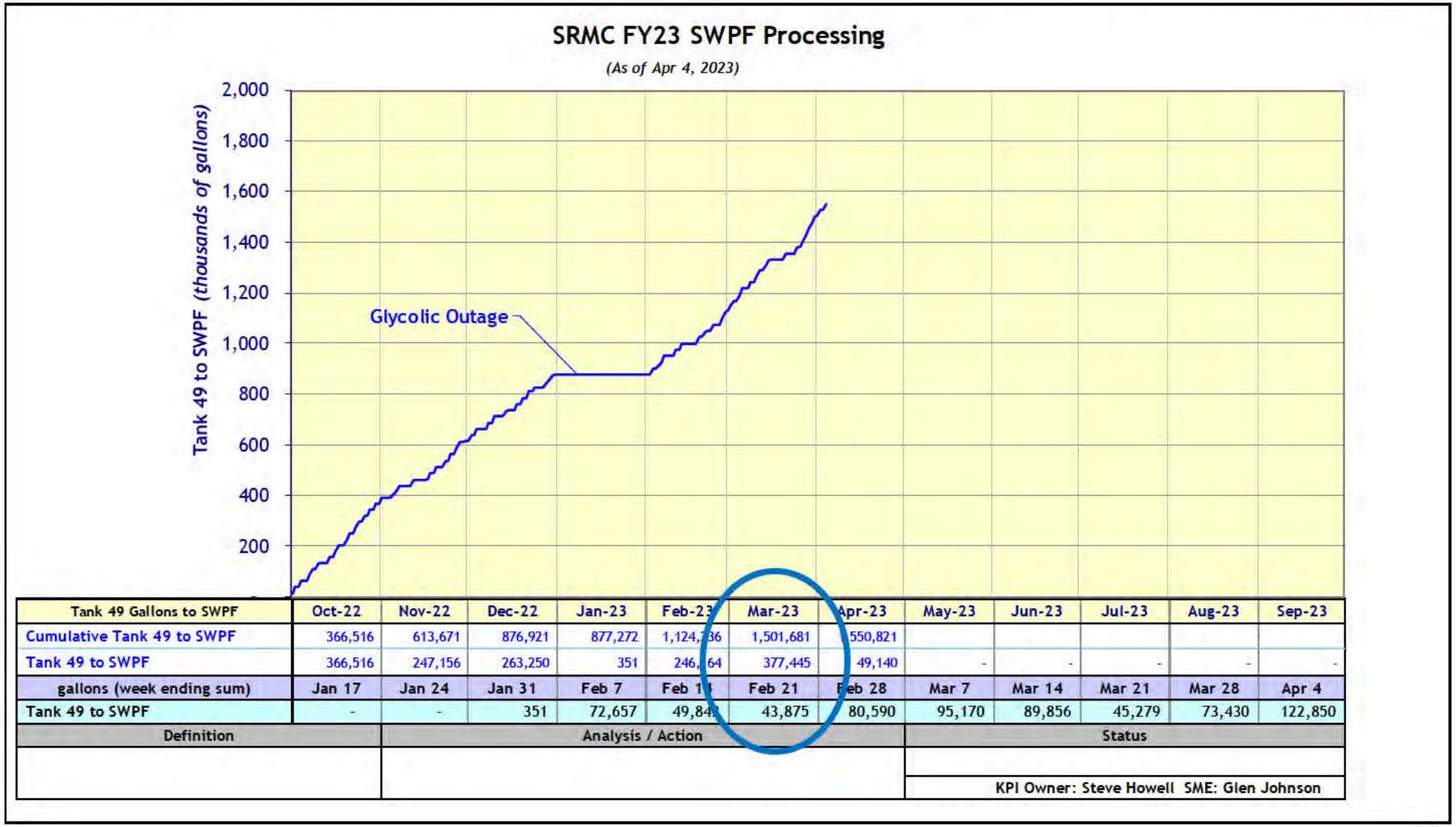
FY23 Gallons Processed

Seeing Results But Continuing to Work the Plan

Recent Production Records

Best Calendar Month
377,445 gal
(March 2023)

Best 7 Day Volume
146,263 gal
(3/25/23-3/31/23)



Tank 49 Gallons to SWPF	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Cumulative Tank 49 to SWPF	366,516	613,671	876,921	877,272	1,124,736	1,501,681	1,550,821					
Tank 49 to SWPF	366,516	247,156	263,250	351	246,464	377,445	49,140	-	-	-	-	-
gallons (week ending sum)	Jan 17	Jan 24	Jan 31	Feb 7	Feb 14	Feb 21	Feb 28	Mar 7	Mar 14	Mar 21	Mar 28	Apr 4
Tank 49 to SWPF	-	-	351	72,657	49,843	43,875	80,590	95,170	89,856	45,279	73,430	122,850

Definition	Analysis / Action	Status
		KPI Owner: Steve Howell SME: Glen Johnson

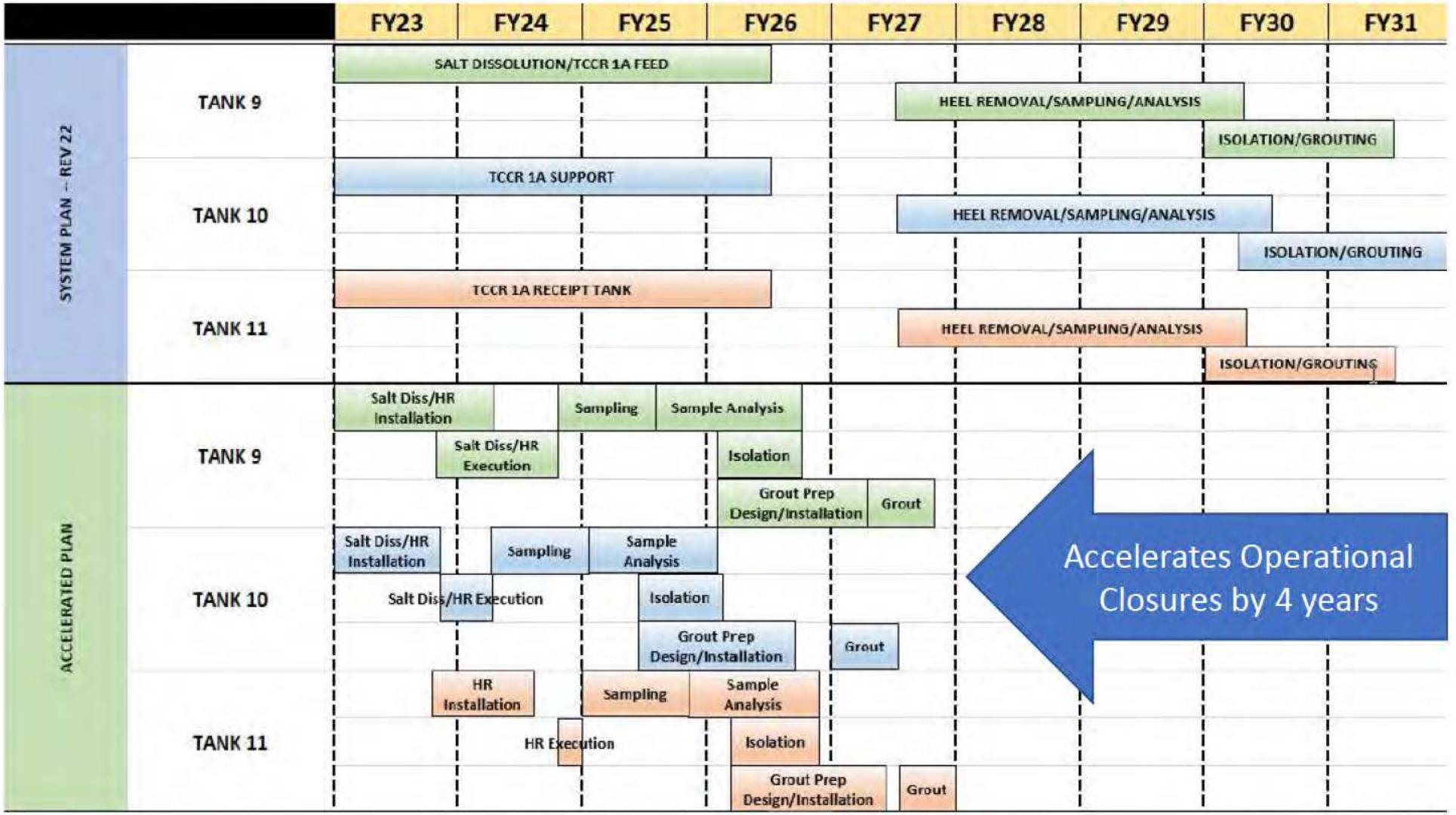
Optimize Timing of Next Gen Solvent Deployment

- **NGS to be implemented in 2024**
- **Once filtration is no longer limiting**
- **Enables 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

Aggressively Pursuing Old-Style Tanks in Water Table

- **Critical Chain Approach**



Summary

- **Focus on processing higher curie batches at SWPF has already accelerated risk reduction**
- **Well defined strategy for accelerating SWPF throughput is being implemented with tangible benefit already realized**
- **NGS implementation in 2024 will enable processing at ~9 Mgal/year starting in FY25**
- **Accelerating waste removal and closure of Tanks 9, 10, & 11**

Questions?