U.S. DEPARTMENT OF ENERGY

Liquid Waste (LW) Program Strategic Vision

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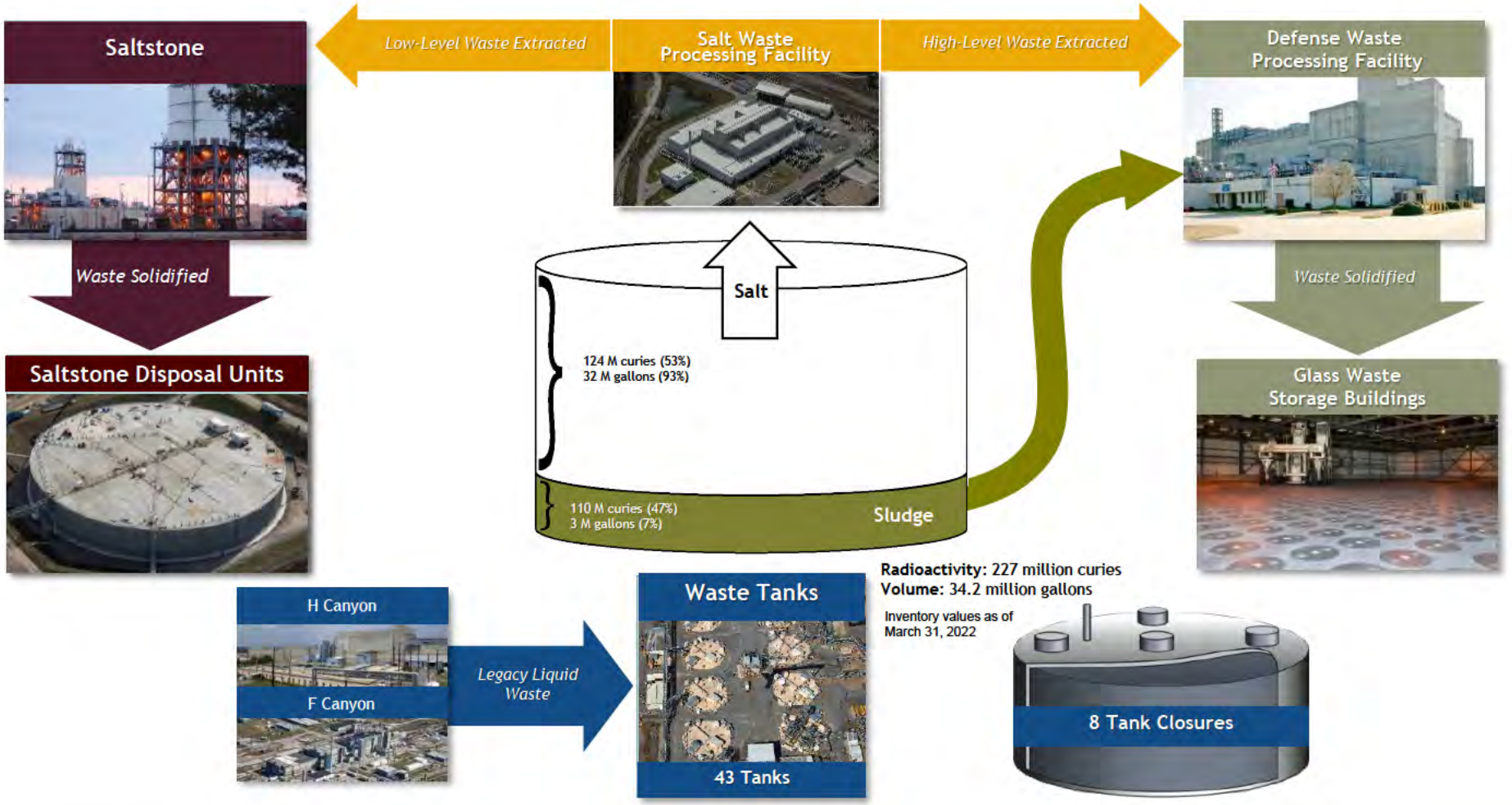
November 2022

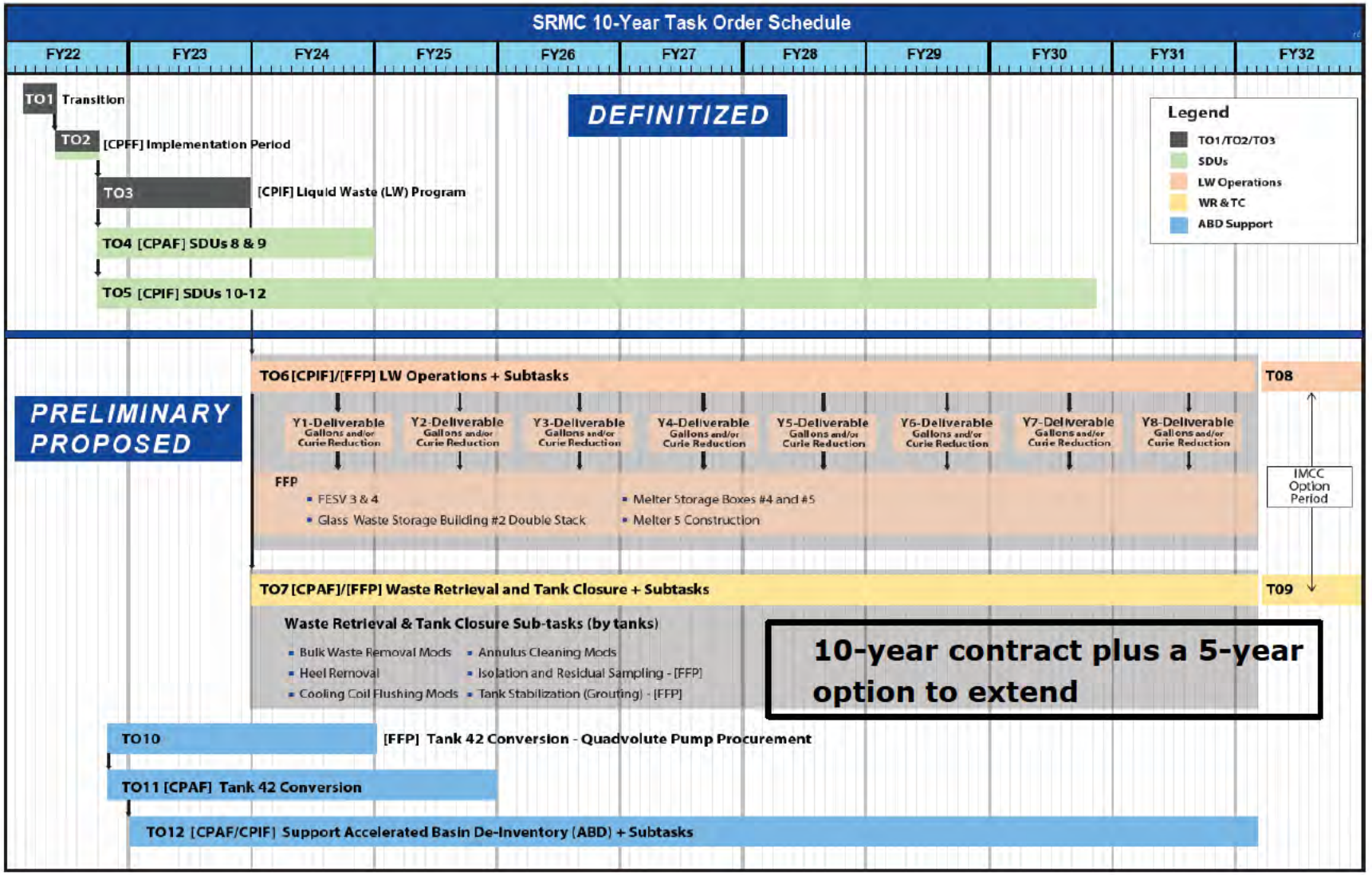
Liquid Waste Program

- **Retrieve, process, treat, and dispose of legacy tank waste**
- **43 active waste tanks, 35 Mgals of high-activity radioactive waste**
- **Four End States**
  - Operational Tank Closure
  - Vitrified high-level waste canisters in Glass Waste Storage Buildings (GWSBs) 1 & 2
  - Low-level waste in Saltstone Disposal Units
  - Deactivate and flush operating facilities to enable safe setup for decommissioning activities
- **Key processing and treatment facilities**
  - Defense Waste Processing Facility (DWPF)
  - Salt Waste Processing Facility (SWPF)
  - Saltstone Production Facility (SPF)
- **Saltstone Disposal Units (SDUs)**

Liquid Waste Path



End State Contract - Task Order Schedule



End-State Contract Model

- Purpose of End-State Contract
  - *Complete Liquid Waste (LW) Mission in 15 Years*
  - *A holistic LW System*

- SRMC Technical Approach
  - *Focus on Early Reduction of Most Significant Risk*
  - *Optimized Processing Approach*

- LW System Planning
  - *Guided by a strong, established, effective Regulatory Model meeting expectation to engage Regulator Involvement*
  - *Realignment of Regulatory Approach*

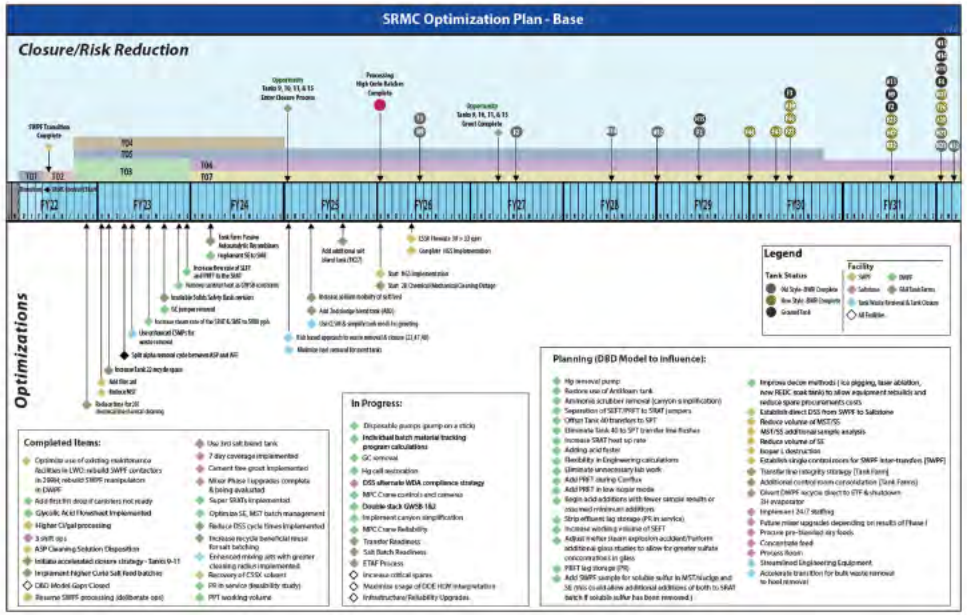
Focused on Risk Reduction

DOE and SRMC are committed to partnering to seamlessly and safely transform SRS liquid waste operations to an end state-driven culture of completion

Five primary initiatives in order to meet the goals of the DOE's end state contracting model

- Liquid waste system optimization and improvement
- Services review and cost reduction
- Work process improvement
- Enhanced workforce / small business utilization
- Risk-based, end-state regulatory partnering

DOE – Department of Energy



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**
  - Evaluate near term use of TCCR (Tank Closure Cesium Removal)

Begins with Partnering

SRS Liquid Waste Program

Common Values and Goals (2022 – 2037)

June 29, 2022

VALUES

1. **Maintain transparency with open communication between regulators, DOE, and the contractor on program progress, and significant emerging issues.**
2. **Ensure DOE's strategy and plans are subject to stakeholder engagement and input, including SCDHEC permitting processes, and CERCLA, as appropriate.**
3. **Maximize the amount of curies (especially long-lived radionuclides) vitrified and ready for ultimate disposal out of state.**
4. **Limit disposal of curies onsite at SRS so that residual radioactivity is as low as reasonably achievable.**

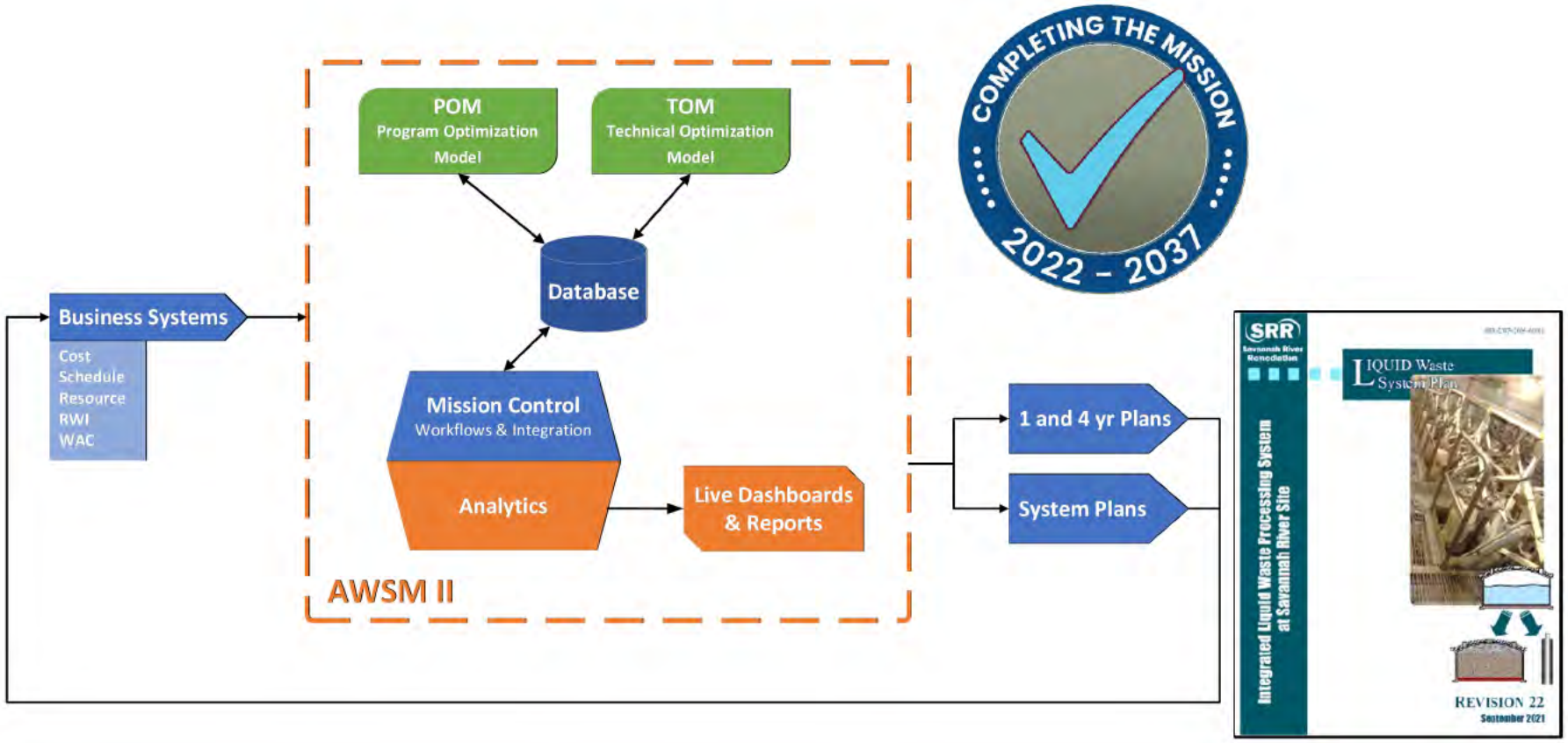
GOALS (in priority order)

1. **Reduce risk to the environment by removing waste and closing tanks with a goal of completion of the liquid waste program by 2037.**
2. **Reduce operational and environmental risk by aggressively removing curies from the waste tanks.**
3. **Reduce operational and environmental risk by optimizing operations to minimize liquid waste program total life cycle.**
4. **Complete waste removal and subsequent grouting of all waste tanks and ancillary structures with a risk-based priority order: first to tanks in the water table, followed by F Tank Farm tanks, followed by remainder of waste tanks, followed by ancillary structures, recognizing the potential for future emergent conditions or opportunities.**

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act SCDHEC – South Carolina Department of Health and Environmental Control

1. LW Program Completion by 2037

- **Enhanced System Modeling (DBD) in Progress**
- **System Plan Rev 23 submission to DOE for review in December 2022**

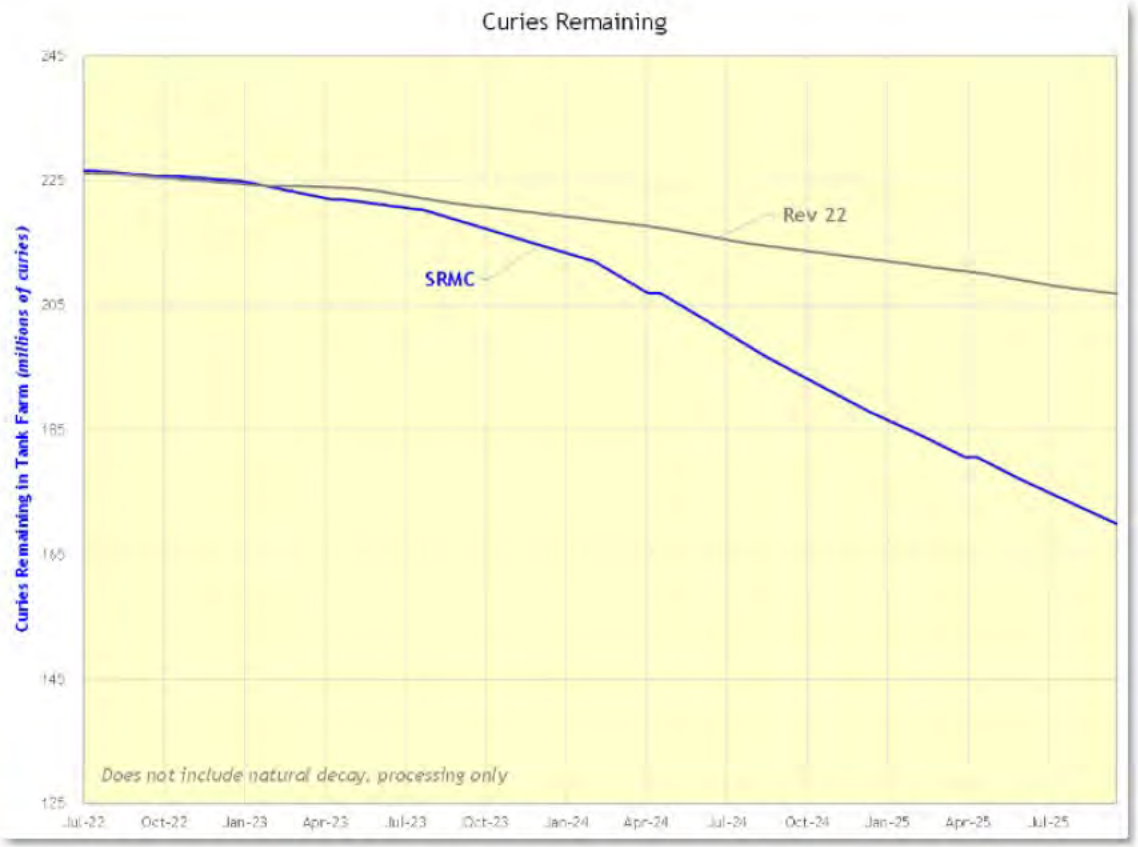


2. Removing Curies

- **Most recent Liquid Waste System Plan (Rev. 22) shows curies removed on a steady pace**
- **That changes with the new strategy**
  - Curies removed on an accelerated pace
  - Operational closure on tanks with the greatest risk

Batch Preparation Details

Batch	Na (M)	Ci/gal	To TK 49
B5	6.9	2.5	10/2022
B6	7.5	2.0	2/2023
B7	6.4	1.6	11/2022
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

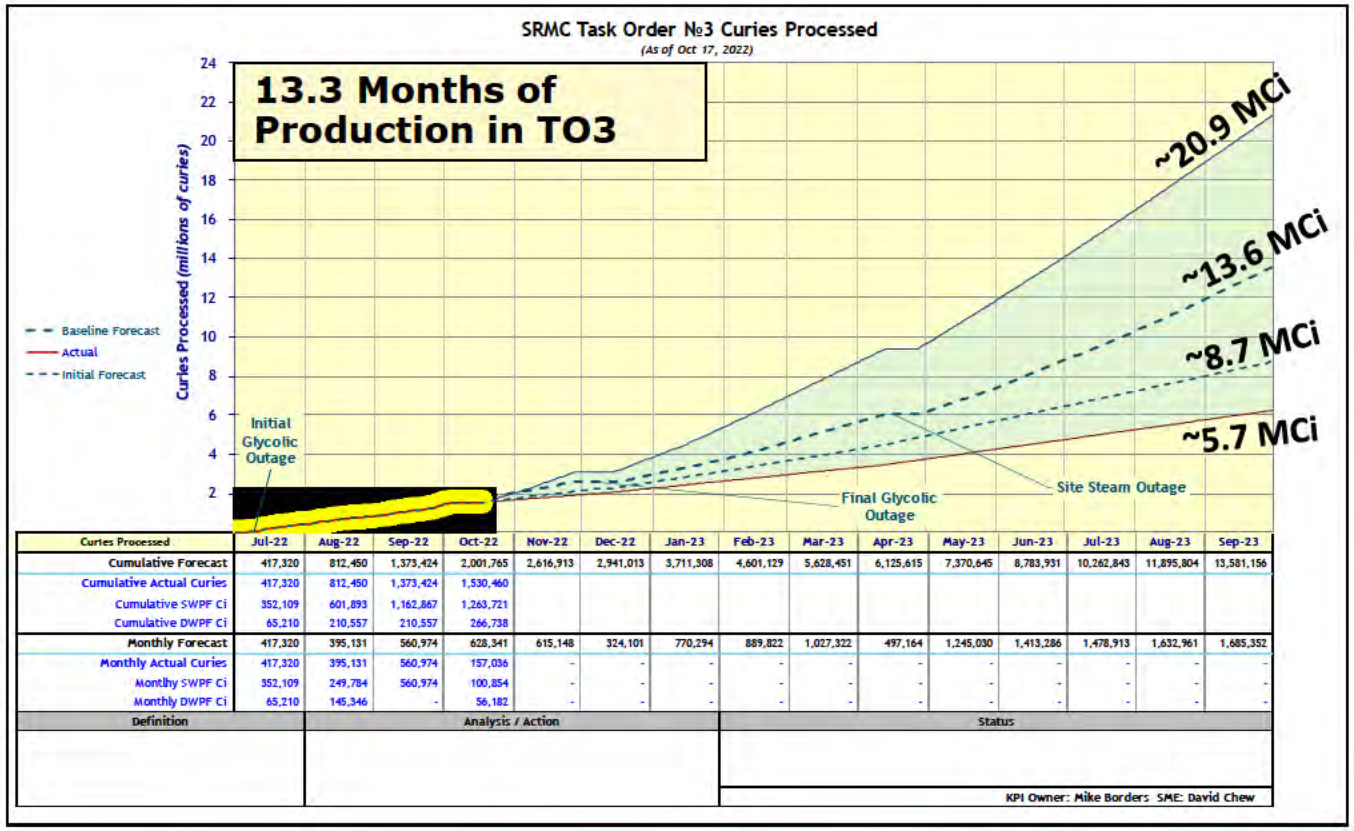
2. Removing Curies

Recent History

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 (thru July)	2.089
Total	18.958

Think MPG with your car

Higher Throughput with Higher Curies

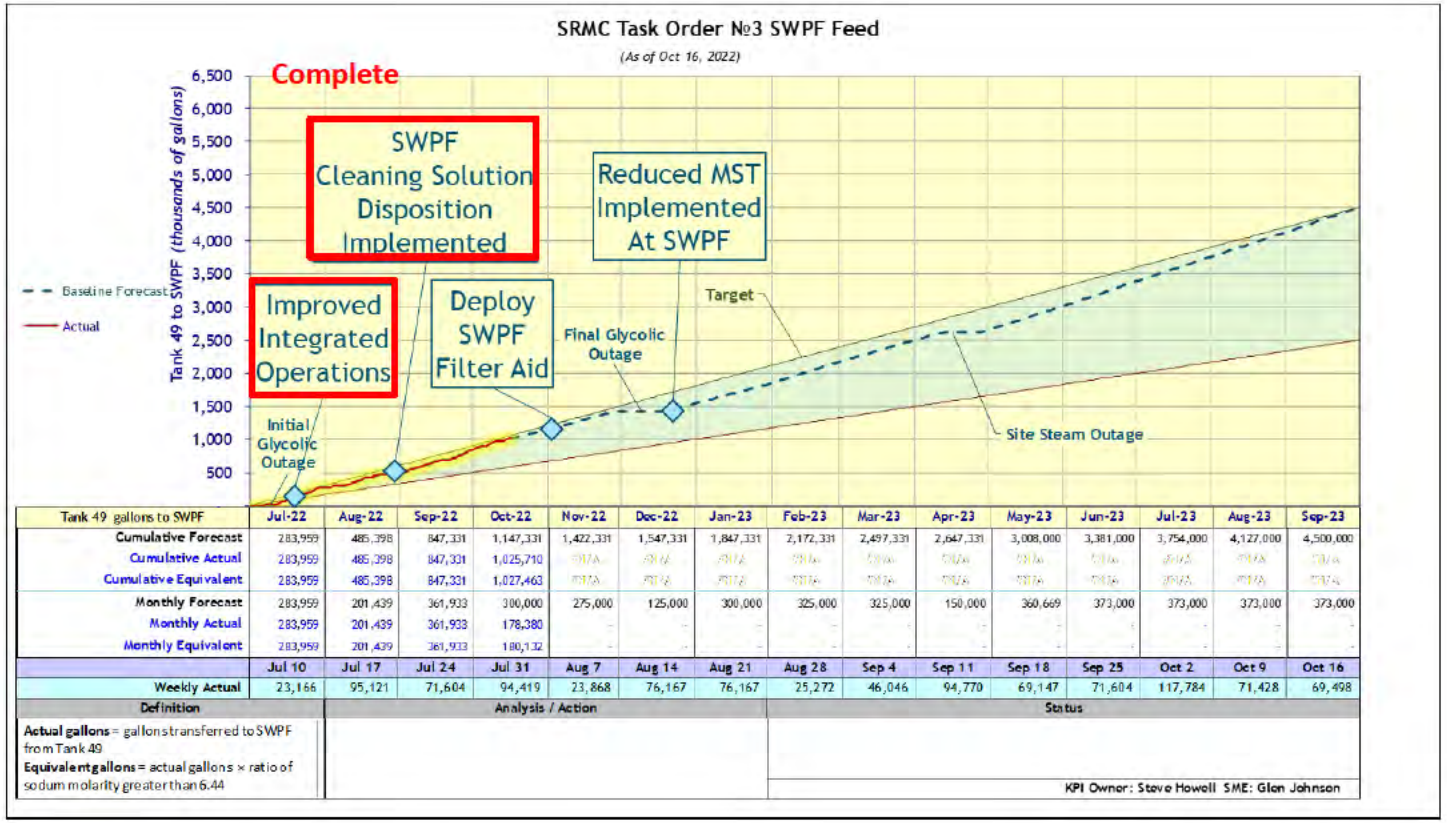


Curies Processed	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Cumulative Forecast	417,320	812,450	1,373,424	2,001,765	2,616,913	2,941,013	3,711,308	4,601,129	5,628,451	6,125,615	7,370,645	8,783,931	10,262,843	11,895,804	13,581,156
Cumulative Actual Curies	417,320	812,450	1,373,424	1,530,460											
Cumulative SWPF Ci	352,109	601,893	1,162,867	1,263,721											
Cumulative DWPF Ci	65,210	210,557	210,557	266,738											
Monthly Forecast	417,320	395,131	560,974	628,341	615,148	324,101	770,294	889,822	1,027,322	497,164	1,245,030	1,413,286	1,478,913	1,632,961	1,685,352
Monthly Actual Curies	417,320	395,131	560,974	157,036	-	-	-	-	-	-	-	-	-	-	-
Monthly SWPF Ci	352,109	249,784	560,974	100,854	-	-	-	-	-	-	-	-	-	-	-
Monthly DWPF Ci	65,210	145,346	-	56,182	-	-	-	-	-	-	-	-	-	-	-
Definition		Analysis / Action						Status							

KPI Owner: Mike Borders SME: David Chew

3. Optimizing Operations - Minimize Life Cycle

- **Objective**
  - Increase process attainment & availability
  - Then focus on throughput ramp up
  - Implement NGS once filtration is no longer limiting

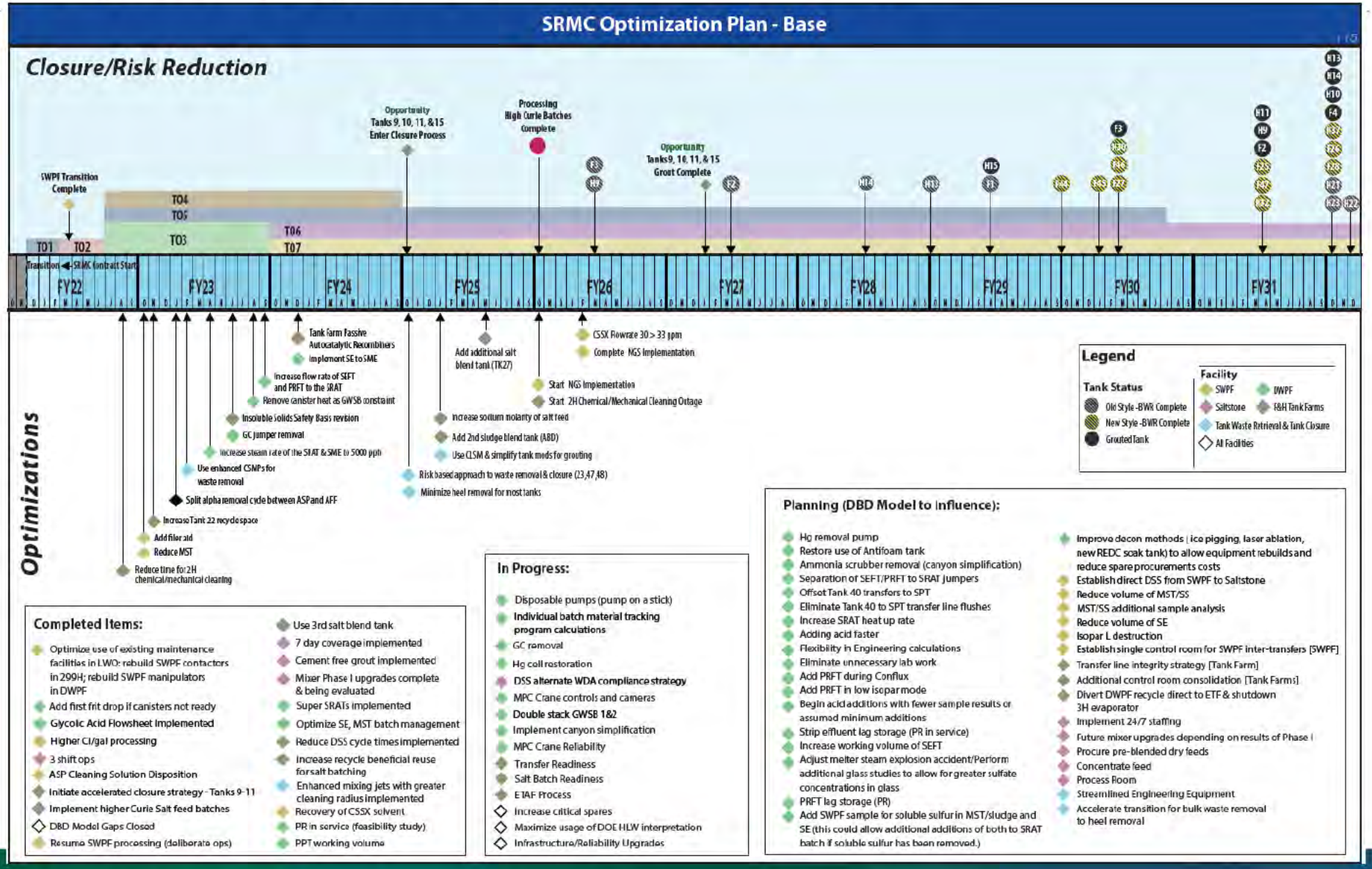


Tank 49 gallons to SWPF	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23
Cumulative Forecast	283,959	485,398	847,331	1,147,331	1,422,331	1,547,331	1,847,331	2,172,331	2,497,331	2,647,331	3,008,000	3,381,000	3,754,000	4,127,000	4,500,000
Cumulative Actual	283,959	485,398	847,331	1,025,710											
Cumulative Equivalent	283,959	485,398	847,331	1,027,463											
Monthly Forecast	283,959	201,439	361,933	300,000	275,000	125,000	300,000	325,000	325,000	150,000	360,669	373,000	373,000	373,000	373,000
Monthly Actual	283,959	201,439	361,933	178,380											
Monthly Equivalent	283,959	201,439	361,933	180,132											

	Jul 10	Jul 17	Jul 24	Jul 31	Aug 7	Aug 14	Aug 21	Aug 28	Sep 4	Sep 11	Sep 18	Sep 25	Oct 2	Oct 9	Oct 16
Weekly Actual	23,166	95,121	71,604	94,419	23,868	76,167	76,167	25,272	46,046	94,770	69,147	71,604	117,784	71,428	69,498

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

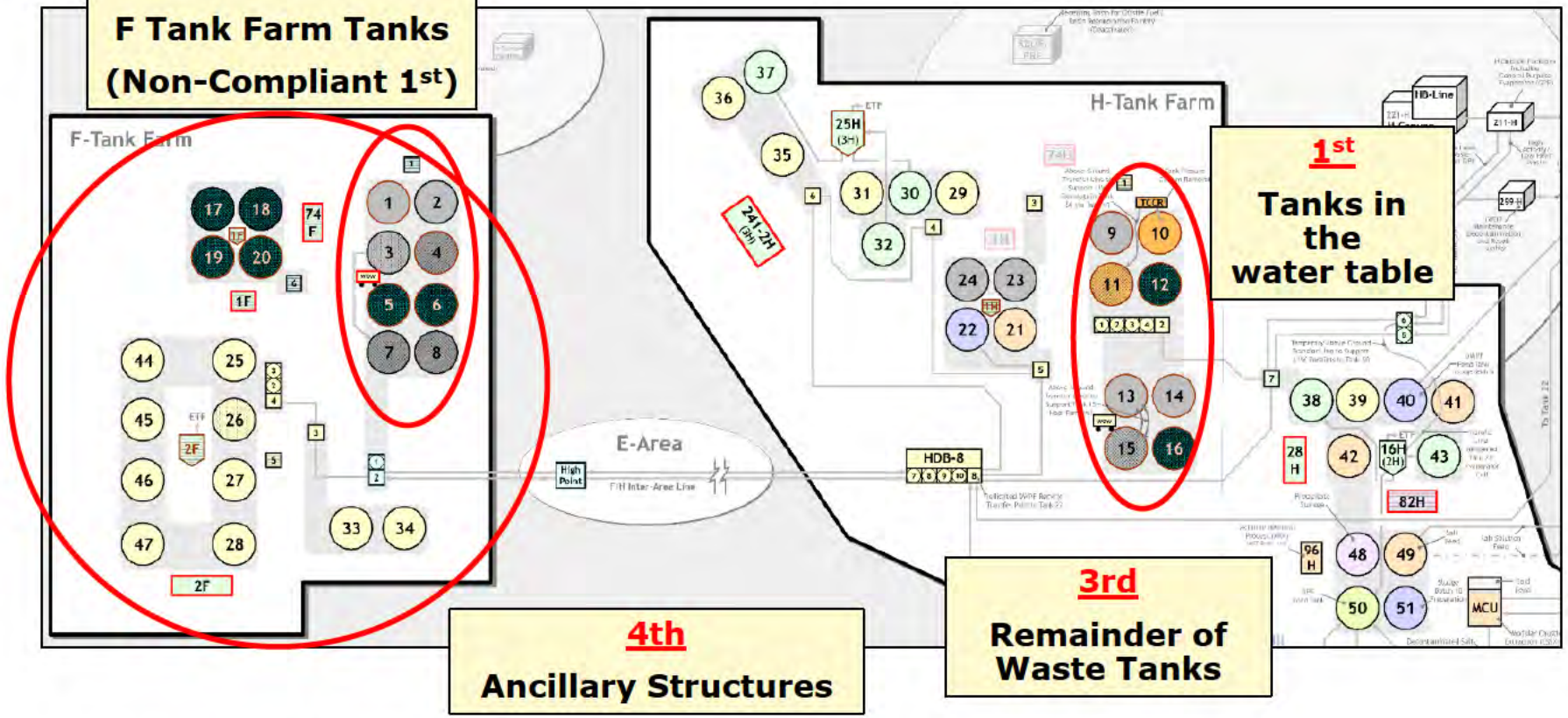
3. Optimizing Operations - Minimize Life Cycle



4. Complete Waste Removal and Grouting of All Waste Tanks and Ancillary Structures

Risk-based priority order

2nd
F Tank Farm Tanks (Non-Compliant 1st)



1st
Tanks in the water table

3rd
Remainder of Waste Tanks

4th
Ancillary Structures

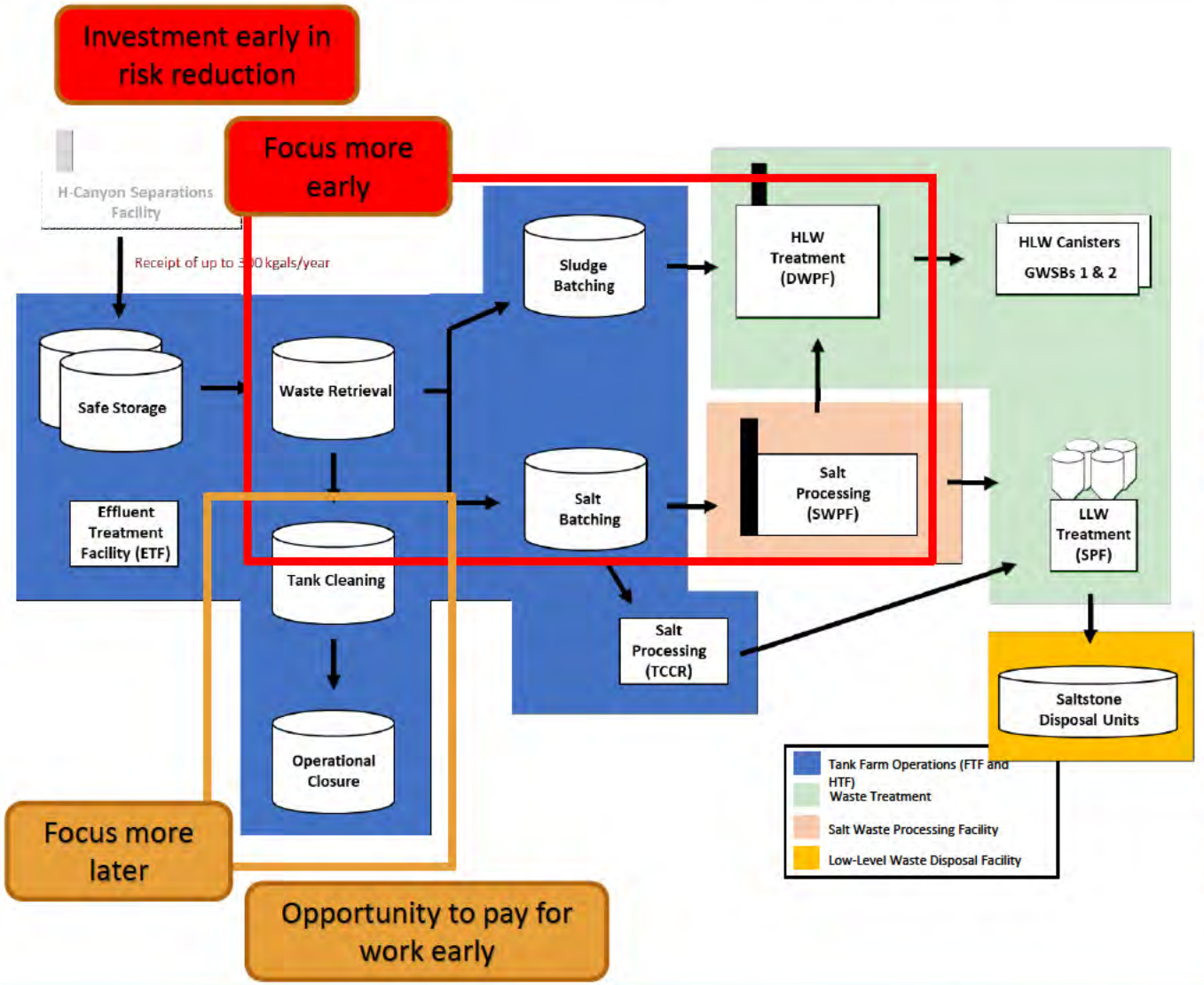
GROUPED FOR BEST UTILIZATION OF $

Completed TCCR Demo > Focus on SWPF

- TCCR was utilized when it was accelerating getting out of old-style tanks in water table
- Implemented as a mitigation factor with SWPF delays
- SWPF can now further accelerate getting out of old-style tanks in the water table
- TCCR may be considered in the future in more cost-effective applications

New Plan – Art of the Possible	Existing Plan
BWR & Heel Removal complete by end of 2024 from Tanks 9, 10, 11 & 15 and in Sludge Batch 12	BWR Complete • Tank 9 – FY26 Heel Removal Complete • Tank 9 – FY27 • Tank 10 – FY28 • Tank 11 – FY28 • Tank 15 – FY22
Tanks 9,10,11, & 15 • Enter Closure process in 2025 • Grout complete in 2027	Grout Complete • Tank 9 – FY31 • Tank 10 – FY32 • Tank 11 – FY31 • Tank 15 – FY29

Risk/Curie Reduction Then Tank Closure



FDB-5 Operational Closure

Our Vision – "Finish in 15"

- **Major Infrastructure in Place to Complete This Mission**
- **Focus Efforts on Risk Reduction**
- **Everything Evaluated Through the Lens of Does It Support & Align to "Finish in 15"**
- **Invest More, Early on Integrated Operations, Optimizations, and Waste Removal**
- **Opportunities on Back End**
  - Accelerated Throughput with Lower Curie Feed
  - Isolate Close/Grout Tanks More Efficiently and at Less Cost