



**Savannah River
Remediation**

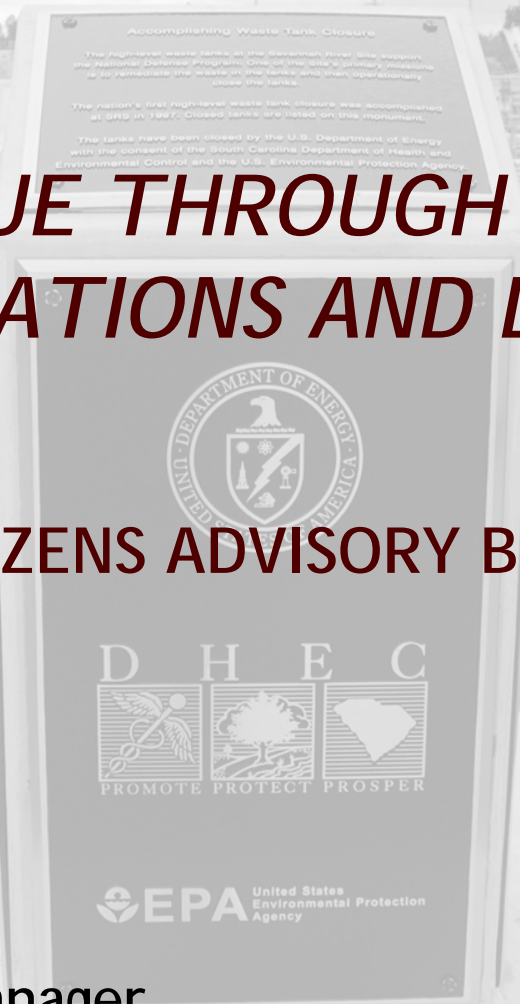
AECOM | BECHTEL | CH2M | BWXT

November 15, 2016

DELIVERING VALUE THROUGH PROGRAM INNOVATIONS AND LEAN

PRESENTATION TO CITIZENS ADVISORY BOARD

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Value for our customer:

- Customer: an individual or group that benefits from the product or service provided.
- Value: a specific deliverable that fulfills a **CUSTOMER** expectation or need (what you are willing to pay for).

Methods:

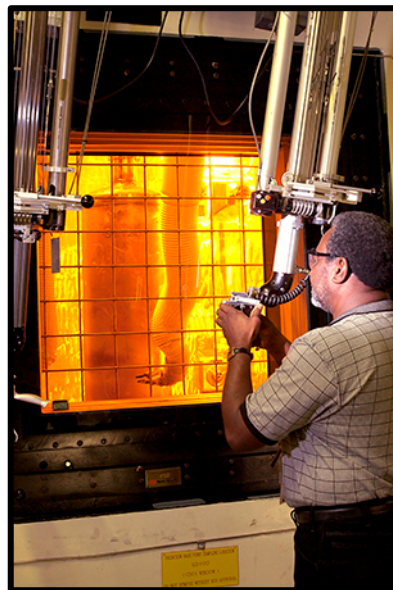
- Daily technical Innovations
- Continuous Improvement Initiatives, such as Lean Business System, Six Sigma

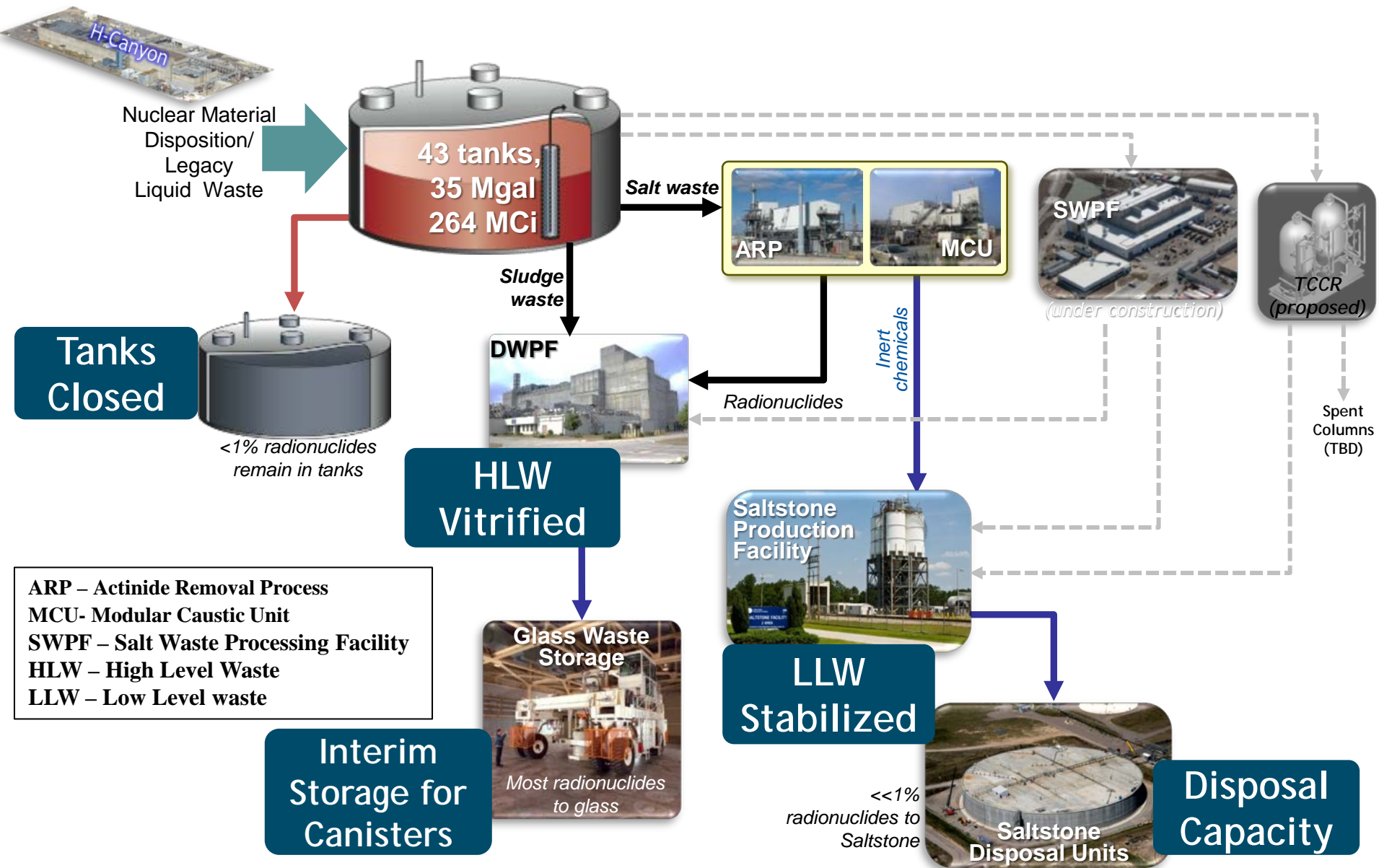




Continuous improvement is a core value similar to safety

- Need to Deliver Value
 - ...what customers want
 - ...while maintaining aging infrastructure
 - ...with the same set of resources





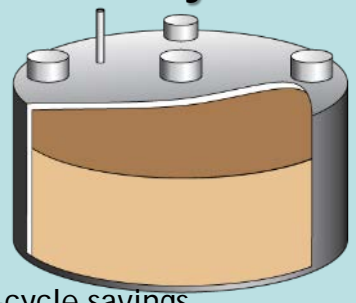
ARP – Actinide Removal Process
MCU- Modular Caustic Unit
SWPF – Salt Waste Processing Facility
HLW – High Level Waste
LLW – Low Level waste

Benefits Come in All Shapes

102 Events
15 Value Streams
30 percent workforce participation
>30 instances of regulator, stakeholder, and customer involvement in events

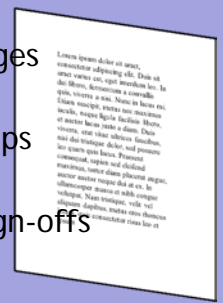
Salt batch qualification cycle time

66% reduction
 ...which equates to...
8.5 months
 ...which equates to...
\$1.0B in life-cycle savings



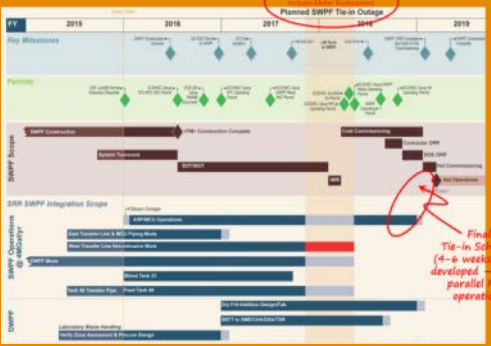
Error Proofing Complex Processes

32% reduction in pages
45% reduction in steps
48% reduction in sign-offs



Salt Waste Processing Facility Tie-In Schedule

\$55M life-cycle savings through
4-month reduction

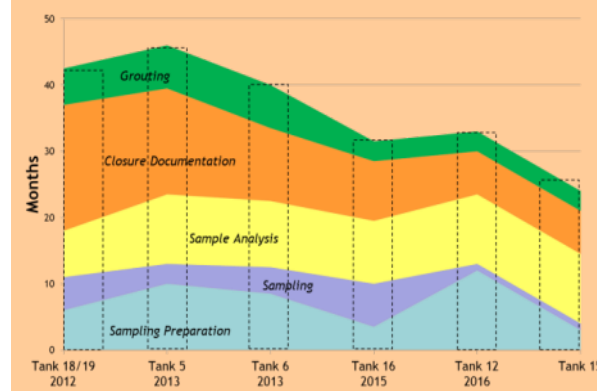


25% reduction in planning cycle-time at SRR
50% reduction in design drawings and cycle time for engineering documents for tank closure

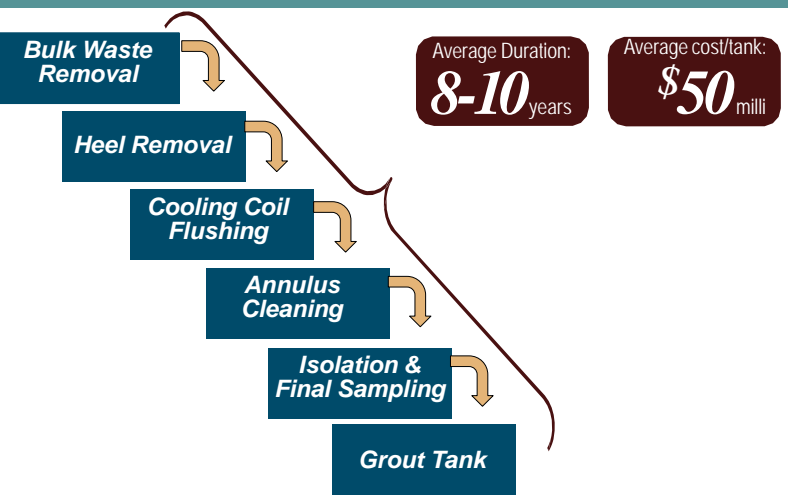
30% reduction in resources needed to operate Effluent Treatment Plant
 ...which equates to...
\$1 1/2M per year



48% schedule improvement and **25%** improvement in cost efficiencies for tank closure



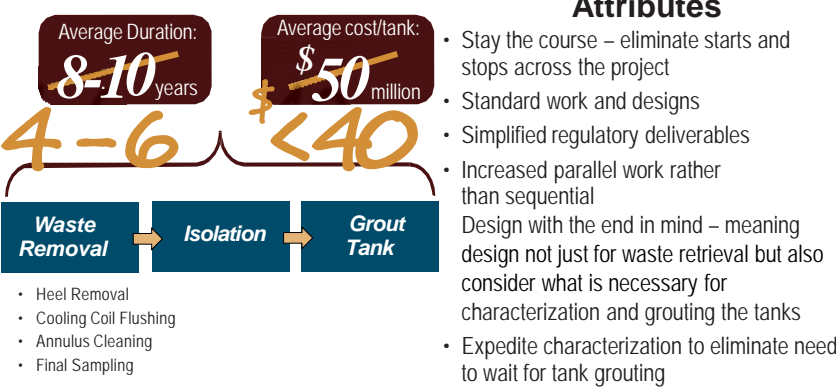
Current State of Tank Closure



Benefits

- Engineering Documents RIE**
 - 58 day (50%) reduction in average design cycle time
 - 50% reduction in the average number of drawing change
- Contaminated Pump Removal RIE**
 - ~900 person-hours reduction from critical path associated with storage control
 - Save \$1M per tank by grouting pumps in-place
- Tank Characterization RIE**
 - Implement Project Management with the end in mind—removes three years from tank closure critical path and saves ~\$1.2M per tank
 - Reduce critical path schedule by six months or \$600k per tank.
- Grouting of In-Tank Equipment (including cooling coils) RIE**
 - Eliminate coil flushing—saves >\$65K per tank and generation of 5,000 gallons of liquid waste that historically goes back to an active waste tank for treatment
 - Eliminate grey water totes (20 per tank)—saves ~\$100K per tank
 - Standardize header removal—saves >2,000 person-hours per tank
- Just Stop Its/Just Do Its**
 - “Just Stop” ventilation removal
 - “Just Stop” pump removal when it does not make economic sense
 - Engineering develops and approves configuration management template
 - For each tank, define and obtain early DOE buy in to complete entire scope—waste removal through tank closure
 - Develop standard work package
 - Develop standard design for closure tanks

Target State of Tank Closure After Lean



Insights to Lean Events

- “ Our own paradigms drive our behaviors: almost 100% of the time we discovered that we were over interpreting the rules or requirements. ”
- “ There is a common misconception that since this is the way “we have always done it,” our stakeholders will not consider accepting anything different. The strength of the Lean process is that key stakeholders are invited to participate in the events. The assembly of affected parties is extremely powerful for team building and educating each other about what drives each organization’s decision making. ”
- “ There is always more than one way to tackle a problem and our stakeholders are open to alternate solutions that have sound technical basis. In one instance, we were able to resolve a technical challenge during the course of an event that saved six months from our closure schedule – it was win-win for all parties! ”



- Elimination of non-value added actions in work planning & control processes
- Re-engaging the workforce by doing meaningful work...and fostering a positive attitude
- Introduction of Standard Work to work planning & control processes
- Introduction of a visual management tool
- Savings has been translated to corrective maintenance backlog reduction

30% decrease in maintenance
schedule add-ons

52% decrease in rescheduled
maintenance work orders

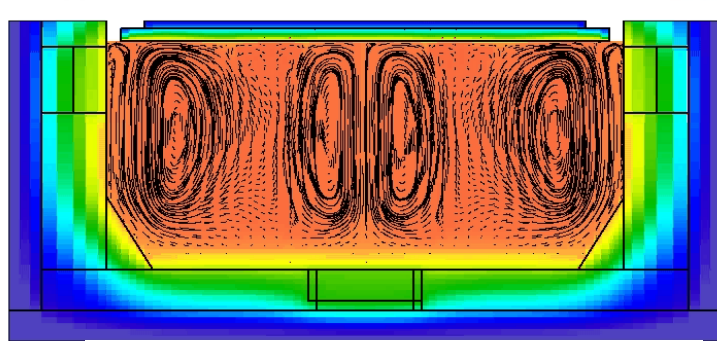
25% reduction in planning cycle
time at SRR

37% - 51% increase in
Tank Farm Maintenance FIN to New
Work Ratio

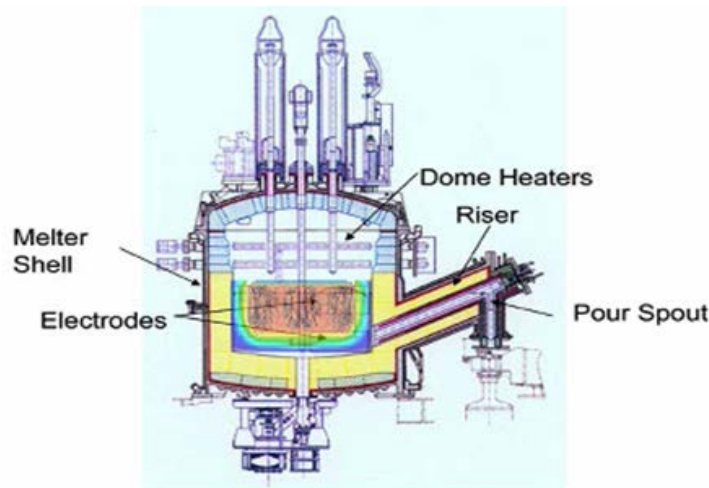
DWPF Bubblers

Bubblers more than double canister production capability

Duratek HLW model, Case 5A: Feed, 2el, bubl
Front View (YZ)

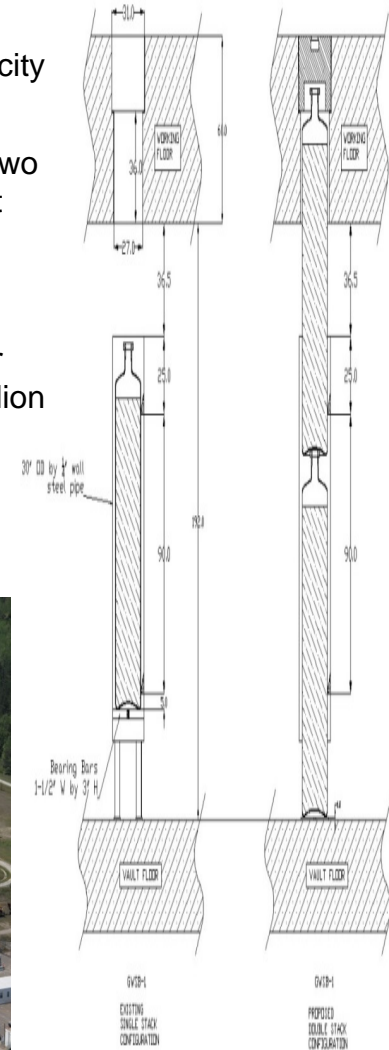


Agitated Melter (forced convection)



Canister Double Stack

- Doubles existing storage capacity (from 2,254 to 4,508)
- Successfully stacked the first two radioactive canisters in August
- Creates safe interim storage through Fiscal Year 2029
- Postpones expense of another storage facility, saving \$74 million



Delivering Value through Innovations: Saltstone Disposal Units

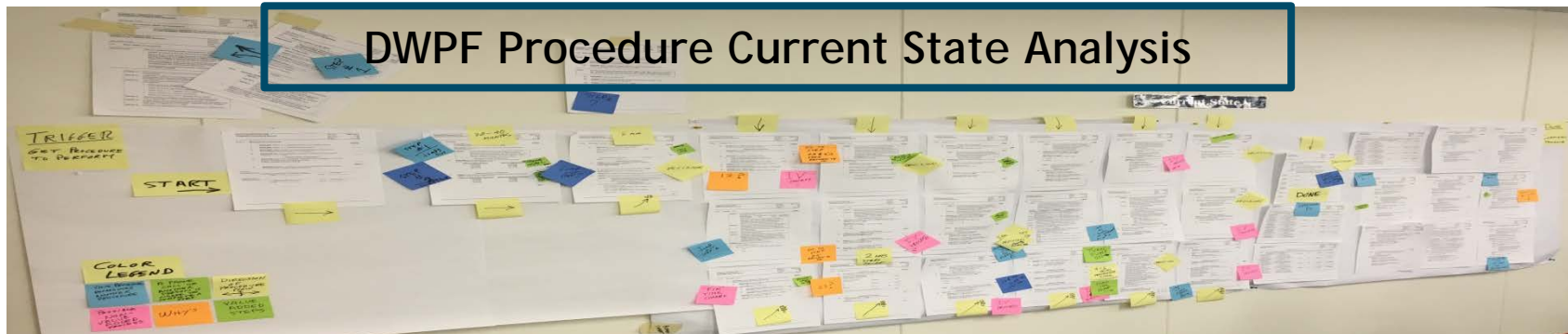


5S

Connecting the dots between LEAN
and a safer work place



- Lean events focused on simplification of high hazard, complex processes
- Evaluated
 - Sequencing and flow of procedure
 - Key Requirements
 - Clarity of instruction
 - Elimination of unnecessary steps and sign offs



Solution	Experiment	Expected Result	Actual Result / Benefit
Use the A3 problem solving approach with a cross functional team to validate to requirements, update and test the procedure	Test Procedure	Ease of use	<ul style="list-style-type: none"> ✓ 32% Reduction of pages ✓ 45% Reduction of number of steps ✓ 48% Reduction of number of sign offs

TANK CLOSURE SOUTH CAROLINA'S SINGLE GREATEST ENVIRONMENTAL RISK

SEVEN waste tanks have been operationally closed at the Savannah River Site, a process that is essential to the Site's mission

LARGEST tank space gain since 2010 in FY15
 Improving tank space management and enabling continued waste processing

3 million gallons/year processing rate achieved
 Decontamination factor increased from 100 to > 50,000

DOUBLED throughput of ARP/MCU

25 million gallons of decontaminated salt solution safely disposed
 60% reduction in decontaminated salt solution disposal costs

LARGEST liquid low-level waste disposal unit in the nation
30 million gallon capacity

DOUBLE STACKING DWPF canisters increases interim storage capacity 33%

3X curie stabilization through DWPF
 Facility improvements allowed DWPF to produce canisters at a 2 times higher rate

4,000th canister out of an estimated 8,582 poured on 12/31/15

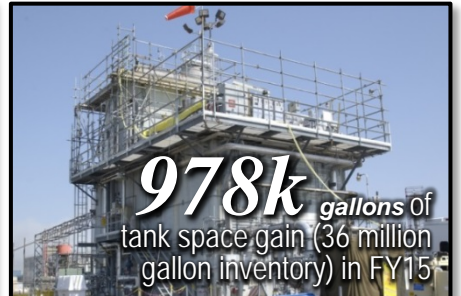
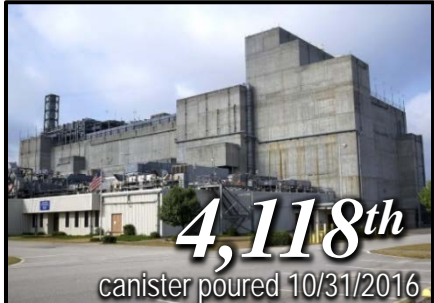
15th million pounds of glass poured at DWPF
 This is equal to the weight of about 5,000 Honda Civic's.

20th million gallons of waste moved in FY15
 This is equal to about 30 Olympic-sized swimming pools!

262kth gallon 31-day process record (MC2)
 This is equal to about two average U.S. households' water consumption in one year!

2009: SRR CONTRACT BEGAN
 1996: Defense Waste Processing Facility (DWPF)
 2016: CURIE STABILIZATION (GROUT AND GLASS)

ARP/MCU (Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit)
 Saltstone Facilities
 Saltstone Disposal Unit B (SDU B)



ARP/MCU = Actinide Removal Process and Modular Caustic Side Solvent Extraction Unit