Savannah River Remediation
AECOM | BECHTEL | CH2M | BWXT

January 14, 2016

SAVANNAH RIVER REMEDIATION UPDATE

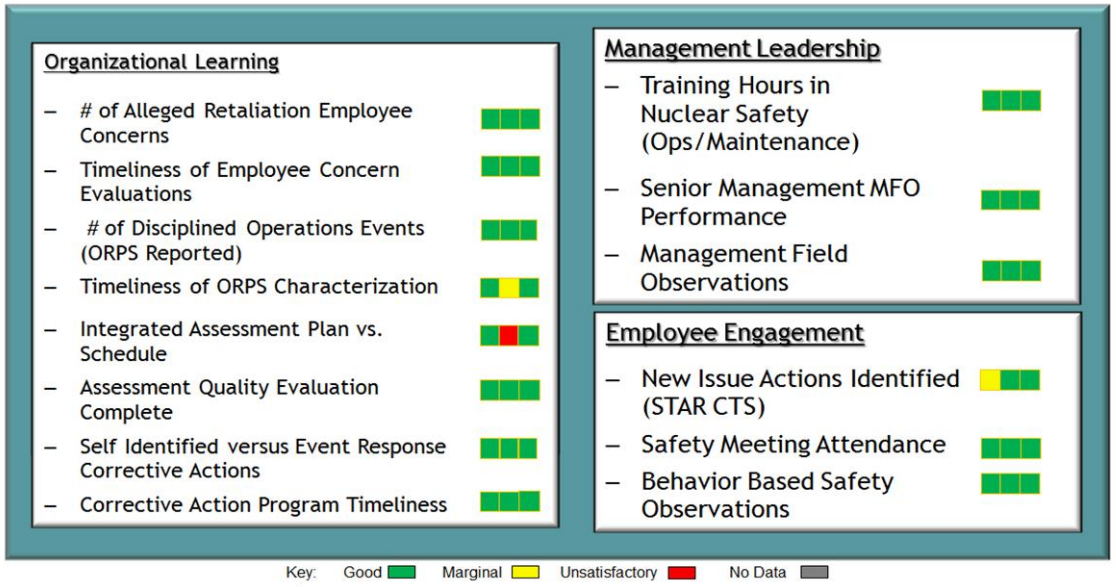
South Carolina Nuclear Advisory Council Meeting

Stuart MacVean

President and Project Manager

Safety

- **Record-setting worker safety**
  - 9.8 million total project safe work hours
  - 27.8 million construction safe work hours
- **Industry Recognition**
  - 2015 VPPPA Star of Excellence
  - 2015 VPPPA Safety and Health Achievement Award—Sharon Kidd, SRR E&I Mechanic
  - National Safety Council's Industry Leader Award
- **Excellent Nuclear Safety Culture**



Focused on Safety Excellence

VPPPA=Voluntary Protection Program Participant's Association

High-Hazard Operations Update

- **Defense Waste Processing Facility (DWPF)**
  - SRR tripled curie stabilization through DWPF
    - >4,000 high-level waste canisters—12-month record—337 canisters poured—from June 2011 to July 2012
  - 93 canisters of vitrified high-level waste filled in FY15
  - 30 canisters filled in 1st Quarter FY16 – including 4,000th canister poured 12/31/15; Operations began 1996
  - 57 of 150 Glass Waste Storage Building locations crossbars removed for canister double stack implementation

- **Salt Processing**
  - 4x salt waste processing in terms of curies taken from the waste tanks by SRR
    - ARP/MCU: Nearly 5 million gallons of salt waste processed
      - Record weekly production (83,538) gallons hit in March 2013
      - 3 Mgal/year rate achieved
    - Saltstone: >8.7 million gallons of salt waste processed by SRR

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

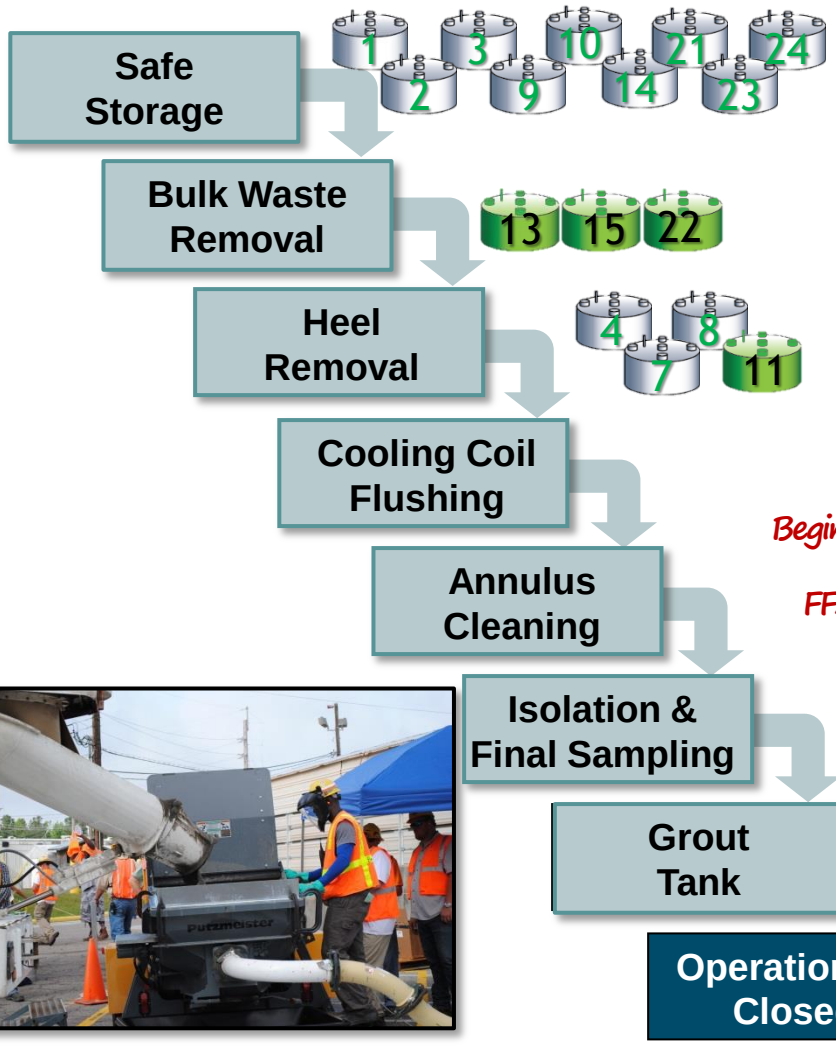
High-Hazard Operations Update

- **Evaporators**
  - 2.6 million gallons of tank space created in FY15, the greatest amount of space gain since 2010
  - 2-year reliability program achieving significant results
  - 5-year feed backlog processed in 2 years
- **32-million gallon Saltstone Disposal Unit 6**
  - Scheduled completion date—October 2016
    - Total project 78% complete
    - Primary construction complete
  - Water tightness testing continues
  - Scheduled ready to receive waste—November 2016
  - Expected to be used in 2017

21,334 yd^3 of concrete
289 miles of cable
375' diameter
43' high

Tank Closure Progress

- **Tank Closures continue at a pace unheard of six years ago**
  - Five tank closures completed during the past 6 years



Tank 16…

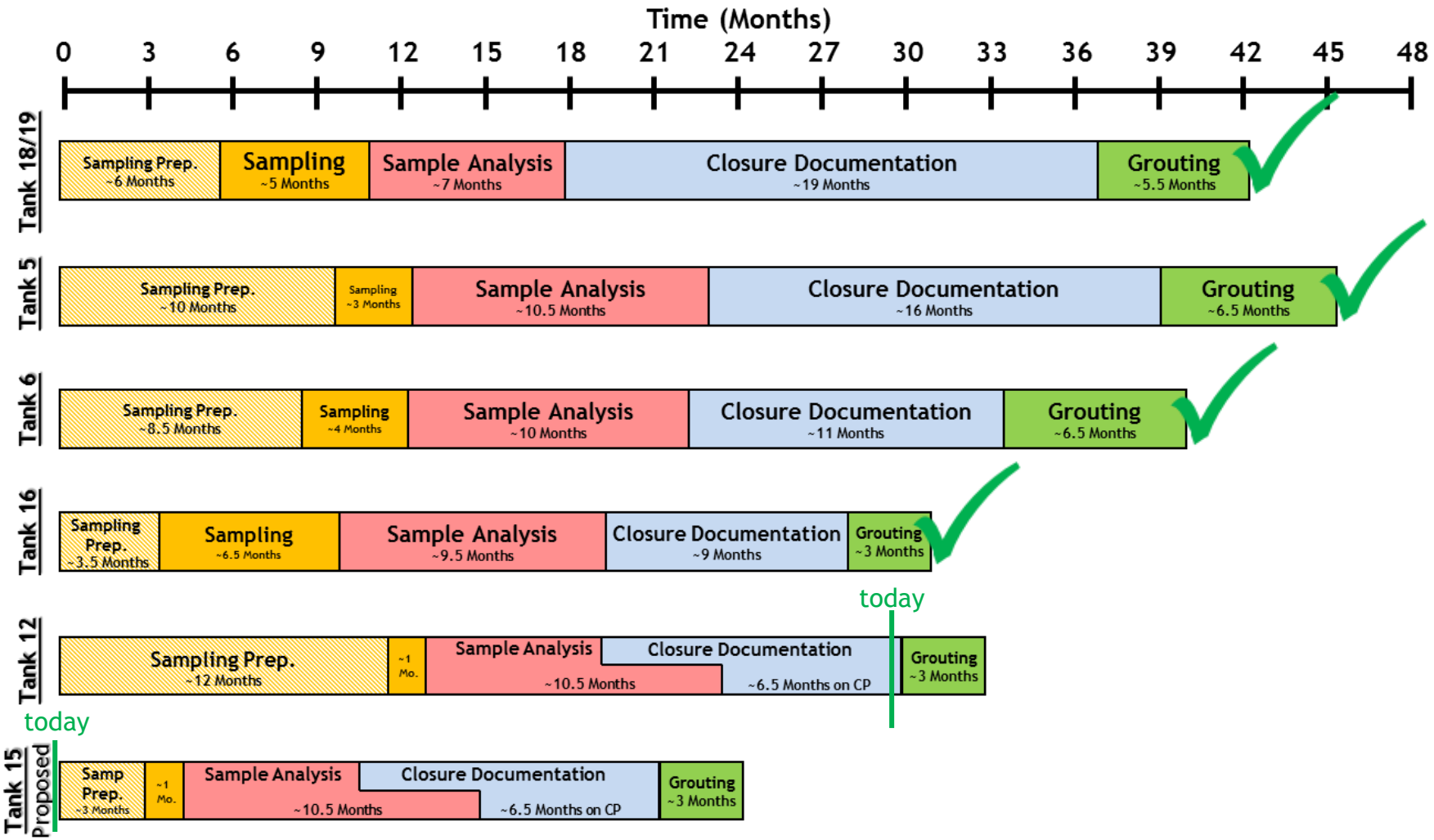
5 failed coils • *39* intact cooling coils • *24* pieces of equipment • *18* risers • *12* inspection ports

786 trucks • *6,163* yd^3 grout

9/22/15
Grouting Compete

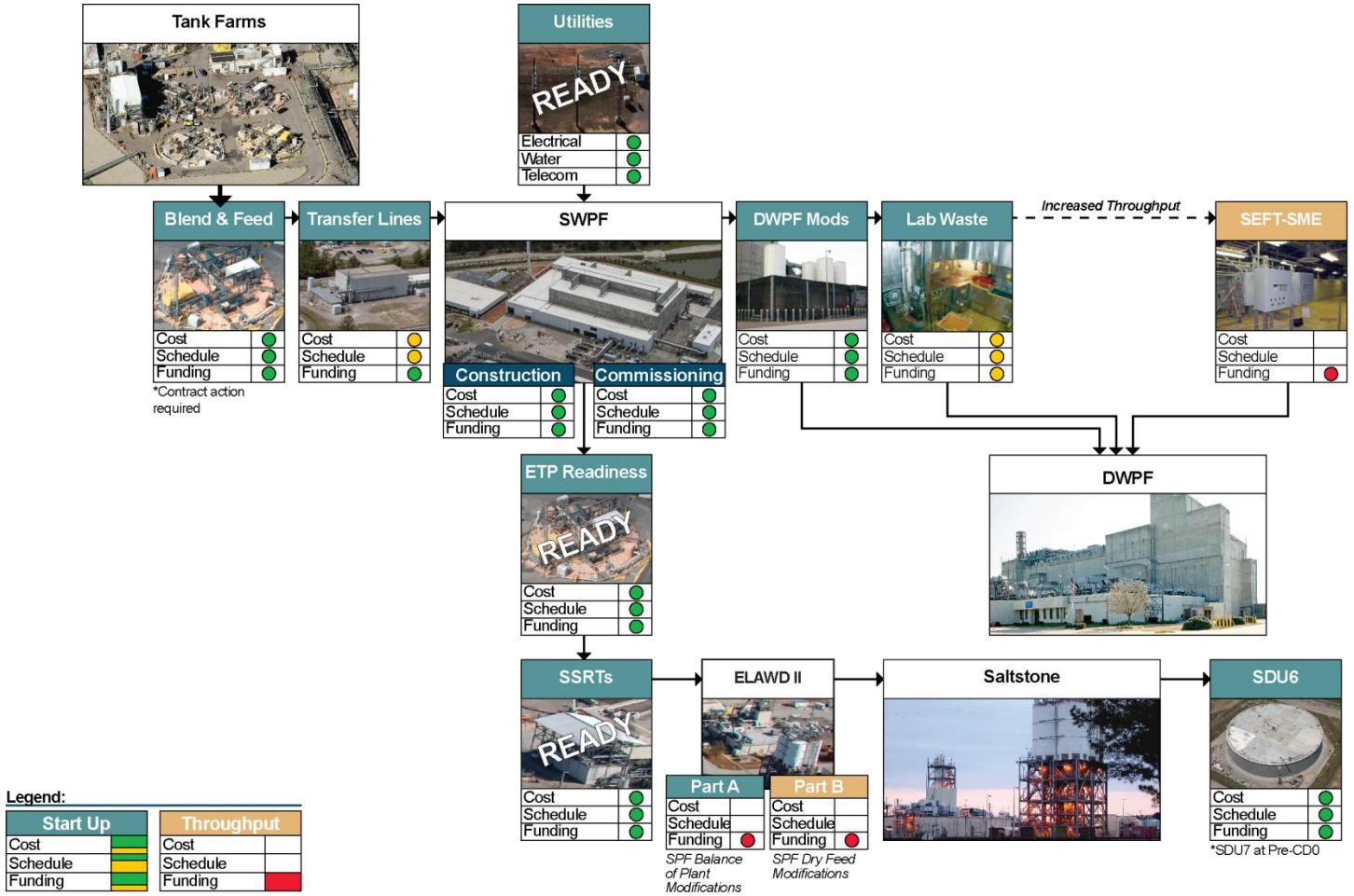
Tank 16 Grouting

Tank Closure Schedule Comparison



SWPF Integration with Liquid Waste

- All liquid waste scope required to support SWPF startup and operation has been identified and is being worked
- Schedule logics for full scope integration are complete



December 14, 2015
SRR_WR_002_r13

Infrastructure Improvements

A lot accomplished to lengthen the life and increase reliability of SRS Liquid Waste facilities…more to do

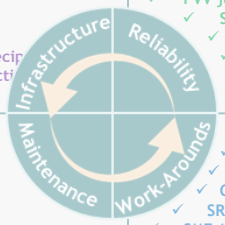
DWPF/Saltstone

- ✓ Mercury Scoping
- ✓ Slurry Mix Evaporator (SME) Bubbler improvement
- ✓ Coils Inspect/Clean
- ✓ Sludge Receipt and Adjustment Tank (SRAT)/SME Blowdown Auto
- ✓ Melter Off-gas restoration
- ✓ Lab Motor Control Center separation
- ✓ New Laboratory trailer
- ✓ New Instrument air dryers
- ✓ New cooling tower pumps
- ✓ Obsolete acid pumps replacement
- ✓ Smear Test Station Exit Pedestal Refurbishment
- ✓ Vault 4 cap & roof coating
- ✓ Basin 4 expansion
- ✓ SDU fill height increase
- ✓ Saltstone Disposal Unit (SDU) 6 construction
- ✓ Salt Solution Receipt Tanks construction
- ✓ Weigh hopper weather protection
- ✓ Wireless infrastructure installation at Saltstone
- ✓ Delta V control system upgrade
- ✓ Replaced 4 obsolete fire system monitoring panels
- ✓ Lab flooring
- ✓ FOS 7 and FOS 18 HVAC units
- ✓ Replace obsolete Moore Controllers
- ✓ Breathing Air manifolds
- ✓ Grout line replacement
- ✓ Elimination of cement from Saltstone recip
- ✓ Saltstone Disposal Unit (SDU) 6 constructi

- ✓ Lab flush 3-way valve
- ✓ Lab cell winch & hoist
- ✓ Diesel Generator 100 Loss of Power Surveillance
- ✓ Melter off-gas Surveillance
- ✓ SRAT/SME interlock Surveillance
- ✓ B8 5 Year Preventive Maintenance (PM)
- ✓ Lab cell window cleaning
- ✓ Field Operating Station PMs
- ✓ Grout process lines
- ✓ Chute inspections
- ✓ Pig valve refurbishment
- ✓ Vault 4 weather enclosures
- ✓ 512-S valve repairs
- ✓ Improve spare parts availability
- ✓ Load center preventive maintenance
- ✓ Steam system repairs
- ✓ Flush water to grout line valve repair
- ✓ Film cooler and quencher cleaning
- ✓ Manipulator arm spare parts
- ✓ Reduced Corrective Maintenance Backlog for SS/SC items
- ✓ SC-1 pump return to service (Spare)
- ✓ TB-6 pump return to service (Spare)

- ✓ Slurry Mix Evaporator Condensate Tank (SMECT) Sample Pump DCS
- ✓ Melter Feed Tank (MFT) Kurz maintenance
- ✓ Rev. E Documented Safety Analysis (DSA) purge mods
- ✓ Evaluate elimination of cement from Saltstone recipe
- ✓ Decon frit valves replacement
- ✓ Melter bubbler replacements
- ✓ Purge system modifications (SC)
- ✓ 512-S secondary filter modifications
- ✓ 512-SW cross flow filter redesign
- ✓ Saltstone Mixer refurbishment
- ✓ Salt feed tank downcomer
- ✓ PVV Mercury Transfer Header flush
- ✓ PVV jumper cleanouts
- ✓ SCT uninterruptable power supply
- ✓ CPC purge air filter sight glasses
- ✓ Process frit line cleanout capability
- ✓ MFT feed pump VFD
- ✓ PVV blower VFD

- ✓ SMECT pH probe
- ✓ Process Steam Generator Level Indicating Transmitter
- ✓ Cold Feed Vent
- ✓ SRAT scrubber valve
- ✓ SME Agitator jumper
- ✓ Interim Canister Closure Station heater
- ✓ AA2 Agitator
- ✓ SME Scrubber
- ✓ Melter Transformer
- ✓ SME transfer pump
- ✓ Frit Slurry Makeup Tank sparger
- ✓ Fire System Valve
- ✓ Outfall Soil Removal
- ✓ Victaulic valve covers
- ✓ Saltstone [illegible] reduction
- ✓ Saltstone [illegible]
- ✓ Fire pump rebuilds
- ✓ Clean dripped [illegible]
- ✓ Grout pump motor support
- ✓ Melter cell aux [illegible]
- ✓ SRAT condenser temperature indication
- ✓ DWTT condens[illegible]
- ✓ MFT recirculation [illegible]
- ✓ Lab drain jumper [illegible]
- ✓ Gas Chromatography NCR
- ✓ KKV temp mod[illegible]
- ✓ 13 Ton motor on main canyon crane



Focus on:

- Infrastructure condition improvements
- Work Around removal
- Maintenance of Safety System/Safety Class items and transfer capability
- Reliability improvements

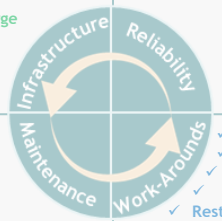
Tank Farms

- ✓ Replace Flush Water Valves V-13 & 19
- ✓ Install new independent SHT sampler to reduce organic cross-contamination
- ✓ [illegible] Transfer
- ✓ [illegible] Pump
- ✓ [illegible] Tank 5
- ✓ 6 Reel Tape Repairs
- ✓ Repair VVV/CAM
- ✓ [illegible]
- ✓ Relocate HLLCPs
- ✓ [illegible] VFDs
- ✓ [illegible]
- ✓ Replaced three cooling towers at ETF
- ✓ Replaced the Tank 48 purge ventilation ductwork (SS)
- ✓ Replaced Tanks 1, 3, 7 and 8 purge ventilation fans (SC)
- ✓ Replace Tanks 1, 2, 3, 9, 10 and 23 purge ventilation reheaters (SC)
- ✓ Removal (D&R) of the 704-8H trailer
- ✓ Inter-Area transfer line repairs
- ✓ Installed 15 ARGOS Monitors

- ✓ Functional Test of UPS
- ✓ Rebuild Tk 30/37 BFVs
- ✓ Rebuild 2H feed Pump
- ✓ Perform 20 Instrument PMs on 3H
- ✓ Perform Cooling Tower PMs
- ✓ Rebuild Cooling Tower Pump(s)
- ✓ Repair 2H/3H Steam Leaks
- ✓ Replace DSS coalescer and pre-filter
- ✓ Replace SE coalescer
- ✓ Replace MCU PVV HEPA filters
- ✓ Perform annual PMs/CMs for electrical, instruments and HVAC
- ✓ Replace Tank 49 Transfer Pump
- ✓ Repair Underground Domestic and Well Water Leaks
- ✓ Repair Chromate Water Pumps
- ✓ Replace 3H Building Vent Fan and VFD
- ✓ Replaced Tank 43 Feed Pump
- ✓ Salt Dissolution in Tank 37
- ✓ Modified Tank 39 Transfer Jet
- ✓ Reduced the Corrective Maintenance Backlog for SS/SC items
- ✓ Replaced 15 conductivity probe junction
- ✓ Repaired jacket for the Tank 38 gravity drain line (GDL)
- ✓ Repaired transfer line jackets at F-Diversion Box
- ✓ Unplugged Drain Line for HDB-2
- ✓ HDB6 valve repairs and actuator upgrades
- ✓ Fabricated a spare Type III Telescoping Transfer Jet

- ✓ 3 Tank Vent Reheater Replacements
- ✓ 4 Ducts Replacements
- ✓ 2 Stacks Extensions
- ✓ Tk 16 New HEPA House
- ✓ [illegible]e HDB-8 Crane Wire Rope
- ✓ [illegible]r Tank 38-43 Transfer Line Jacket
- ✓ Integrity inspection of MCU cell coating
- ✓ [illegible]37 Salt Dissolution
- ✓ [illegible] Coalescer filter replacement
- ✓ [illegible]vaporator feed pump repair
- ✓ Installed new SS diesel generator for H-Diversion Box (HDB)-8 (SS)
- ✓ [illegible]pairment reduction
- ✓ [illegible]ced the Inter-Area Transfer Line (IAL) transfer pump
- ✓ MCU caustic wash mods
  - ▪ MCU Intek flow meters

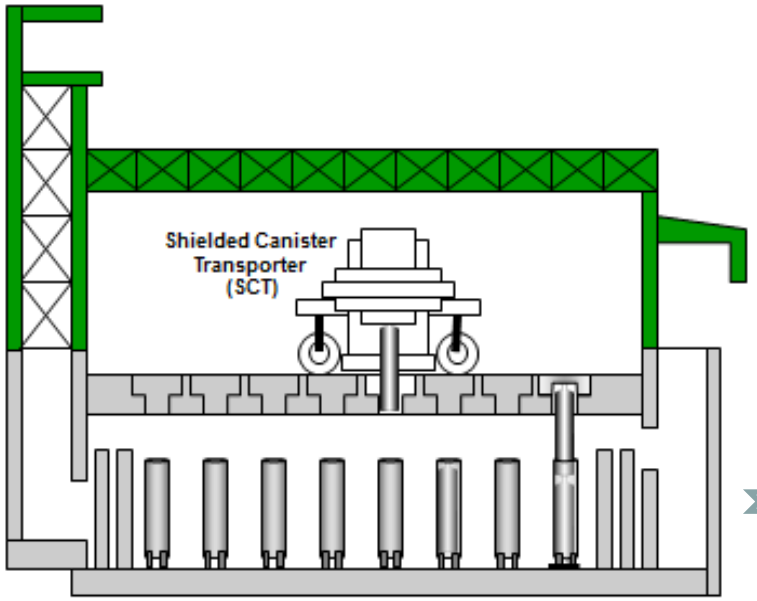
- ✓ 3H Deliqouring
- ✓ PT-1 Pump Repair
- ✓ Replace DB-8 DG
- ✓ Install MCU rain cover
- ✓ Restore Tank 22 Mixing Capabilities
- ✓ Building Replacement Type III and IIIA TTJs
- ✓ Replace Tank 41 Transfer Pump
- ✓ Replace Tank 4 Transfer Pump and Install valve flushing manifold
- ✓ Tank 37 Back flush valve replacement
- ✓ HDB4 valve repairs and actuator upgrades
- ▪ Procurement of 3 Slurry Pumps, 5 SMPs & 6 CSMPs
- ✓ Completed cleanout of Leak Detection Box (LDB) Drain Cell
- ✓ Removed temporary modification from F-Catch Tank
- ✓ Installed new air compressors at 241-58H and HDB-8
- ✓ Reestablished stream to the Tank 43 Transfer Jet
- ✓ MCU duct replacement with flush capability
- ▪ Tank 32 Feed Pump diamond bearings
- ▪ Tank 37 Transfer Jet
- ▪ MCU PVV shielding

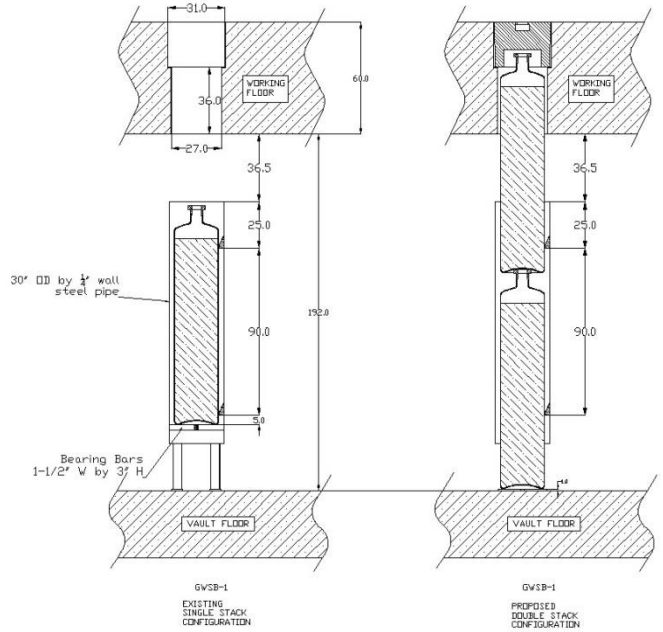


Completed in FY14
Continued /Coimpleted in FY15
Completed in FY15
Continues in FY16

Interim Canister Storage: Double Stack

- **Double capacity of Glass Waste Storage Building 1**
  - Defers $130 million expense for construction of GWSB3
  - Provides adequate storage capacity through FY26
- **Application includes:**
  - Modify existing locations to store two canisters each (from 2,254 to 4,508)
  - Remove existing crossbar canister support; lower canister supported on vault floor
  - Upper canister placed on top of lower canister
  - Upper canister Shield plug redesigned for equivalent radiological protection
  - Work completed on 57 of 150 slots so far

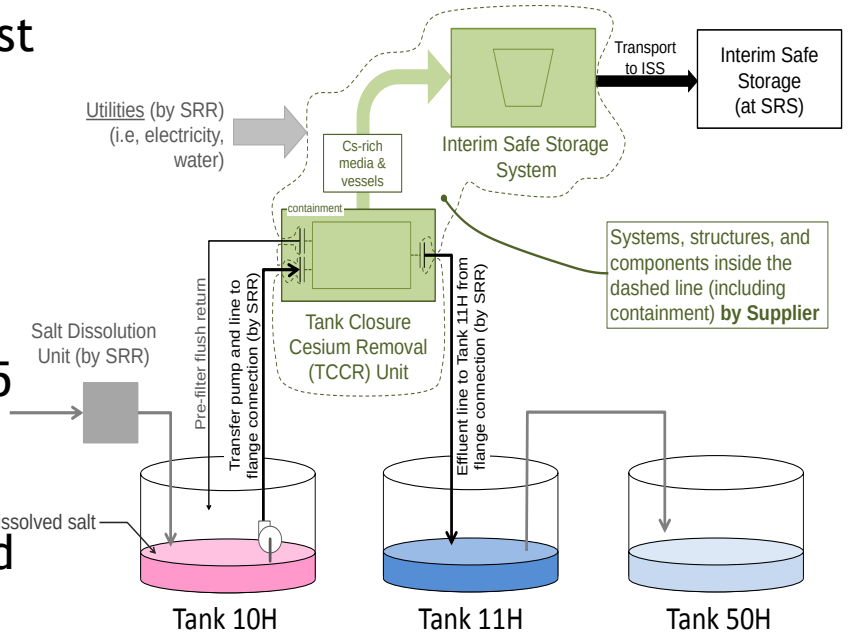




Tank Closure Cesium Removal

- **Objective**
  - Pursue ion exchange (IX) technology to enhance tank closure capabilities
  - Leverage commercial IX supplier expertise and Fukushima experience
  - Improve flexibility by exploring alternatives for spent resin disposal
  - Simple, modular, affordable
- **Status**
  - Expressions of Interest (EOI) / DRAFT Request for Proposals (RFP) issued - 6/1/15
  - Supplier Industry Day conference – 6/17/15
  - Supplier EOI responses received – 6/19/15
  - RFP / Statement of Work issued - 8/13/15
  - Supplier proposals received - 9/21/15
  - DOE Progress Report to SCDHEC –10/15/2015
  - Notifications to suppliers who responded to the RFP - 11/2/15
  - Final Proposals received and to be evaluated by the end of February 2016

TCCR Concept



Emergency Preparedness

- **SRR Emergency Preparedness (EP) Program averages about 60 drills/exercises a year**
- **SRR conducted a comprehensive assessment to identify the way drills are planned, scheduled, and performed in order to meet all requirements and expectations**
- **Issued EP Corrective Action Plan**
  - Total of 67 Corrective Actions were generated and 63% of Corrective Actions have been completed with a scheduled completion date of 6/1/2017 (vast majority due by 1QCY16)
    - Focus Areas
      - Programmatic Improvements
      - Improve Drill Performance
      - Compliance with Drill Schedule Requirements
      - Improve scenario variability/complexity

DWPF Issues - Resolved

- **Mercury**
  - SRS liquid waste contains mercury/Higher than expected levels of mercury detected/
    - No disposal permit limits exceeded
    - Samples showed unexpected trace levels of monomethyl mercury
  - Based on analysis, Liquid Waste operations are not impacted by monomethyl mercury
    - Conducting additional evaluations to mitigate potential future impacts
- **Antifoam**
  - Routinely added during the processing of waste at the Defense Waste Processing Facility (DWPF)
    - Used to minimize foaming in the feed prep processing vessels
  - Antifoam degradation by-products can be flammable
  - DWPF can operate safely because engineers proposed operational restrictions and additional compensatory controls
  - Department of Energy (DOE) has approved these restrictions/controls and DWPF resumed operations in September

FY16 Production Goals

- 150 HLW Canisters
- >1.0 million gallons through ARP/MCU
- 1.5 million gallons through Saltstone
- Close Tank 12
- Complete Bulk Waste Remove on Tank 15
- Complete Saltstone Disposal Unit 6
- Continue infrastructure work for Salt Waste Processing Facility
- Modify 150 canister positions at DWPF/Start double-stacking canisters

Summary

- **Our primary focus is on safe work**
  - Protect workers, public, environment
- **Continue to be good stewards of taxpayers' money**
  - Always trying to find ways to accelerate the cleanup, saves money long-term
  - Technology is transferred to other sites, bringing more cost-savings for the federal government
- **Want you to be informed, knowledgeable**
- **Thank you for your continued support**