



**Savannah River
Remediation**

AECOM | BECHTEL | CH2M | BWXT

April 14, 2016

SAVANNAH RIVER REMEDIATION UPDATE

South Carolina Nuclear Advisory Council Meeting

Mark Schmitz

Acting President and Project Manager





Industrial Safety



Radiological Safety



Environmental Safety



Chemical Safety

Safety: Perspective/Awards

- Construction forces (legacy and current) accumulated over 28 million safe hours
- SRR operations accumulated over 1 million safe hours since the last injury requiring a day away from work
 - Reached contract-high 9.8 million safe hours in 2015
- Recipient of National and State Awards in recognition of safety performance (National Safety Council Industry Leader, S.C. Chamber of Commerce and S.C. Department of Labor, Licensing and Regulation Awards)



High-Hazard Operations

REDUCING SOUTH CAROLINA'S SINGLE GREATEST ENVIRONMENTAL RISK

TANK CLOSURE SRR completed FIVE closures in FIVE years and reduced tank closure schedules by nearly half

5 in 5 YEARS

9,800,000 safe hours from 2013-2015, best in SRR contract history

\$1 BILLION identified in lifecycle savings through Mission Excellence

LARGEST space gain since 2010 in FY15

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

DOUBLED throughput of ARP/MCU

400% increase in Saltstone production rate

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 **2 times higher rate**

15 million pounds of glass poured at 100 ft

20 million gallons of waste moved in FY 15

262k gallons of water consumed in one year

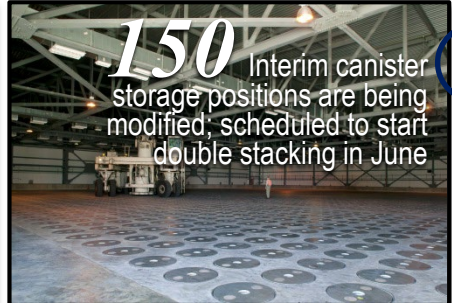
2015 CURIE STABILIZATION (GROUT AND GLASS)

Evaporators
ARP/MCU (Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit)
Saltstone Facilities
Saltstone Disposal Unit 6 (SDU 6)
Defense Waste Processing Facility (DWPF)

SRR CONTRACT BEGAN 1996

SRR Remediation

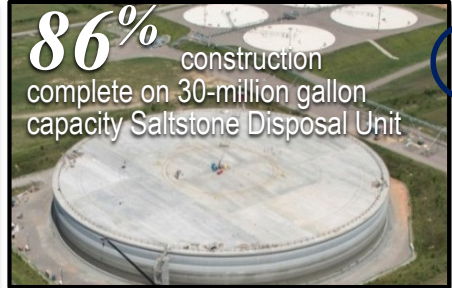
3



4



5



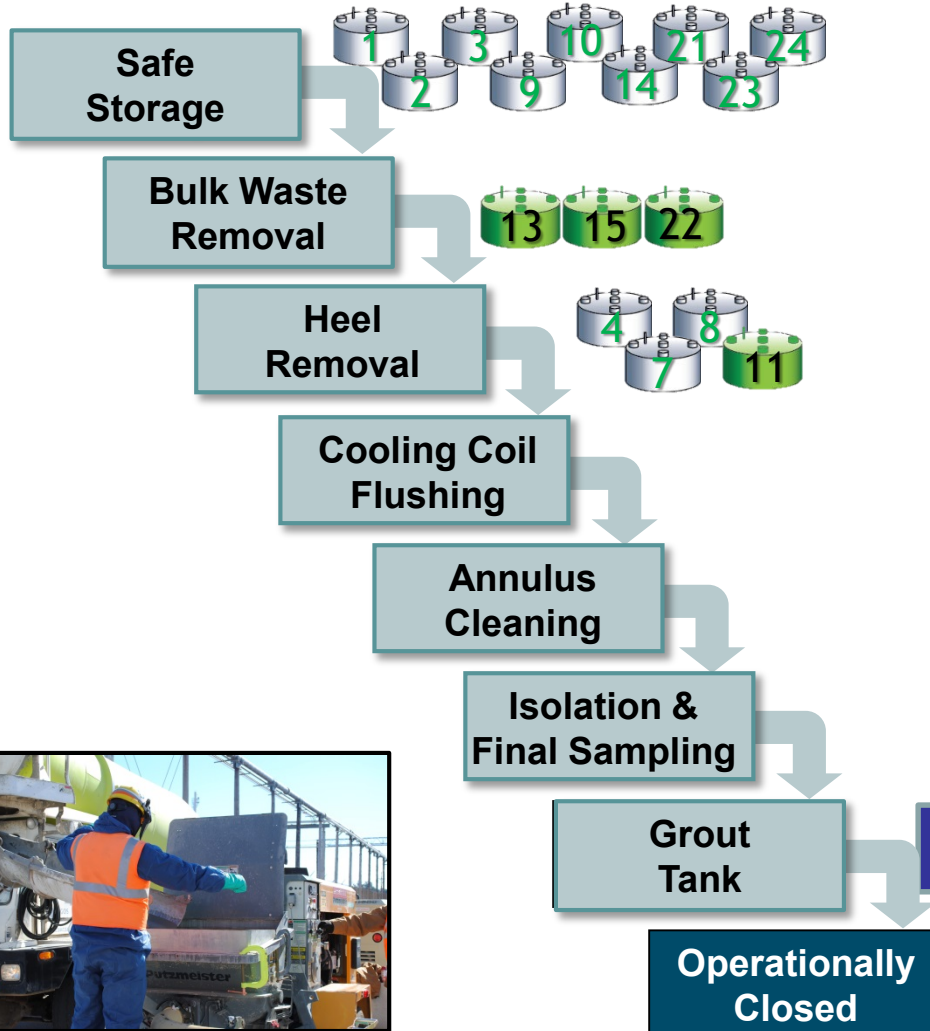
6

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

Closing Waste Tanks

■ Tank Closures

- Five tank closures completed during the past 6 years; One in progress now



Tank 12 Grouting

Tank 12 so far...

*Overall grouting 97% complete
Items remaining: tanks risers,
equipment and cooling coils*

908,580 gallons of grout used so far

Grouting complete by late April;
FFA Deadline: May 31, 2016

- **3H Evaporator Mission: Evaporating liquids generated during:**
 - Sludge batch washing
 - Receipts from H Canyon
 - Tank waste removal and cleaning
- **Leak discovered on Feb 17, 2016, contained in stainless steel lined cell**
- **System Plan revision supports continued H Canyon, DWPF, and MCU operations for up to 3 years without 3H Evaporator operating**
- **Strategy**
 - Currently feeding Sludge Batch 8 to DWPF
 - Sludge Batch 9 has already been washed
 - Sludge Batch 10 washing was to have begun in March 2017, will be deferred
 - Insertion of a Sludge Batch 9B (Tank 22 does not require washing)
 - Decrease canister loading from 36 wt% to 32 wt% (ensures no “salt only” processing at end of campaign)
- **Estimate for evaporator replacement is 3 years and ~\$18M**
- **Recovery Teams evaluating repair vs. replacement**

■ Leak Repairs

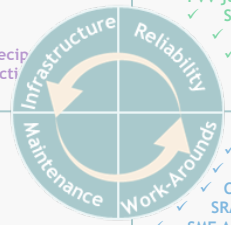
- 30 million gallon construction
- Unable to pass water-tightness test with dye
- Install a liner
- Retest tank
- Under budget
- On track to meet system plan need date



Infrastructure Improvements

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

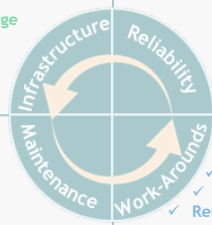
- ✓ Mercury Scoping
- ✓ Slurry Mix Evaporator (SME) Bubbler improvement
- ✓ Coils Inspect/Clean
- ✓ Sludge Receipt and Adjustment Tank (SRAT)/SME Blowdown Auto
- ✓ Melter Off-gas restoration
- ✓ Lab Motor Control Center separation
- ✓ New Laboratory trailer
- ✓ New Instrument air dryers
- ✓ New cooling 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 recipe
- ✓ Saltstone Disposal Unit (SDU) 6 construction



- ✓ Slurry Mix Evaporator Condensate Tank (SMECT) Sample Pump DCS
- ✓ Melter Feed Tank (MFT) Kurz maintenance
- ✓ Melters Transfer Transformer (SCT) maintenance
- ✓ Sludge Receipt and Adjustment Tank (SRAT) maintenance
- ✓ Sludge Receipt and Adjustment Tank (SRAT) maintenance
- ✓ Rev. E Documented Safety Analysis (DSA) purge mods
- ✓ Upgrade 3 Canister Decantation Cell Decantation pumps
- ✓ Saltstone core sampling
- ✓ Antifoam in feed line
- ✓ New High Purity (HP) Feed Line
- ✓ Evaluate elimination of cement from Saltstone recipe
- ✓ Decon frit valves replacement
- ✓ Melter bubbler replacements
- ✓ Purge system modifications (SC)
- ✓ 512-5 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 uninterruptible power supply
- ✓ CPC purge air filter sight glasses
- ✓ Process frit line cleanout capability
- ✓ MFT feed pump VFD
- ✓ PVV blower VFD

- ✓ Replace Flush Water Valves V-13 & 19
- ✓ Install new independent SHT sampler to reduce organic cross-contamination
- ✓ Repair/replace Valve Transfer Valve
- ✓ Remove excess Tank
- ✓ 6 Reel Tape Repairs
- ✓ Repair 30V/CA
- ✓ Relocate HLLCPs
- ✓ Repair 30V/CA
- ✓ Relocate HLLCPs
- ✓ 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

- ✓ 3 Tank Vent Reheater Replacements
- ✓ 4 Ducts Replacements
- ✓ 2 Stacks Extensions
- ✓ Tank 15 New HEPA House
- ✓ HDB-8 Crane Wire Rope
- ✓ Transfer Tank 38-43 Transfer Line Jacket
- ✓ Integrity Inspection of MCU cell coating
- ✓ 37 Salt Dissolution
- ✓ Coalescer filter replacement
- ✓ Evaporator feed pump repair
- ✓ Installed new SS diesel generator for H-Diversion
- ✓ HDB-8 (SS)
- ✓ Vibration reduction
- ✓ Replaced the Inter-Area Transfer Line (IAL) transfer pump
- ✓ MCU caustic wash mods
 - MCU Intek flow meters



Tank Farms

- ✓ Functional Test of UPS
- ✓ Rebuild Tk 30/37 BFFVs
- ✓ 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 D55 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 Joints at F-Diversion Box
- ✓ Unplugged Drain Line for HDB-2
- ✓ HDB6 valve repairs and actuator upgrades
- ✓ Fabricated a spare Type III Telescoping Transfer Jet

- ✓ 3H Deliquoring
- ✓ PT-1 Pump Repair
- ✓ Replace DB-8 DG
- ✓ Install MCU rain cover
- ✓ Restore Tank 22 Mixing Capabilities
- ✓ Building Replacement Type III and IIIA TTJTs
- ✓ 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

- ✓ 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
- ✓ 512-5 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)

DWPF / Saltstone

- ✓ 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 30/37 BFFV construction
- ✓ Saltstone 30/37 BFFV construction
- ✓ Fire pump rebuilds
- ✓ Clean capped
- ✓ Grout pump meter support
- ✓ Melter cell auxiliary
- ✓ SRAT condenser temperature indication
- ✓ DWTT condenser temperature indication
- ✓ MFT recirculation line
- ✓ Lab drain jumper
- ✓ Gas Chromatograph (GC)
- ✓ KKV temp mod
- ✓ 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

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

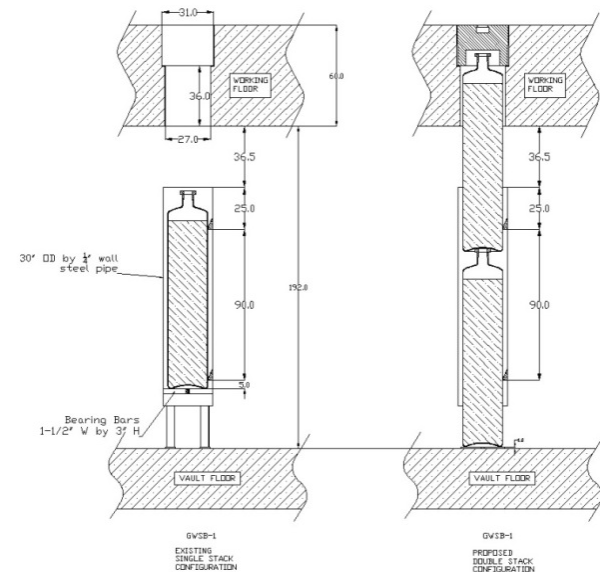
Canister Double Stack Project

- Work 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
 - Scheduled to begin double stacking in June

Glass Waste Storage Building 1



Canister Double Stack



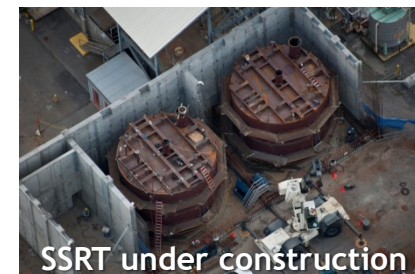
■ No MST Demonstration

- SRR team continues to refine the system used to process salt waste
- Eliminating the addition of monosodium titanate (MST) from the salt waste processing system improves ARP filtration rate
- Successfully processed approximately 200,000 gallons of the salt waste to date
- Demonstration will continue for several more months



■ Preparing for Salt Waste Processing Facility

- In May, one of the two newly constructed Salt Solution Receipt Tanks (SSRT) will begin a Readiness Review
 - There are two 60,000-gallon SSRTs
 - Provides 4 days of space for salt operation
- Liquid waste-wide outage June-September 2017
 - Install underground transfer lines for SWPF tie-ins



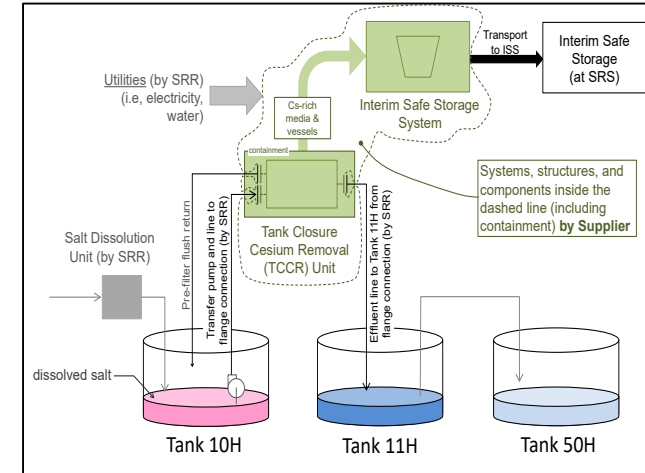
Tank Closure Cesium Removal

Objective

- Pursue ion exchange technology to enhance tank closure capabilities
- Leverage commercial ion exchange supplier expertise and Fukushima experience
- Improve flexibility by exploring alternatives for spent resin disposal
- Simple, modular, affordable

Status

- Best & Final Offer Request for Proposal sent to Suppliers
- Final Proposals received
- SRR Proposal evaluation complete - 2/18/16
- TCCR Subcontract Award



TCCR Concept



TCCR Process Area

- **Focus continues on**
 - Safe work to protect workers, public, environment
 - Close Tank 12 by May 31, 2016
 - Continue salt waste processing with ARP/MCU > 1M gallons per year
 - Prepare for Salt Waste Processing Facility startup
- **Innovative SRR Team continues to provide unique solutions to the liquid waste work**
 - No MST demonstration
 - Canister double stack
 - Tank Closure Cesium Removal
 - Many others
- **Questions?**

