

# SRS Aligning Mission Needs and Aging Infrastructure: Liquid Waste Perspective

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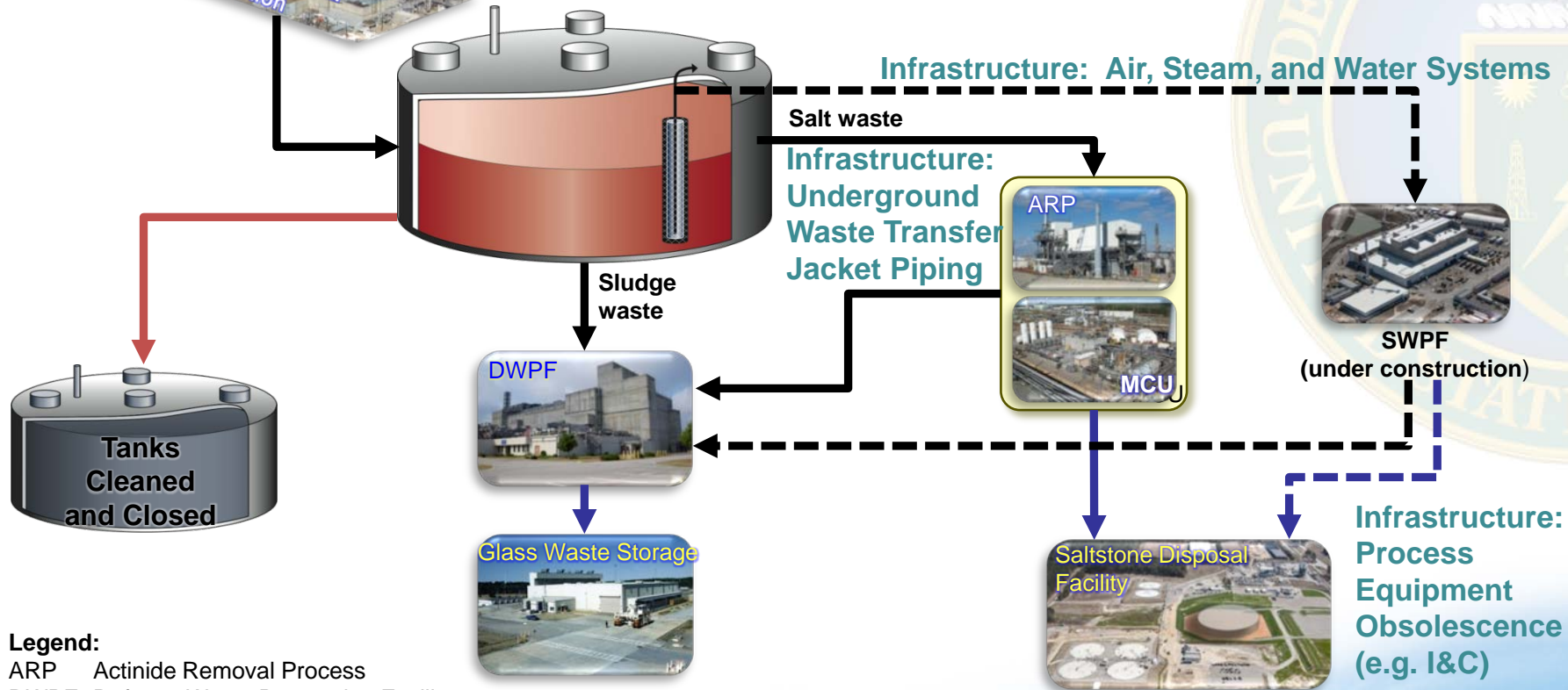
Savannah River Site





# Liquid Waste Project: *Infrastructure Needs*

Infrastructure: Power Distribution, Roads, Steam

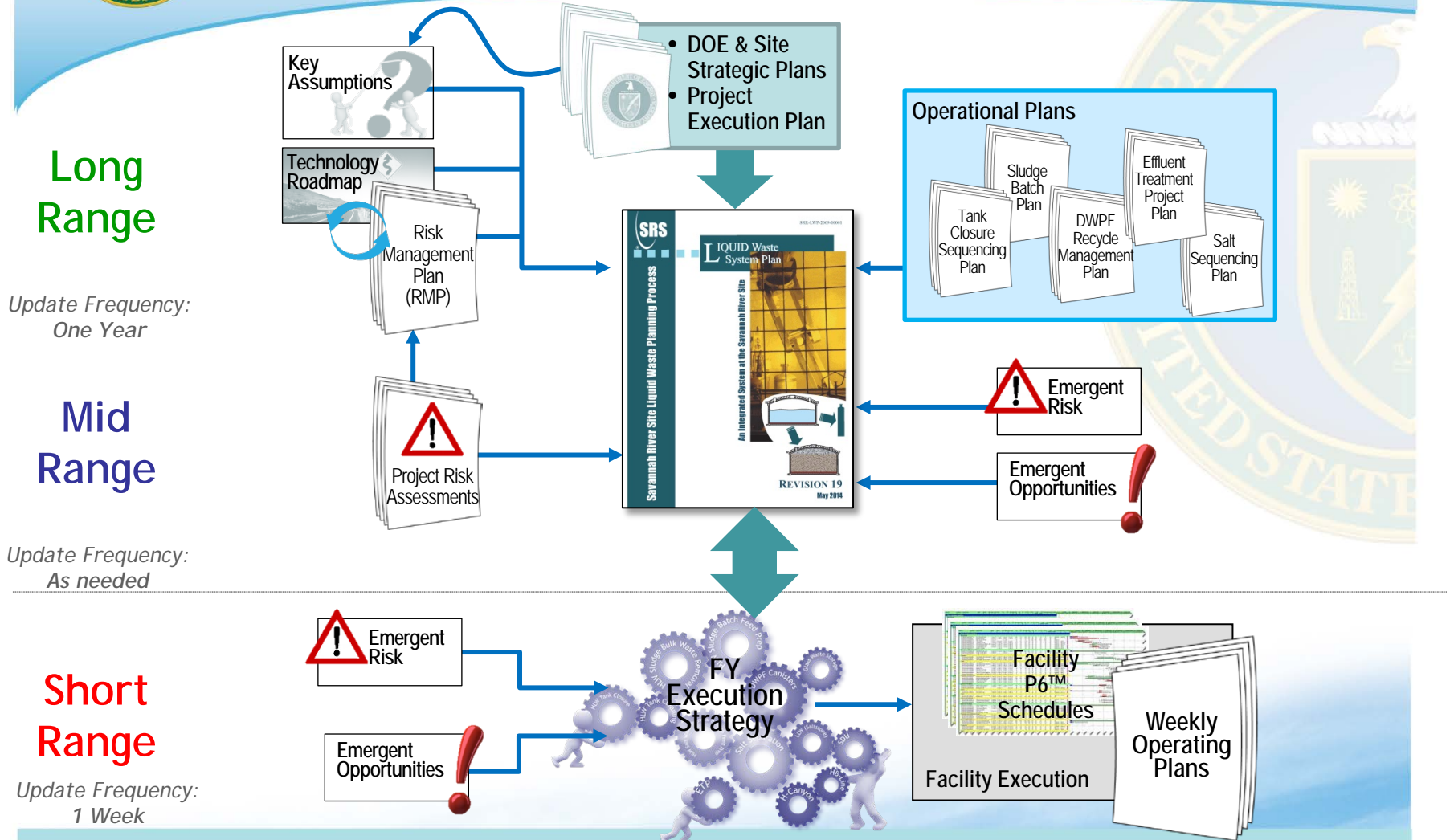


**Legend:**

- ARP Actinide Removal Process
- DWPF Defense Waste Processing Facility
- MCU Modular Caustic Side Solvent Extraction Unit
- SWPF Salt Waste Processing Facility



# Liquid Waste System Planning Tools Recognize Infrastructure Risks







## DWPF and Saltstone: *Infrastructure Risks and Challenges*

- DWPF is a single production line
  - Single point failures exist through out the production flow-sheet
  - Redundancy exists in safety systems only
  - Most repairs have to be performed remotely
- Saltstone is also a single production line
- Increased personnel dose potential due to changing feed streams requires innovative ALARA techniques
- Funding limitations require accepting some risks for downtime
  - Safety is never compromised



# DWPF and Saltstone: *Improvements and Status*

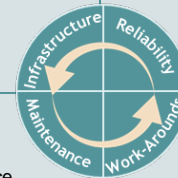
Significant investment was made in 2014 to restore infrastructure and improve plant reliability

- Labor dollars - \$10,417,000
- Material dollars - \$8,000,000
- Projects/Contracts - \$1,306,000

- 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
- Saltstone Disposal Unit (SDU) 6 construction
- SDU fill height increase

- 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

- Slurry Mix Evaporator Condensate Tank (SMECT) Sample Pump DCS
- Melter Feed Tank (MFT) Kurz maintenance
- Shielded Canister Transporter (SCT) zero level switches
- SCT wheel bearings
- Rev. E Documented Safety Analysis (DSA) purge mods
- Upgrade 3 Canister Decontamination Cell Decon Valves
- Grout pump hoses
- Saltstone core sampling
- Evaluate elimination of cement from Saltstone recipe
- Antifoam DSA development
  - Purge instrumentation DSA development
  - Redesign CDC nozzles



- 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
- Victallic valve covers
- Saltstone Control room alarm reduction
- Saltstone Air system piping



# DWPF and Saltstone Reliability

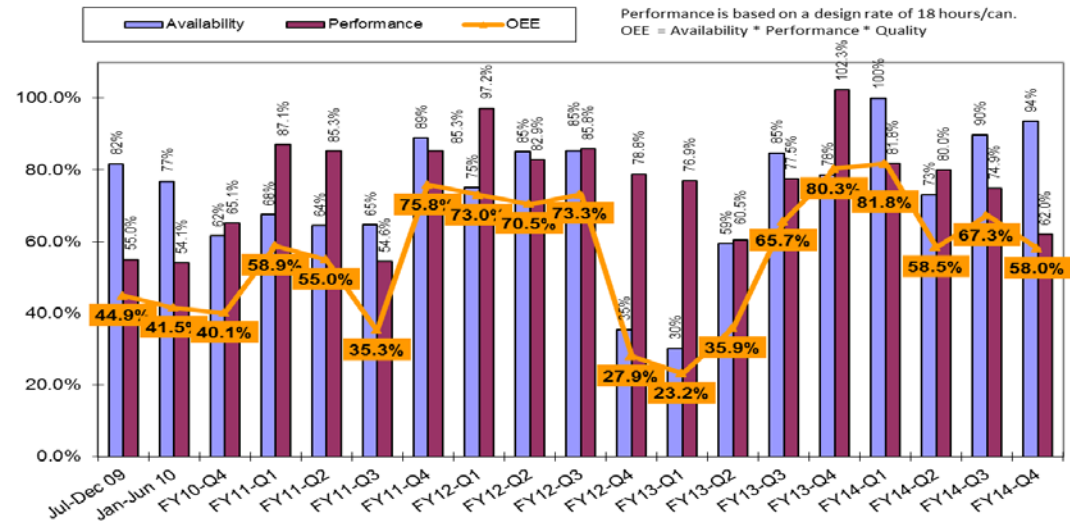
## DWPF

- Availability in FY14 was markedly improved over FY13
- 90% availability or above for three quarters
  - FY14 2nd Quarter affected by weather conditions

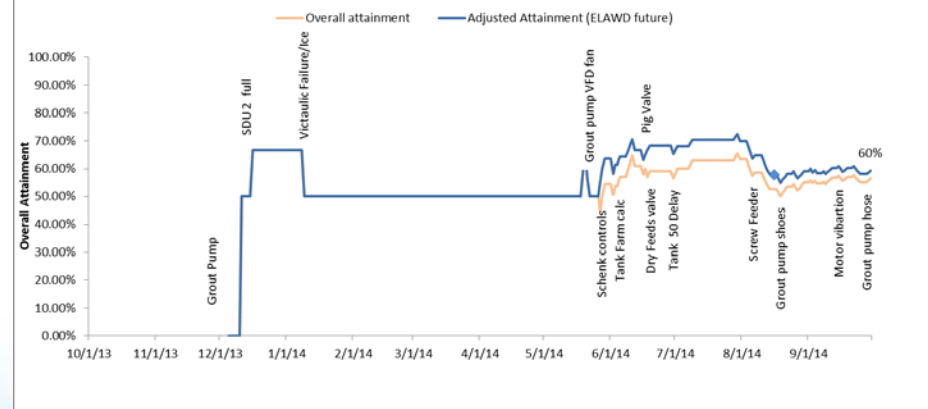
## Saltstone

- Daily run effectiveness based on run duration (availability) and quantity produced (performance) on planned run days

DWPF Overall Equipment Effectiveness Indicators



Saltstone Overall Attainment 2014





## Tank Farm: *Infrastructure Risks and Challenges*

- Many Tank Farm facility systems are old, outside, and underground
  - Single point failures exist through out the production flow-sheet
  - Redundancy exists in safety systems only
- Original focus was Storage; Current focus is Closure
  - Configuration Management not a Cold War priority
  - Installed system design not optimum for new mission usage
  - DWPF and Saltstone require steady and consistent feed delivery
  - Reliable infrastructure needed to perform waste tank transfers as scheduled (e.g. steam, water, air)
- Funding limitations require accepting some risks for downtime
  - Safety is never compromised



# Tank Farms: *Improvements and Status*

Significant investment was made in 2014 to restore infrastructure and improve plant reliability

- Labor dollars - \$24,719,000
- Material Dollars - \$ 3,729,000

- Replace Flush Water Valves V-13 & 19
- Install new independent SHT sampler to reduce organic cross-contamination
- Repair / Replace Waste Transfer V-201
- Reseal Tank 32 Pump Riser
- Removal Solids Tank 22
- 6 Reel Tape Repairs
- Repair VAMPS/ CAMs
- Repair Heat Tracing/
- Insulation
- Relocate HLLCPs
- Upgrade VFDs

- 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)
- Replace 3H Building Vent Fan and VFD
- 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

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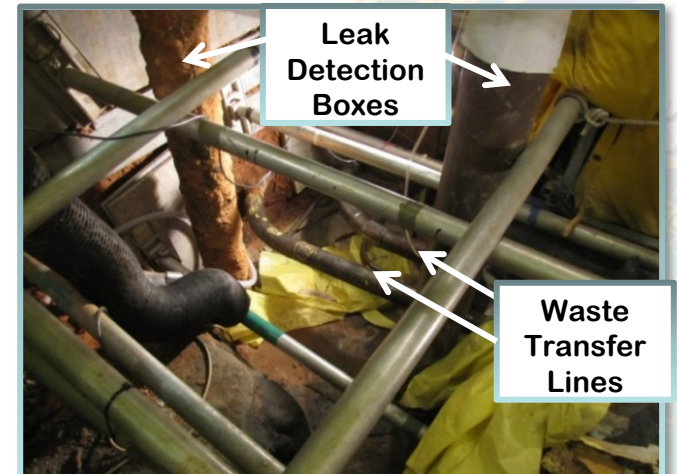
- 3 Tank Vent Reheater Replacements
- 4 Ducts Replacements
- 2 Stacks Extensions
- Tk 15 New HEPA House
- Replace HDB-8 Crane Wire Rope
- Repair Tank 38-43 Transfer Line Jacket
- Integrity inspection of MCU cell coating
- Tank 37 Salt Dissolution
- 3H Deliquoring
- PT-1 Pump Repair
- Procurement of 3 Slurry Pumps, 5 SMPs & 6 CSMPs
- 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 Farm Risks and Challenges: *Transfer Line Failures*

- Waste Transfer Lines = stainless steel core pipe inside a carbon steel "jacket"
- Failures detected in F-Tank Farm jackets for two waste transfer lines that are nearly 50 years old.
- Both transfer lines critical for inter-area transfers between both Tank Farms
- Transfer lines 13' below grade at failure locations
- Lines difficult to excavate due to radiological conditions, other piping interferences, shoring requirements, digging restrictions near transfer lines, etc.
- Pitting corrosion is occurring along the jackets making repairs difficult to scope.
- These specific cases are representative of the likely material condition of tank farm transfer line jackets of that age.





# Tank Farm Risks and Challenges: Water System Failures

- Most tank farm Well Water headers are now over 50 years old
- Well Water lines critical to Tank Farm processes
- Well Water lines have been a significant problem in the last 5 years for H-Tank Farm
- Difficult to excavate due to piping interferences, shoring requirements, digging restrictions near other utility/process lines and in radiological areas

## H-Tank Farm East Hill



2013 failure of 2" carbon steel Well Water line on H-Tank Farm West Hill impacting 3H Evaporator operations

Appearance of carbon steel well water lines after approximately 30 years of service.



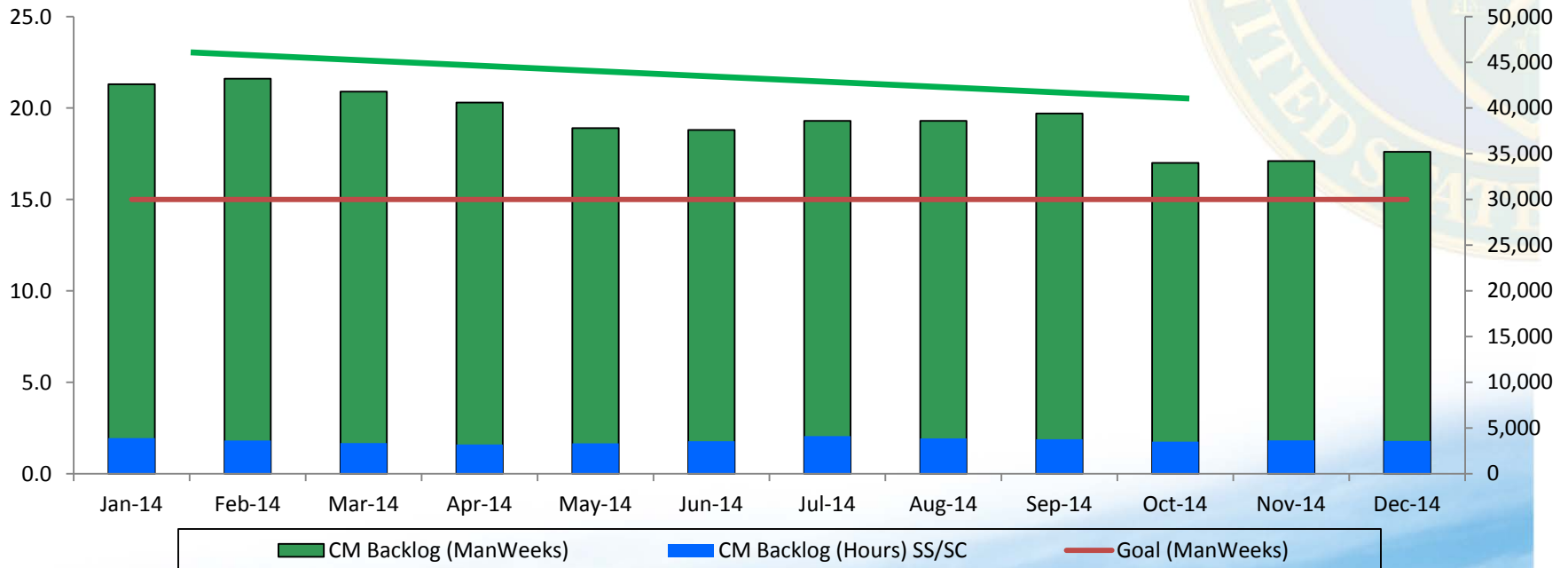


# Lean Results: *Backlog Reduction*

Reduction in Corrective Maintenance Backlog by almost 5 weeks

- Improved efficiencies in planning and execution
- Additional field execution resources
- SS/SC CM Backlog (Hours) maintained low

## Open Corrective Maintenance Work for SRR Crew Facilities



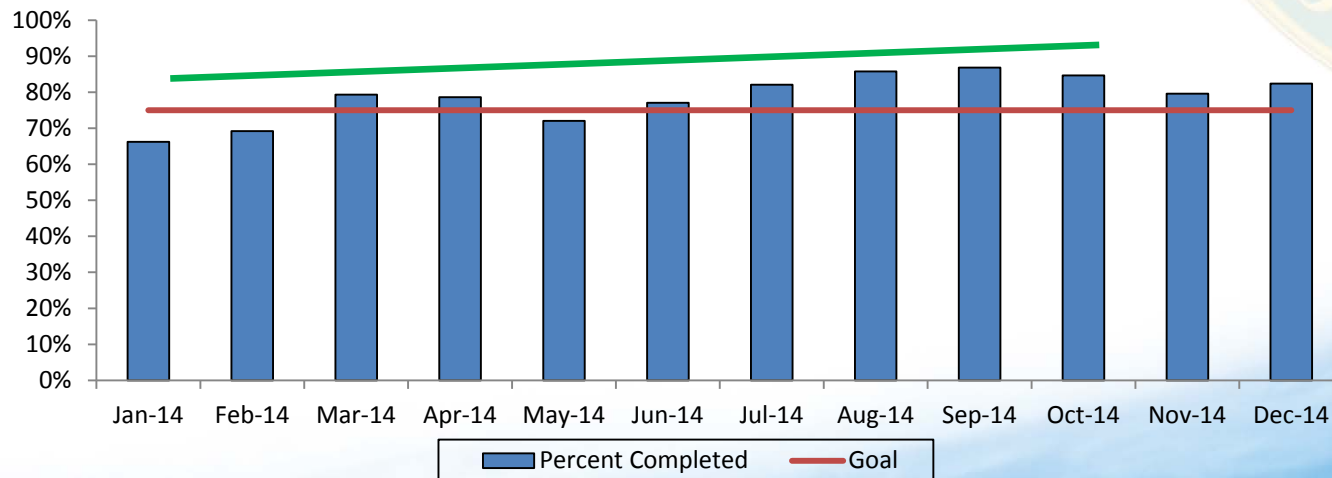


# Lean Results: *Improved Effectiveness*

Approximately 10% increase in schedule effectiveness (tasks completed as scheduled)

- Simplified work construction
- “Locking in” planned work two weeks before planned execution
- Visual Management tool

SRR Work Window Schedule Performance  
Scheduled Task Completed







## SRS Aligning Mission Needs and Aging Infrastructure

- Single integrated System Plan aligning stakeholder goals and values with project execution.
- Nuclear Safety Culture always nurtured; safety systems are maintained, monitored, and visible to senior management.
- Planning process recognizing and prioritizing infrastructure material condition with “to go” closure mission.
- Investing ~11% of overall budget in infrastructure risk mitigation (industry average 4-5%)

While these core attributes are yielding expected and predictable performance for the Liquid Waste mission, aging infrastructure will continue to present mission challenges and will continue to require investment and close management attention.