



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

Saltstone Disposal Units

Carl Lanigan

Federal Project Director
DOE-Savannah River

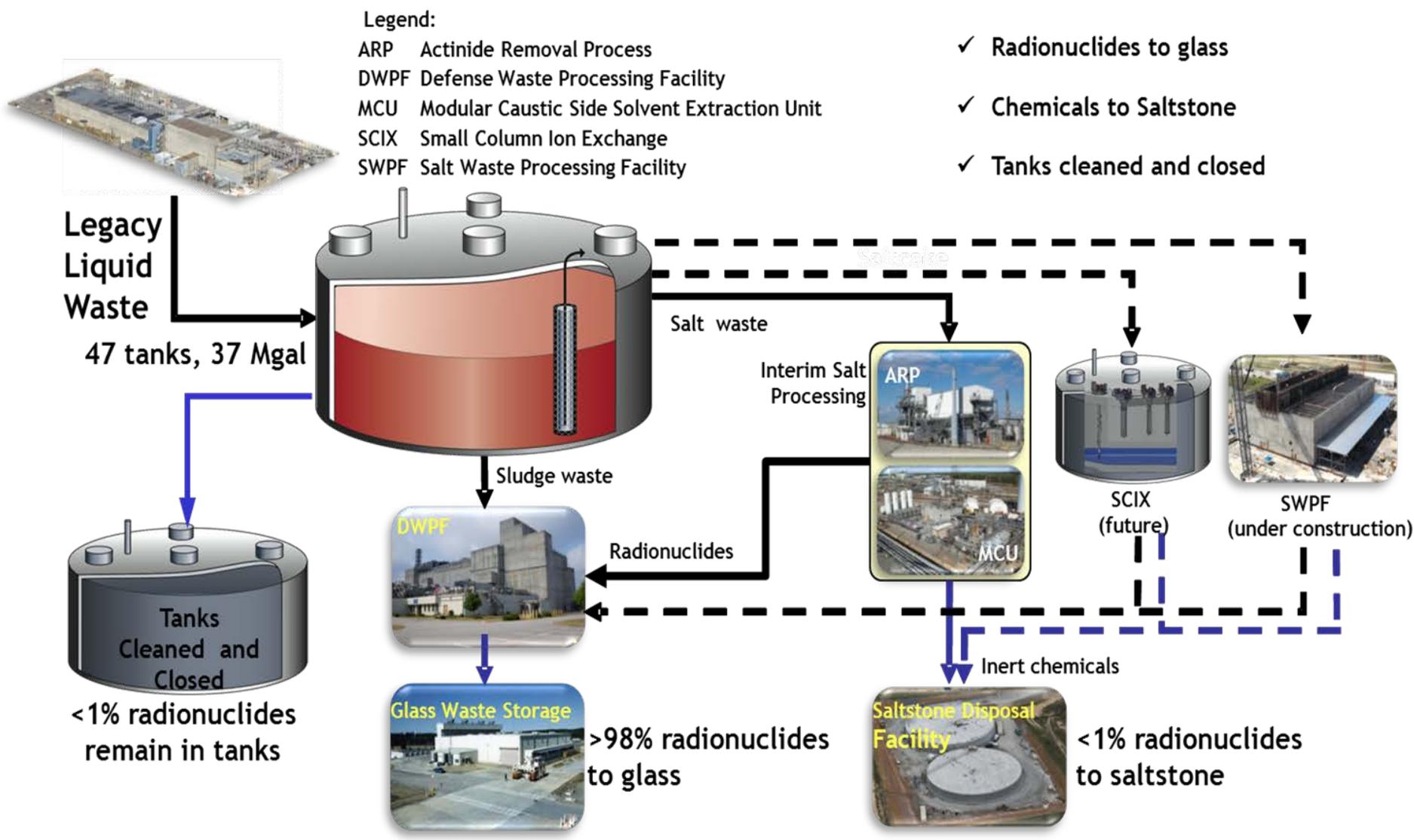
Citizens Advisory Board
November 18, 2013

To satisfy Waste Management Committee Work Plan by:

- Providing a description of the Saltstone Disposal Units (SDUs)
- Providing an update on SDU status

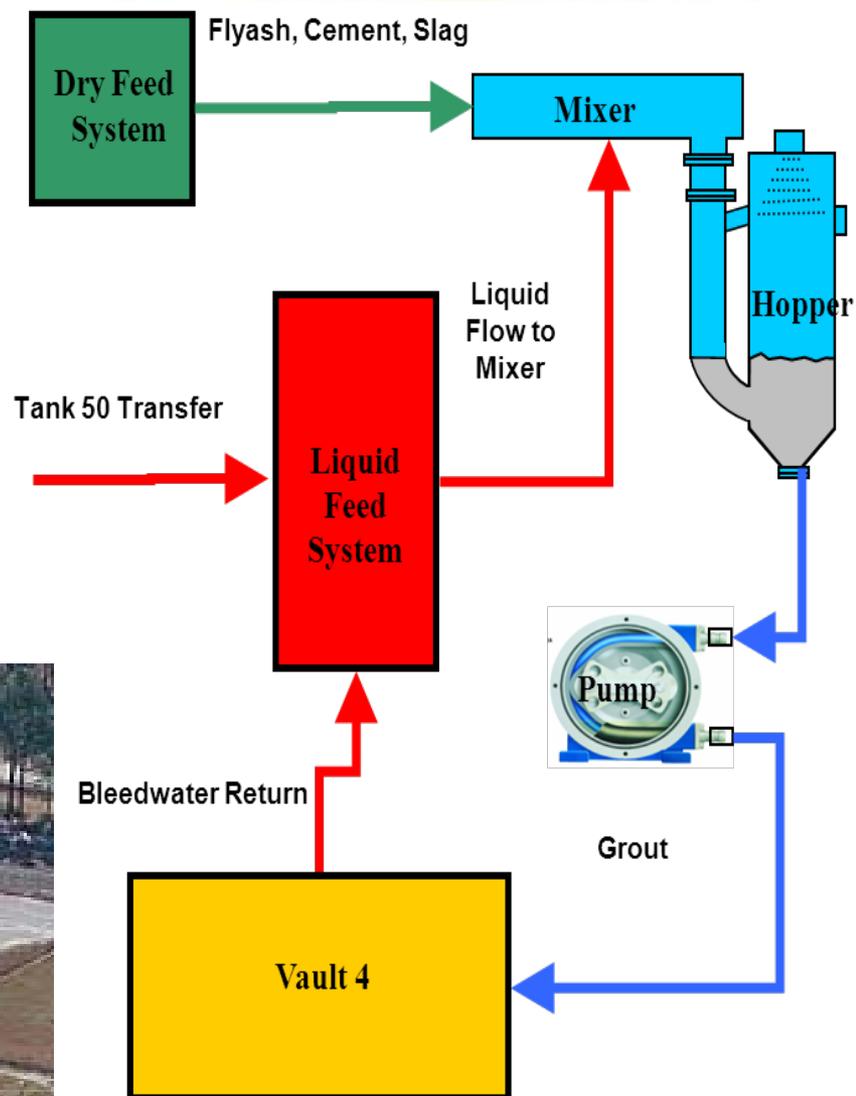
- AE Acquisition Executive
- AWWA American Water Works Association
- BOP Balance of Plant
- DOE [U.S.] Department of Energy
- DSS Decontaminated Salt Solution
- FPD Federal Project Director
- LLW Low-level Waste
- LW Liquid Waste
- PA Performance Assessment
- SCDHEC South Carolina Department of Health and Environmental Control
- SDU Saltstone Disposal Unit
- SRR Savannah River Remediation
- SRS Savannah River Site
- SWPF Salt Waste Processing Facility
- VES Value Engineering Study

DOE-SR Liquid Waste System



Saltstone Production Facility (SPF)

- SPF takes decontaminated salt solution from either the Actinide Removal Process / Modular Caustic Unit or Salt Waste Processing Facility, combines it with a cement mixture to create a grout that, when set, becomes a stable waste form for permanent disposal of this low level waste



Background

- Ninety nine percent of treated tank farm waste will be in the form of low level salt waste
 - The disposition of this low level waste is fundamental to emptying liquid waste tanks at the Savannah River Site

Mission

- To construct SDUs on time and with sufficient capacity to continue uninterrupted treatment and disposal of low level salt waste

Evolution of the SDU Design: Rectangular Vaults

- Vault 1 and Vault 4 are a rectangular reinforced cast in place concrete structures constructed between 1986 and 1988
- Vault 1 is 600 ft. long, 100 ft. wide and 27 ft. high with six 100X100 ft. cells
- Vault 2 is of similar design with roughly twice the capacity but includes a drainage system to return flush water back to SPF



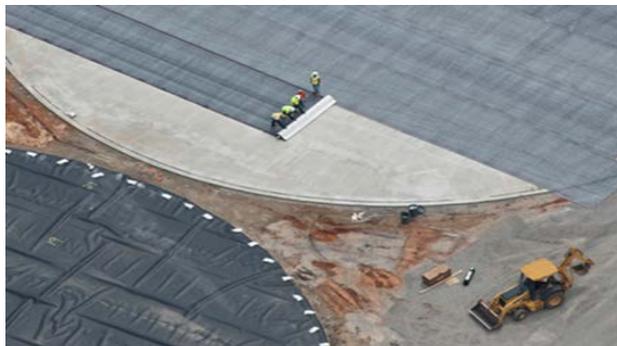
- DOE conducted studies in early 2000 to enhance safety and evaluate strategies to reduce the cost and complexity of its waste disposal operations
- These studies concluded that commercial drinking/waste water storage tanks could be adapted for saltstone disposition
 - Successful track record
 - Designed to withstand large hydrostatic pressures



Evolution of the SDU Design: Circular Tanks

SDUs 2, 3, & 5 are pairs of cylindrical disposal cells, 150 ft. in diameter, 22 ft. high with a capacity of 2.9 million gallons

- Water tight
- Geo-synthetic clay liner
- Exterior HDPE liner
- Leak detection system on SDU 3A
- Grout level markers
- Drainwater collection



Evolution of the SDU Design: "Mega" Tank

A 2011 study determined that economies of scale could be achieved if a significantly larger, or 'Mega' disposal cell (30 million gallons) were constructed

'Old' Concept: 72 disposal cells

New Concept: 7 'Mega' Cells



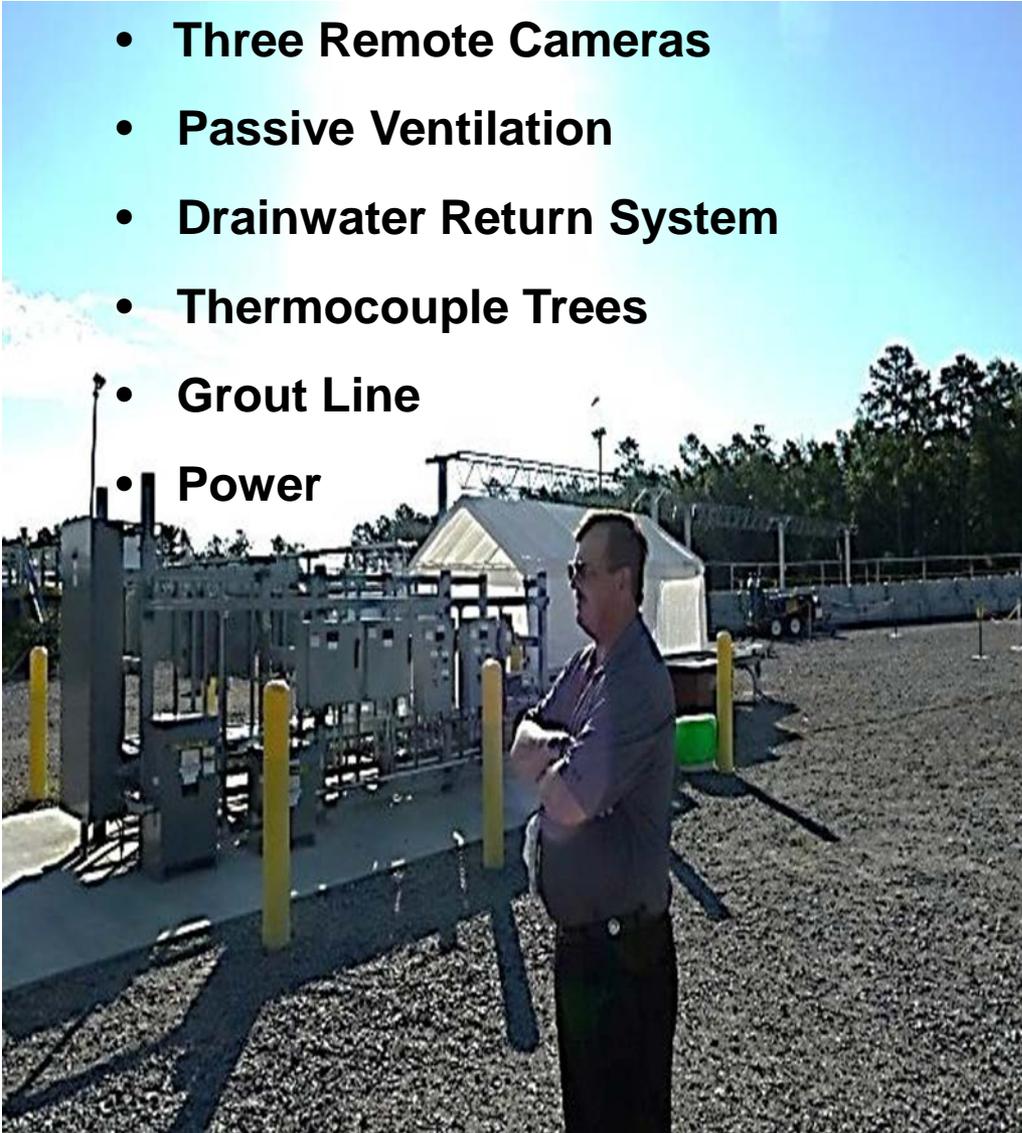
Projected Lifecycle Savings ~ \$300M

Evolution of the SDU Design: SDU 6

- SDU 6 will be 375 ft. in diameter and 43 ft. high with a capacity of 30 million gallons based upon the Syracuse, NY Westcott Reservoir design
- This is a robust reinforced concrete design using both vertical and horizontal post tensioning for added strength and durability



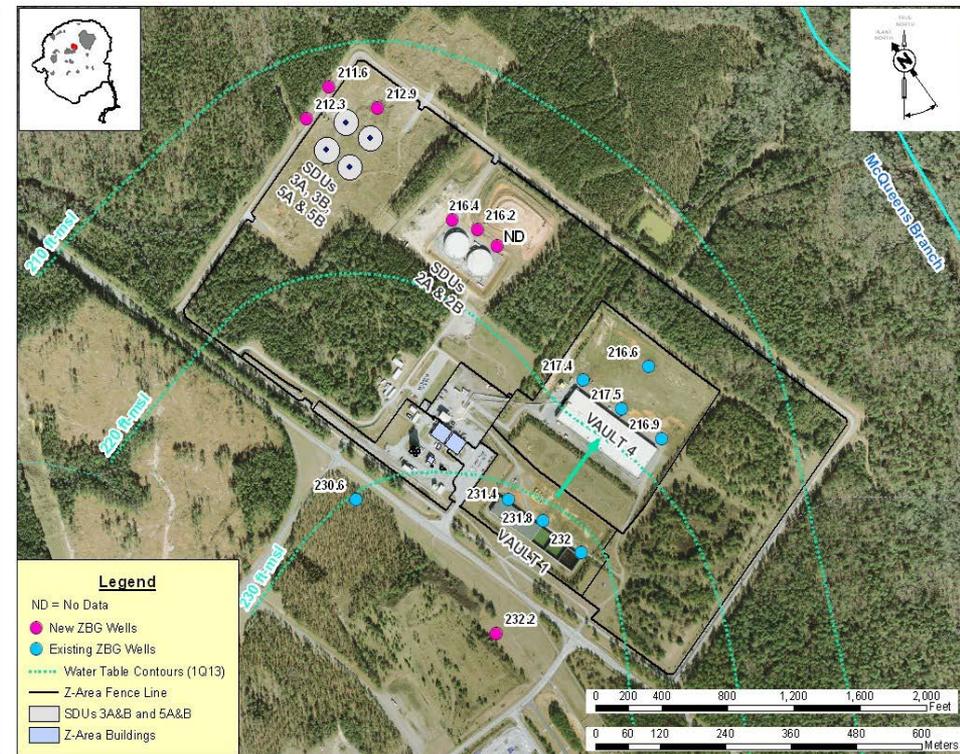
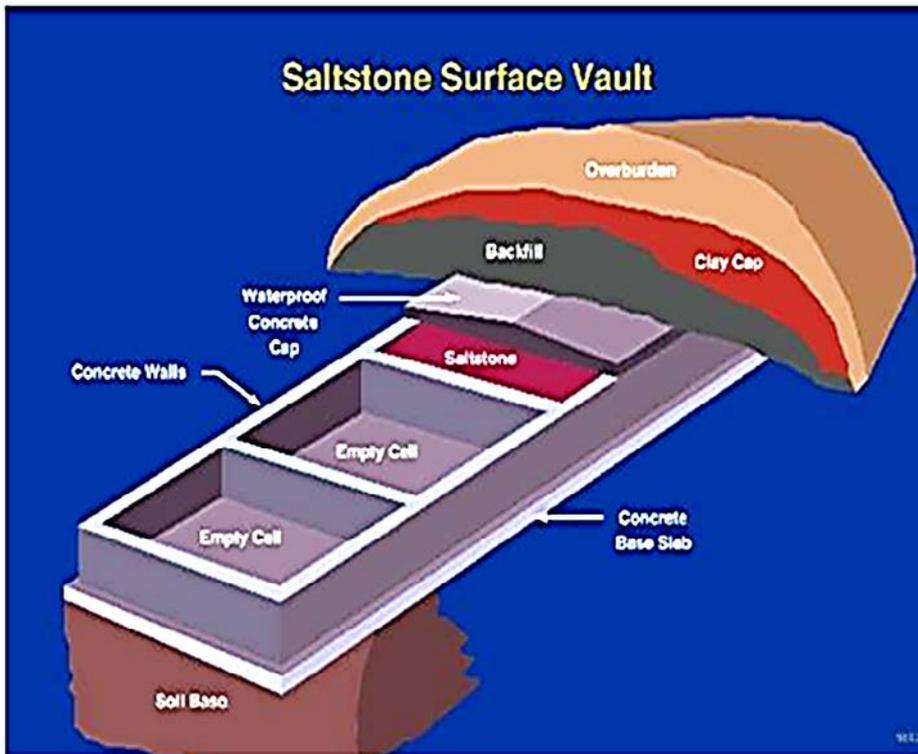
- Three Remote Cameras
- Passive Ventilation
- Drainwater Return System
- Thermocouple Trees
- Grout Line
- Power



- Vault 1 - Three cells filled with saltstone and capped with a 6 in. clean concrete cap
- Vault 4 - Cells are in various stages of fill and capping based upon operational necessity
- SDU 2 - Almost full
- SDU 3&5 - Ready for operation
- SDU 6 - Disposal cell construction has commenced



- When all liquid waste has been treated and saltstone operations have completed, all disposal cells will be covered with a final closure cap to prevent water intrusion
- Ground water monitoring wells have been established to detect contamination with additional wells planned as more SDUs are built



- The Saltstone Disposal Facility (SDF) is the final disposal location for decontaminated salt solution fixed in a saltstone grout matrix
- The SDUs have gone through many design evolutions to provide the safest containment structure with the most cost benefit to the tax payer
- The SDF has been operating since the early nineties with additional disposal cells under construction to assure uninterrupted disposition saltstone grout.
- Once all salt waste is treated, a final closure cap will cover the SDF with ground water wells used to monitor its performance post active operations

