# Photo of the Week

## #641: Party by the Lake

There is nothing like a refreshing swim on a hot day with food, family, and wait a minute…

Today's risk management quiz: How long did it take for this fun filled group see what else was floating in the water?

# Saltstone Disposal Units

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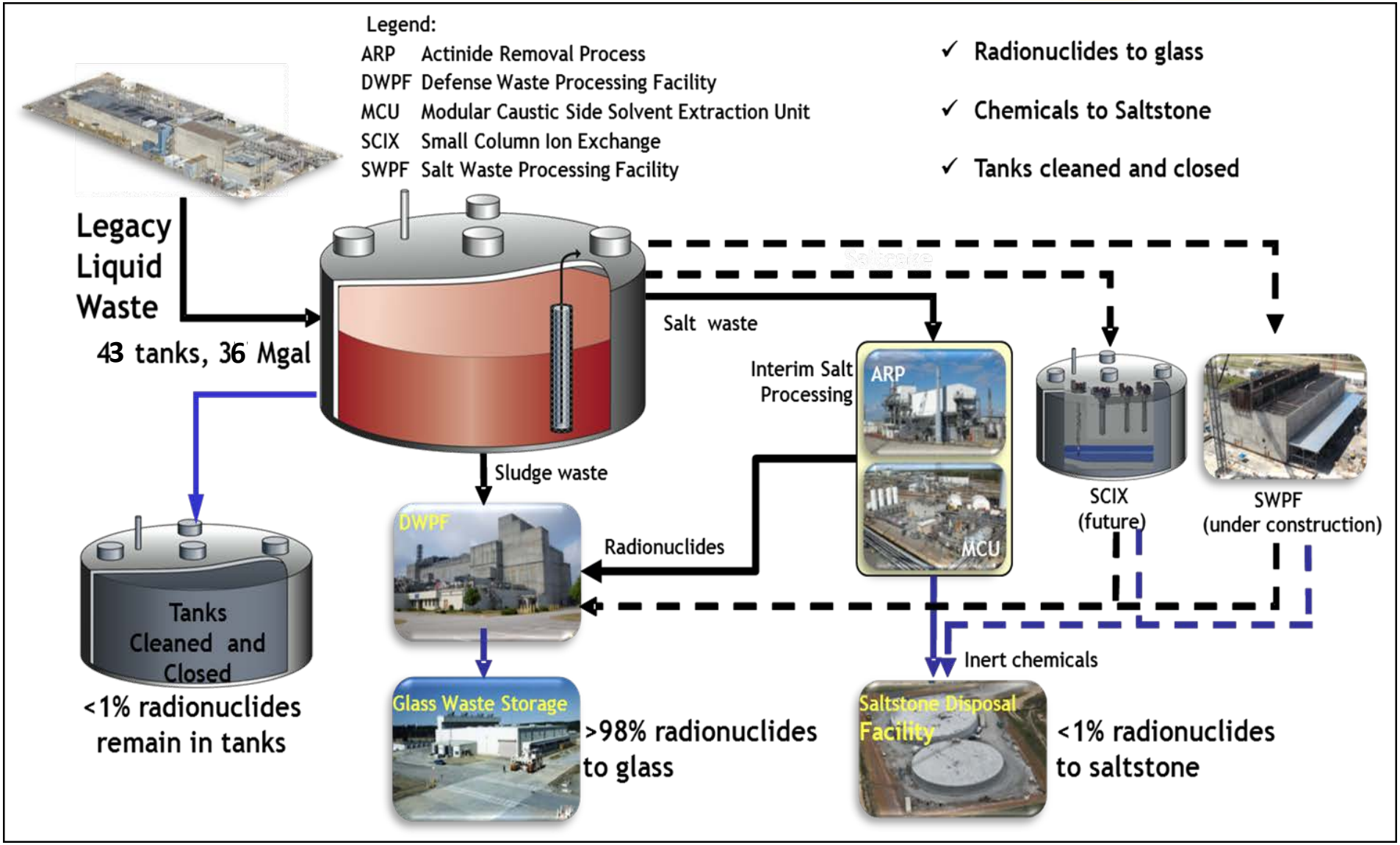
**Industry Day**

**January 27, 2016**

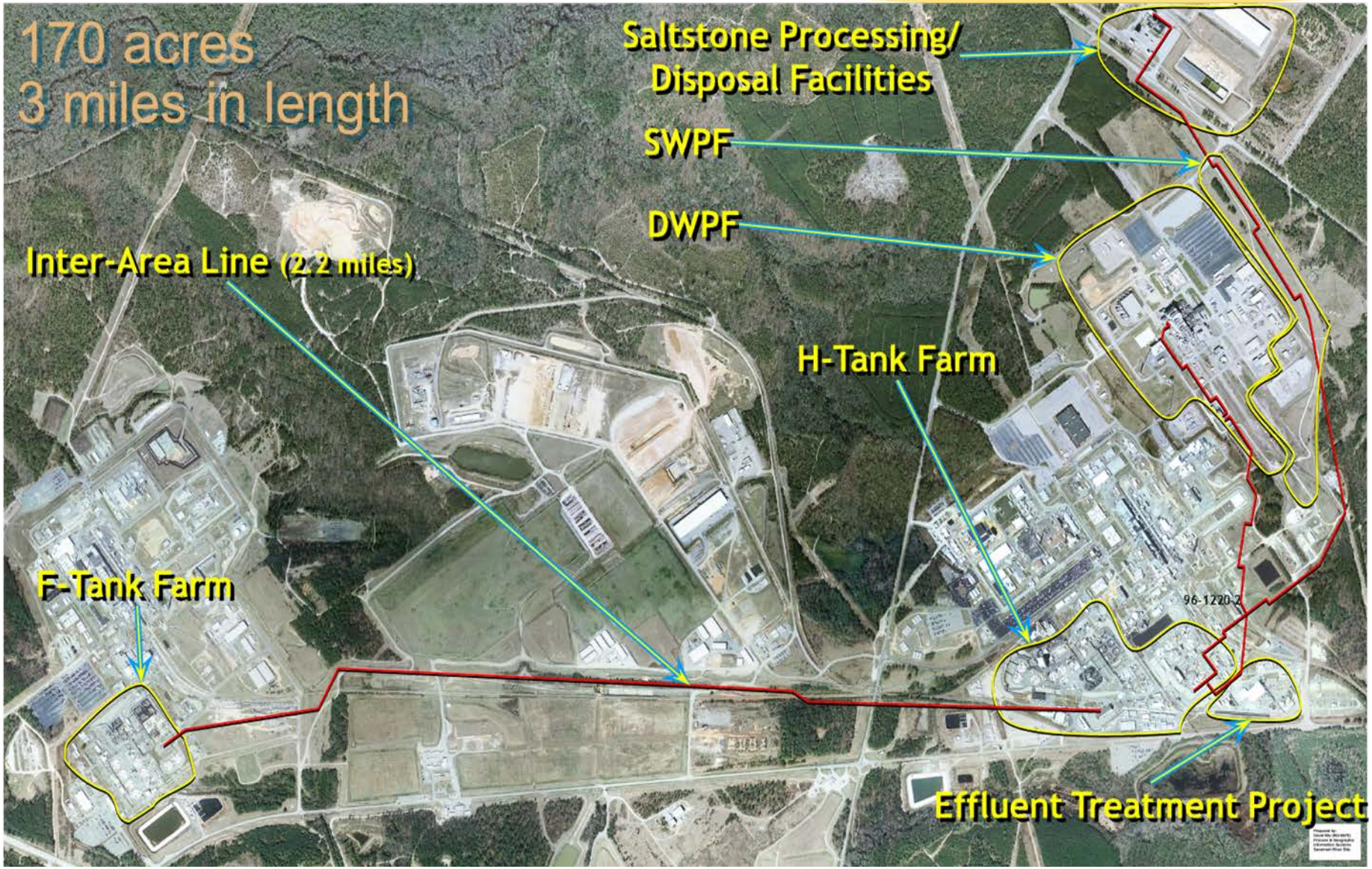
# Purpose

- DOE-SR has begun the planning process to acquire additional disposal capacity for low activity nuclear waste in the form of Saltstone
- As SR's liquid waste mission progresses, there is always potential that new ideas and methods for Saltstone disposition may arise
- This Request for Information (RFI) is meant to support the Departments goal of identifying the optimal system, structure or component to safely contain and disposition Saltstone

# DOE-SR Liquid Waste System

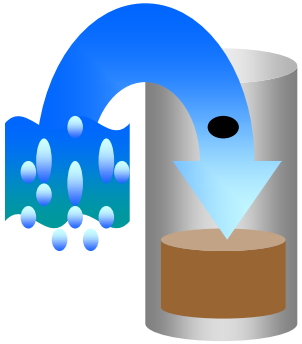


# Radioactive Liquid Waste Facilities



# Salt Waste Treatment

## Removing Salt Waste from Tanks



Water and Liquid Waste

## Salt Waste Processing

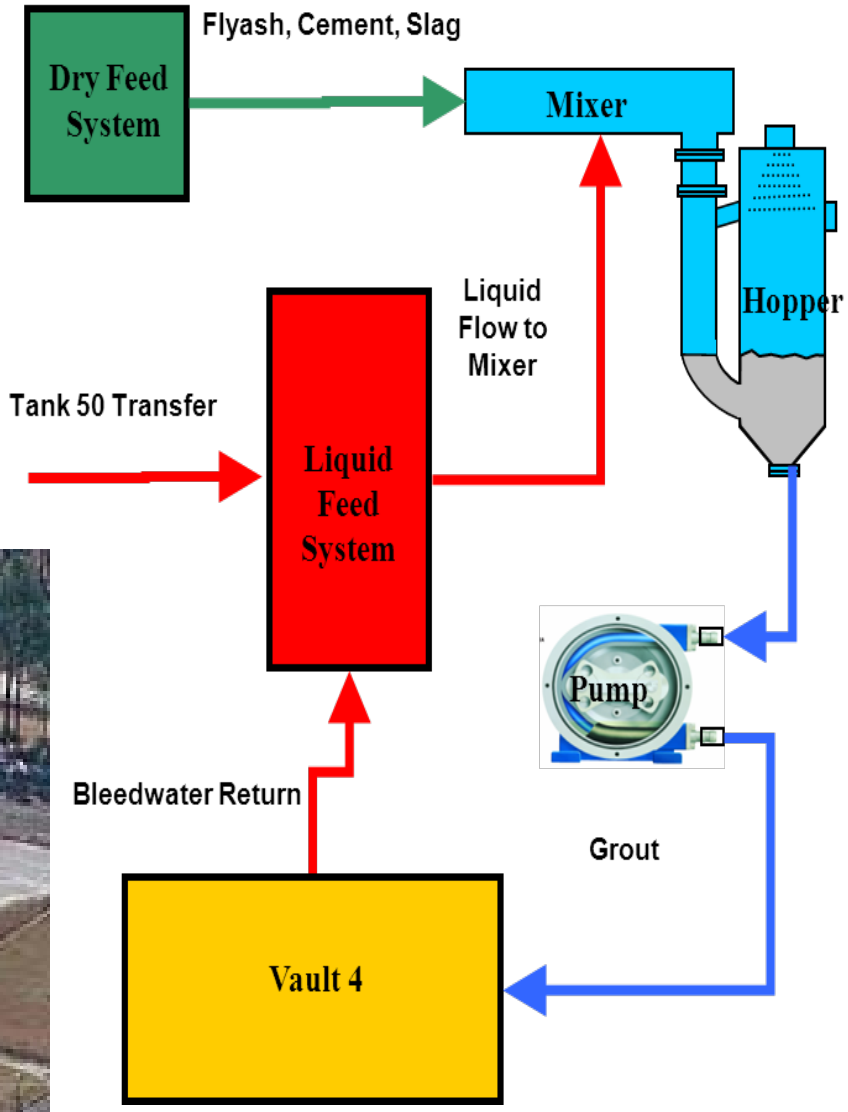
- ARP/MCU
- SWPF (Future)

## Saltstone Facility

Over 99% of the volume is sent to Saltstone for disposal in concrete vaults

# Saltstone Production Facility

- Saltstone Production Facility (SPF)
  - SPF takes decontaminated salt solution from either the ARP / MCU Unit or SWPF, 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 and Mission

- Background
  - The disposition of this low level waste is fundamental to emptying liquid waste tanks at the Savannah River Site (SRS)
- Mission
  - ***To construct Saltstone Disposal Units (SDUs) on time and with sufficient capacity to continue uninterrupted treatment and disposal of low level salt waste***
  - It is anticipated that an additional 200Mgal of Saltstone will have to be dispositioned before SRS completes its LW disposal mission.

# 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

# Evolution of the SDU Design: Circular Tanks

- 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

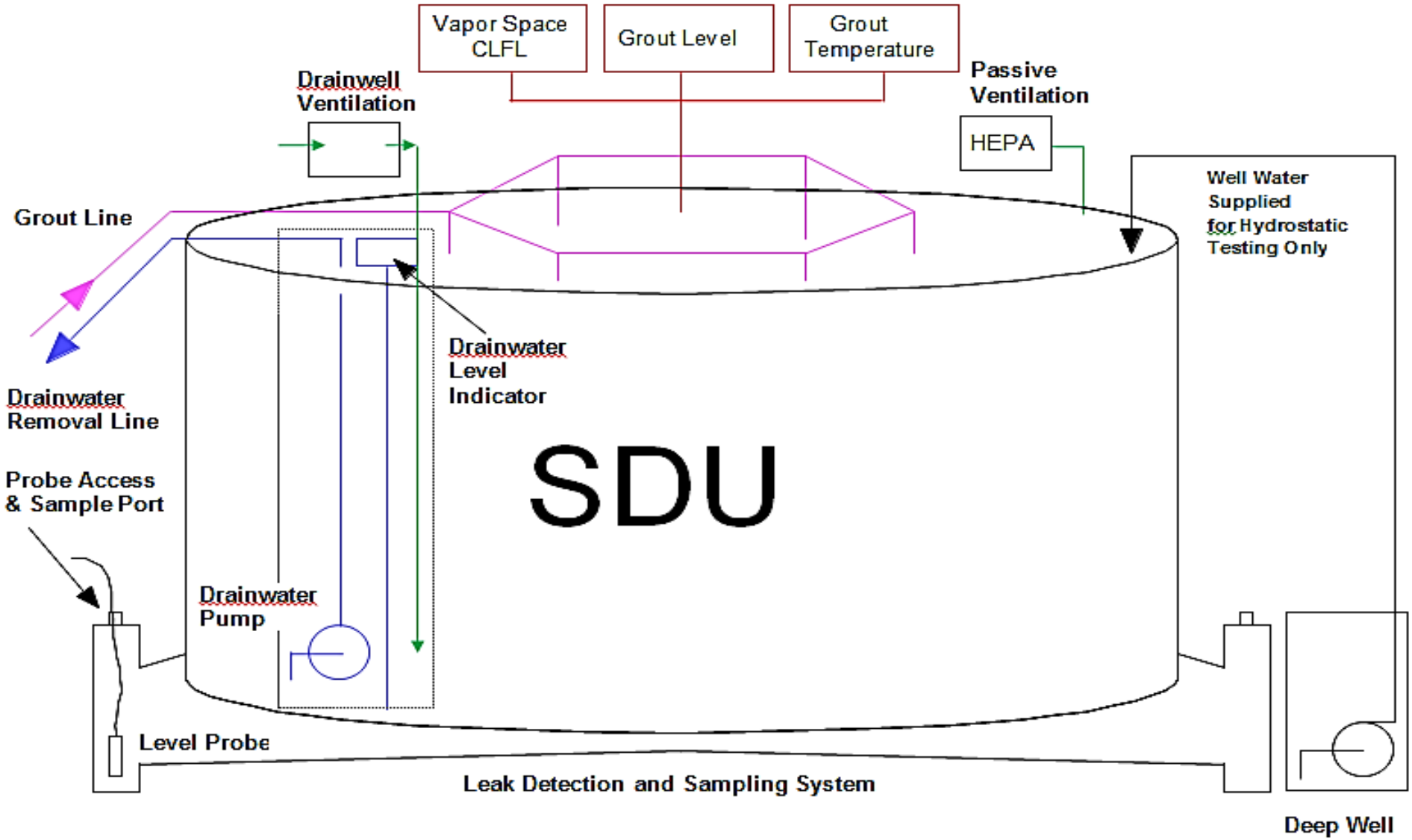
# Evolution of the SDU Design: "Mega" Tank

- 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

# Balance of Plant

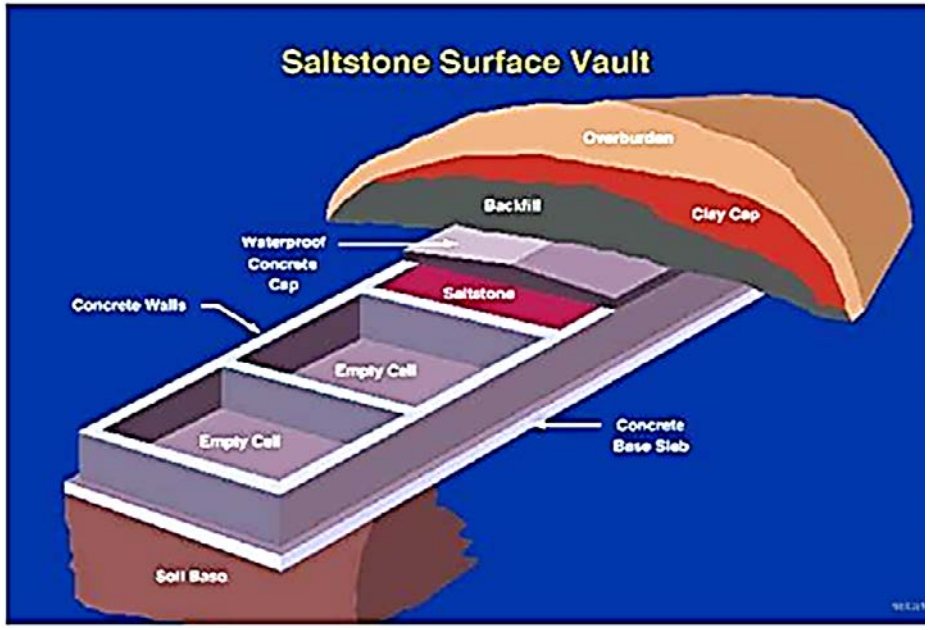


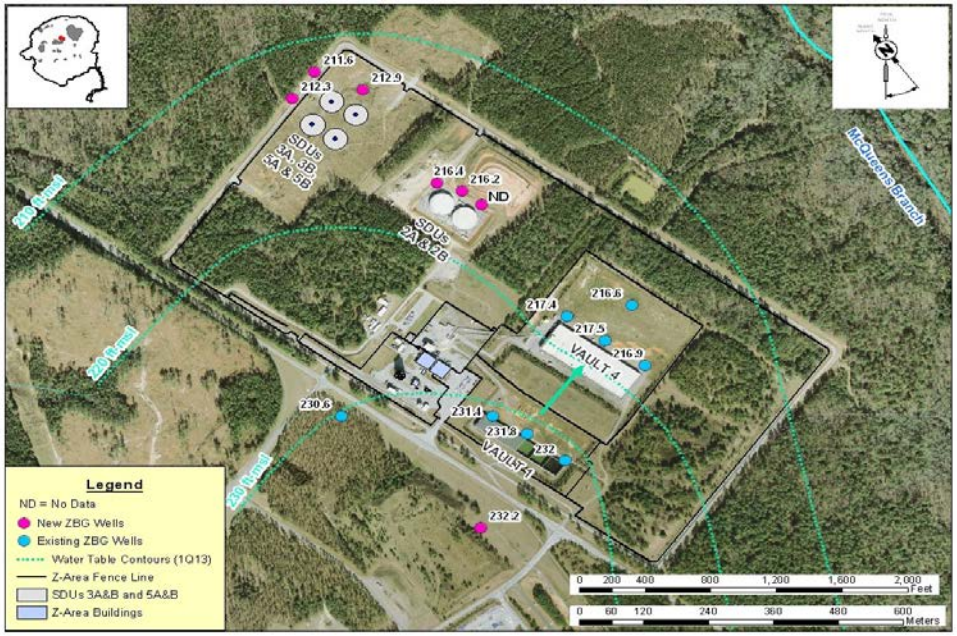
# Current Status

- Vault 1 & Vault 4 – Not in service
- SDU 2 - Full
- SDU 3&5 – In operation
- SDU 6 – 80% complete

# Final Closure

- A two foot thick 'clean cap' of grout is placed on top of the Saltstone matrix before the SDU is operationally closed
- 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
  - ***If water can't get in, radionuclides can't get out!***
- Ground water wells are used for long term performance monitoring



# Information Sought

- The RFI identified the basic requirements that must be addressed for future SDUs
- These requirements represent the following objectives for dispositioning Saltstone
  - No water gets in or out during operational period (25 years)
    - SDU considered secondary containment of Saltstone
    - Scientific studies have shown that concrete / cement structures do well over the long Saltstone compliance period (i.e., 1,000 years)
  - SDU must be fully operational with sufficient capacity and schedule margin before the preceding SDU is filled with Saltstone (anticipated to be mid fiscal year 2020)
    - Without on timely disposal capacity, the liquid waste program shuts down
  - Best value for the tax payer

# Information Sought

- Recommended Structure, System or Component(s) to contain and disposition Saltstone which includes
  - Rough order magnitude estimate of cost for the next disposal cell(s)
    - Includes design, site preparation, construction and acceptance testing
  - Time frame
- Optimal disposal cell volume
- Recommended strategy for the life-cycle containment of Saltstone (~200 Million gallons)
- Other recommendations