



U.S. DEPARTMENT OF  
**ENERGY**



# Tank Closure Cesium Removal (TCCR) Technology Demonstration Update

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*Status Update*

*November 14, 2017*

# Tank Closure Cesium Removal

## Objectives

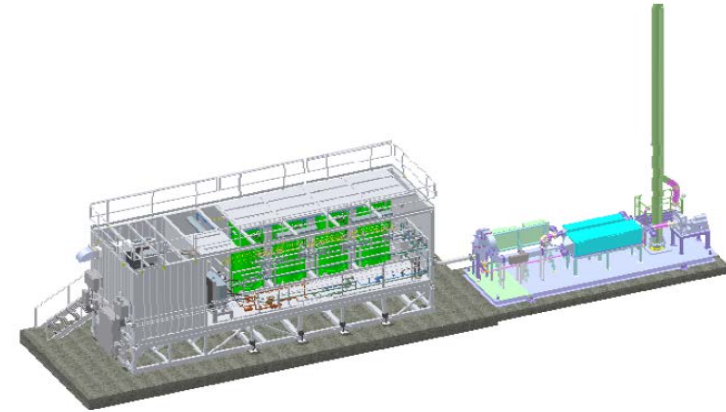
- Design a modular, at-tank, ion exchange (IX) technology demonstration designed that can:
  - *Treat salt waste by removing cesium*
  - *Increase salt processing capability*
  - *Enhance bulk waste removal efforts*
  - *Be operated by Site staff once complete*
- Leverage commercial supplier expertise and contemporary Fukushima experience
- Improve flexibility by exploring alternatives for off-site disposition of used resin
- Address the Dispute Resolution Agreement with the State of South Carolina, dated October 31, 2016
- Achieve completion of Tank 10 Bulk Waste Removal Efforts under the Federal Facility Agreement



Shielded Ion Exchange Column  
(Dimensions 12'x5.5' Shielded)

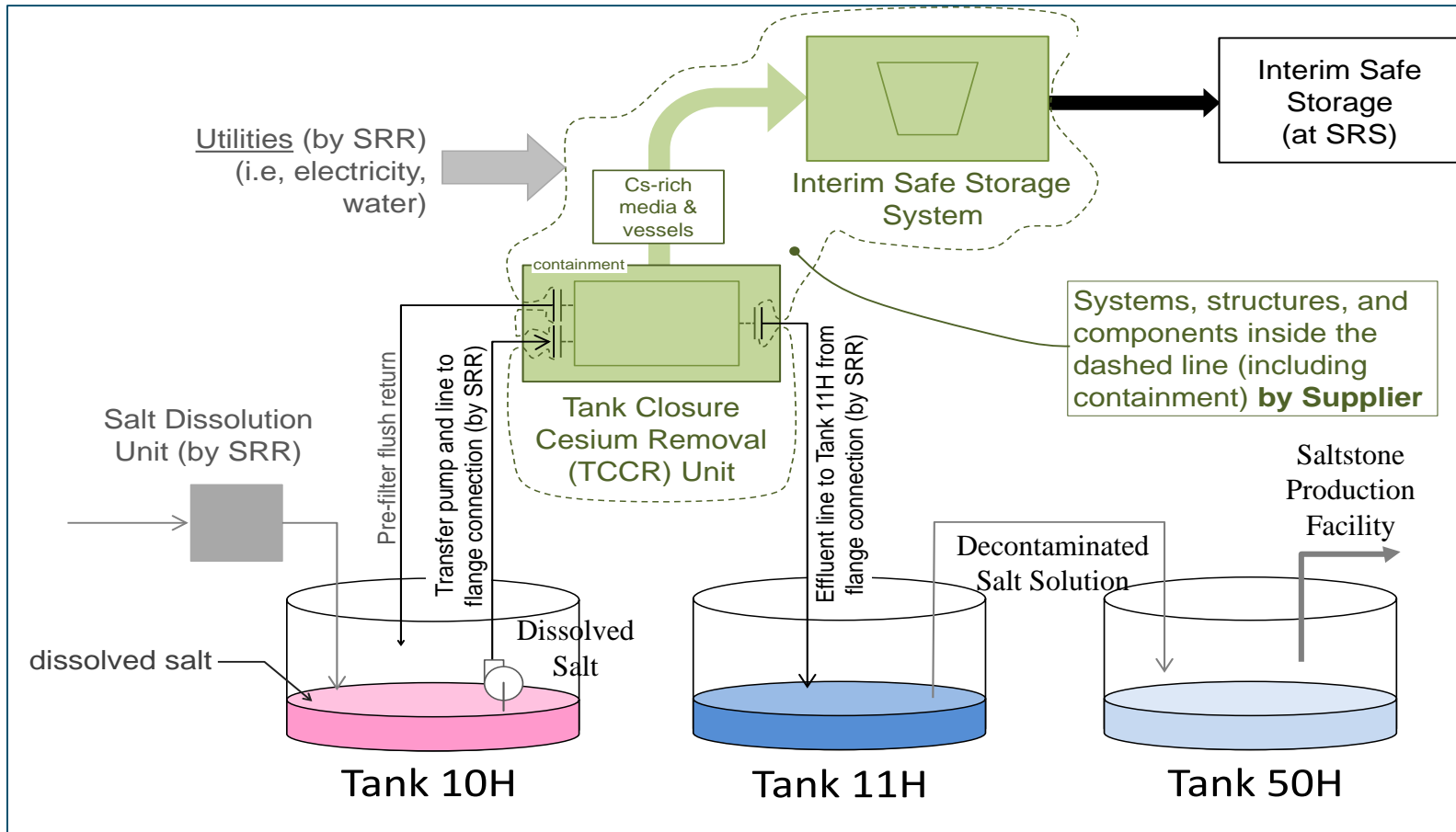
# Technology Demonstration

- Demonstration planned for May – Aug 2018.
- Will treat approx 750 kgal (~0.16 Ci/gal) from Tank 10.
- Each IX Column will be loaded with approx 25k Curies.
- **Will demonstrate a decontamination factor  $\geq 1000$ .**
- Gather actual processing data during treatment:
  - Effectiveness of pre-filtration
  - Variations in processing rate
  - Measurement of real rad rates
  - Optimize feed control strategy
- Evaluate technical feasibility and economic efficiency report by September 30, 2019 for continued operations and additional TCCR.
  - Decontamination Factor
  - Worker and public safety, Compliance with applicable regulations
  - Ability to result in beneficial (accelerated) liquid waste disposition



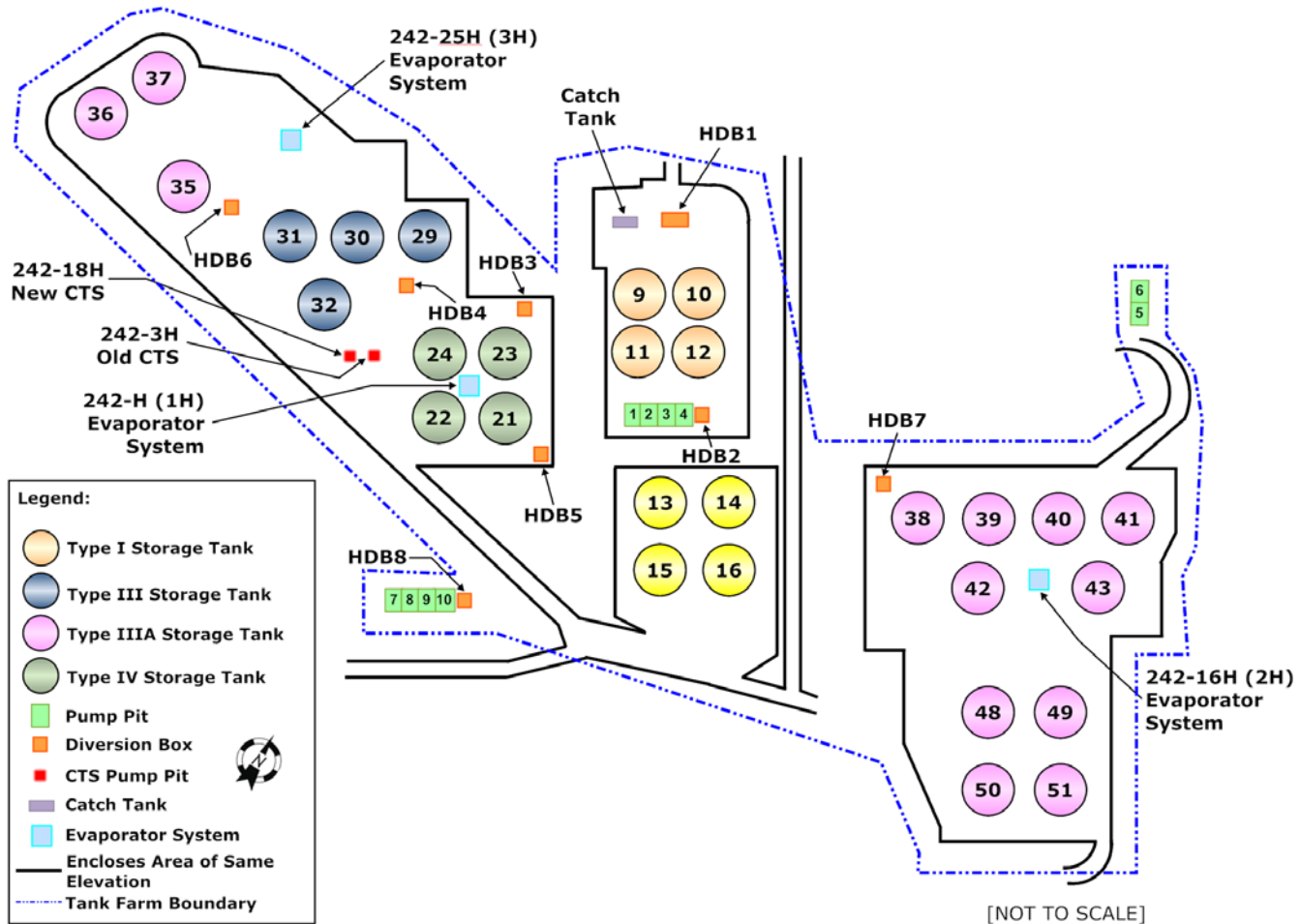
TCCR Module Enclosure Assembly  
(Enclosure Dimensions 40'x10')

# TCCR Unit 1: Conceptual Process Diagram



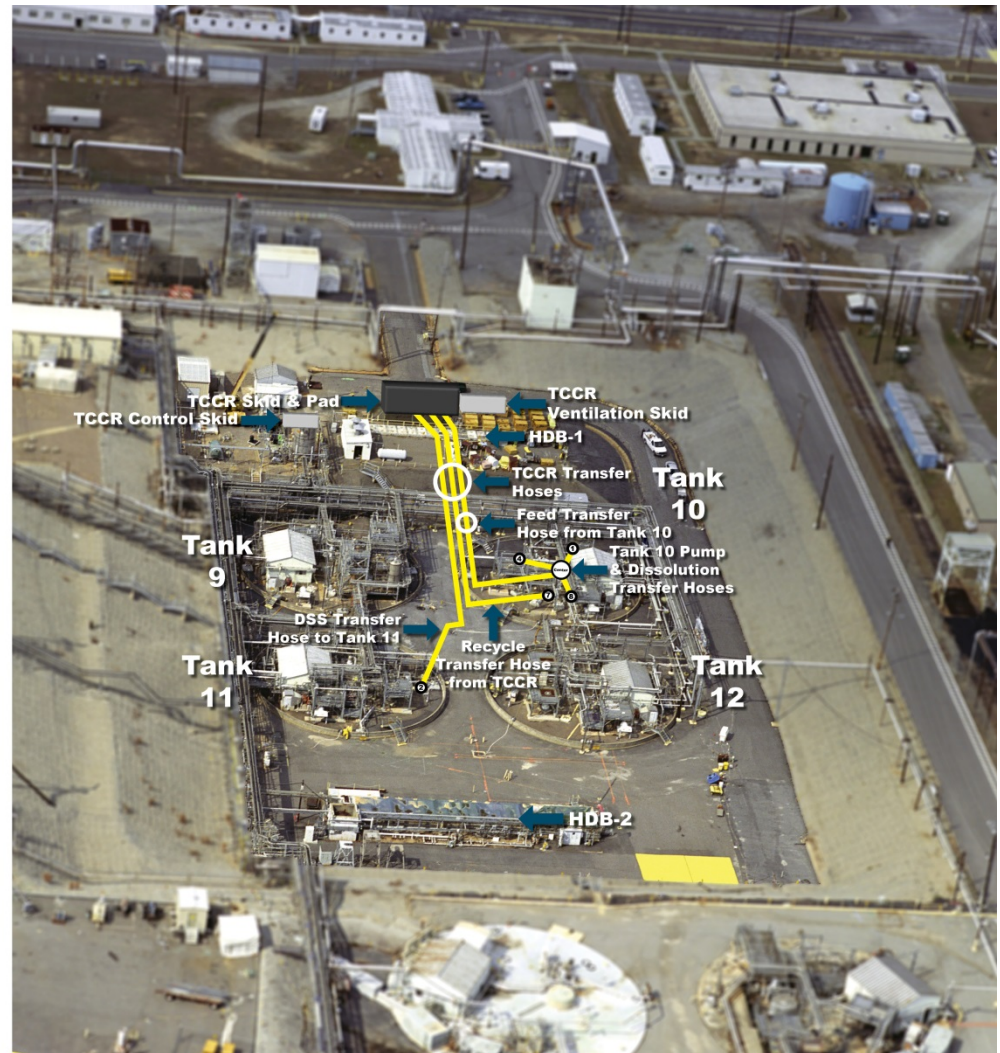
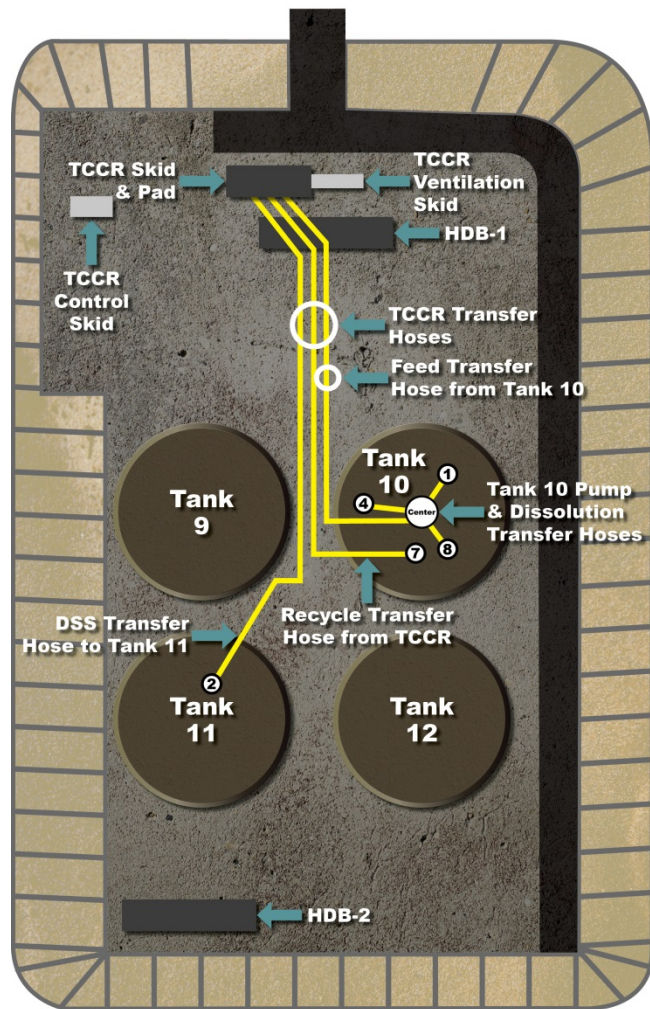
TCCR Concept – Tank 10 Demonstration Operations Diagram

# SRS - H-Area Tank Farm Layout



CTS – Concentrate Transfer System

# H-Area Tank Farm TCCR Unit 1 Layout



# Tank Closure Cesium Removal Status

- **Project Status**

- A design/build contract to Westinghouse Electric Company was awarded in July 2016
- TCCR unit fabrication is complete
  - *Process Skid*
  - *Ventilation Skid*
  - *Control Skid*
- System assembly is complete
- System testing is in progress
- Delivery of TCCR Unit to SRS is expected in late November
- SRR Balance of Plant (BOP)/utility activities are ongoing
- Safety Basis development is in progress
- Regulatory approvals progressing
  - *Received DOE-HQ concurrence for post-SWPF operations on August 10, 2017*
  - *Transmitted letter to SCDHEC to add TCCR stream to Saltstone disposal permit*
  - *Construction permit approved by SCDHEC on October 31, 2017*
  - *Feasibility study to follow demonstration (due September 30, 2019)*



TCCR Equipment Fabrication Photos  
(Above)



SRR TCCR Preparation Photos  
(Above)

SWPF – Salt Waste Processing Facility    SCDHEC – South Carolina Dept. of Health & Environmental Control

# TCCR Equipment Modular Units





# IX Columns and Shield Assemblies



IX Columns and Shield Assemblies

# TCCR Benefits/Opportunities

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- Increase salt throughput and accelerate waste removal from old style tanks.
- Enable salt waste treatment when SWPF is down.
- Demonstrates deployment of modularized, targeted treatment capability.
- Large-scale radioactive test bed to demonstrate related technologies (e.g., elutable resins).
- Capability to treat unfavorable waste streams anticipated at the end of the program, in lieu of SWPF.
  - Could eliminate DWPF recycle returns to the Tank Farm.
- **Applicability to other DOE complex sites.**
  - Interest from Low Activity Waste- Pre-treatment at Hanford