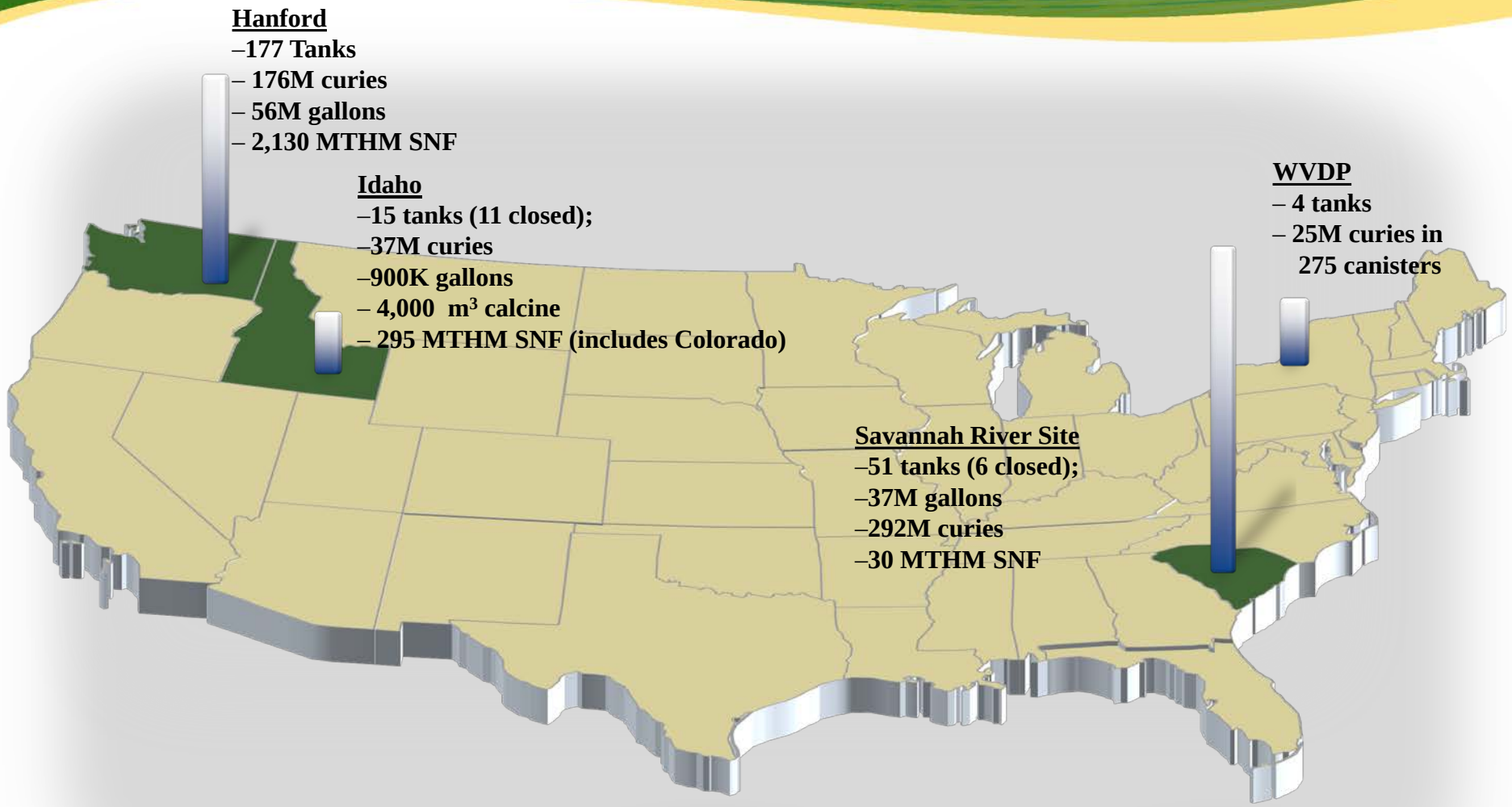
U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

# Waste Management 2015
# Hot Topics Panel

**Ken Picha**
*Deputy Assistant Secretary for Tank Waste and Nuclear Material*
Office of Environmental Management

**March 16, 2015**

# Tank Waste and Nuclear Materials Challenges




- Aging infrastructure (Some tanks and facilities built in 1940's and 1950's)
- Nuclear materials is multiple DOE organization mission - Office of Science, Nuclear Energy, National Nuclear Security Administration

# FY 2014 Tank Waste Accomplishments

## Progress Continues at the Hanford Tank Farms

- Deployed first-of-a-kind robotic crawler in AY-102 to confirm no release to the environment.
- 242-A Evaporator completed six week campaign that created 790,000 gallons of DST space.

## Construction of the Salt Waste Processing Facility making progress

- Target date for completing construction is Dec 2016
- Construction is ahead of target schedule
- Efforts to support facility testing and commissioning are ramping up

## Integrated Waste Treatment Unit at Idaho

- Introduced and processed over 60,000 gallons of simulant

# FY 2014 Tanks Waste Accomplishments (Cont'd)

## At the Savannah River Site:

- In FY 2014 more than 500,000 gallons of salt waste processed thru the Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MDU) (5 million gallons since 2008)
- Implementation of the "Next Generation Solvent" in MCU has dramatically increased cesium decontamination factor (DF >40,000). This results in lower amounts of cesium in the saltstone stream.
- More than 38,000 gallons transferred from the Modular Caustic Side Solvent Extraction Unit (MCU) to the DWPF.
- 126 canisters of HLW produced at DWPF

*Defense Waste Processing Facility – Savannah River Site*

*Defense Waste Processing Facility HLW Glass Canisters*

# Saltstone Disposal Unit No. 6


- The mission of the Saltstone Disposal Units (SDUs) is to provide storage for non-hazardous material (the low-radioactivity grout mixture) for permanent disposal in support of tank closure activities
- Saltstone Disposition Units 6 (SDU 6) is third-generation of SDU, it is new concept in cell design, will have one large tank (Diameter-375’ and height= 45’) ; Total capacity of this tank will be 30 million gallon and potential to save over $300M in life cycle cost.
- SDU 6 project is approximately 42% complete and early forecast completion is 3rd quarter of 2017 and estimate to complete is $99.9M.
- Seven additional SDUs will be needed to handle all the saltstone expected to be produced.

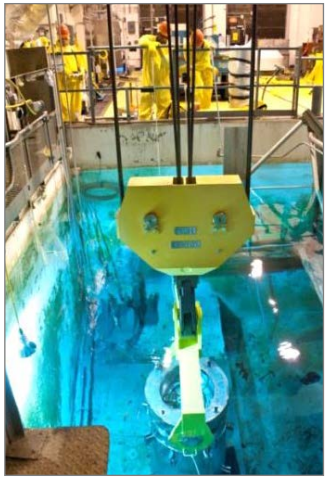
# FY 2014 Nuclear Materials Accomplishments

- Processing SNF at the Savannah River Site (SRS) that Posed a Potential Risk
  - Sodium Reactor Experiment (SRE) spent nuclear fuel (SNF) (reactor operated 1957-1964 at Santa Susana Field Laboratory
  - Metallic-based thorium fuel (reactive when exposed to water)
  - To mitigate a potential safety risk SRE SNF (~2 MTHM) was dissolved in H-Canyon
- Began processing campaigns for Material Test Reactor fuel
- Began plutonium metal to oxide conversion in HB-Line for disposition by NNSA

H-Canyon

# Non-Proliferation and HEU Minimization

L- Basin

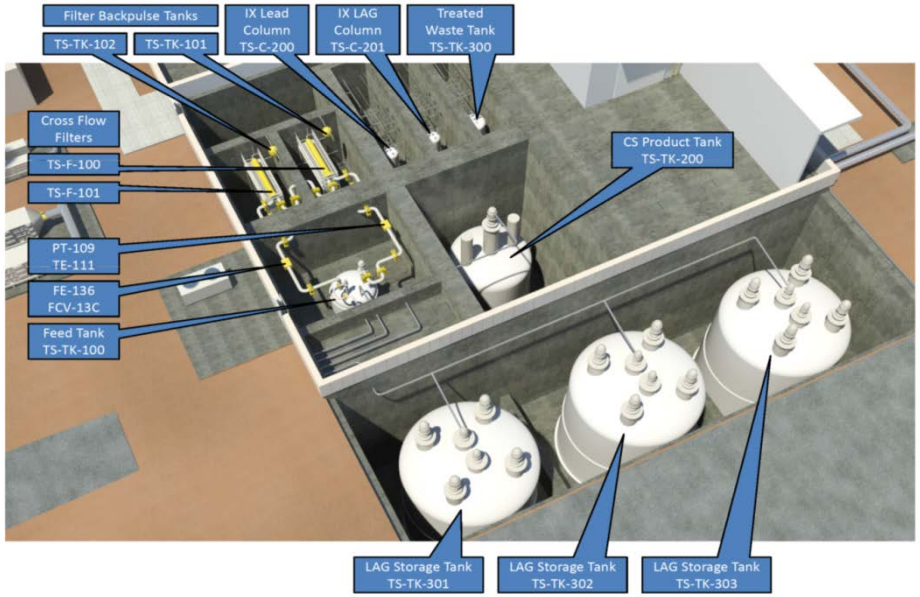


- Received four shipments of domestic research fuel and two shipments of plutonium (Italy and Belgium) at SRS
- EM is conducting a feasibility study to determine the potential acceptance and disposition of graphite pebble bed reactor fuel containing U.S.-origin HEU
- Began design and construction activities to support return of US-origin target material from Canada

SNF Transportation Cask

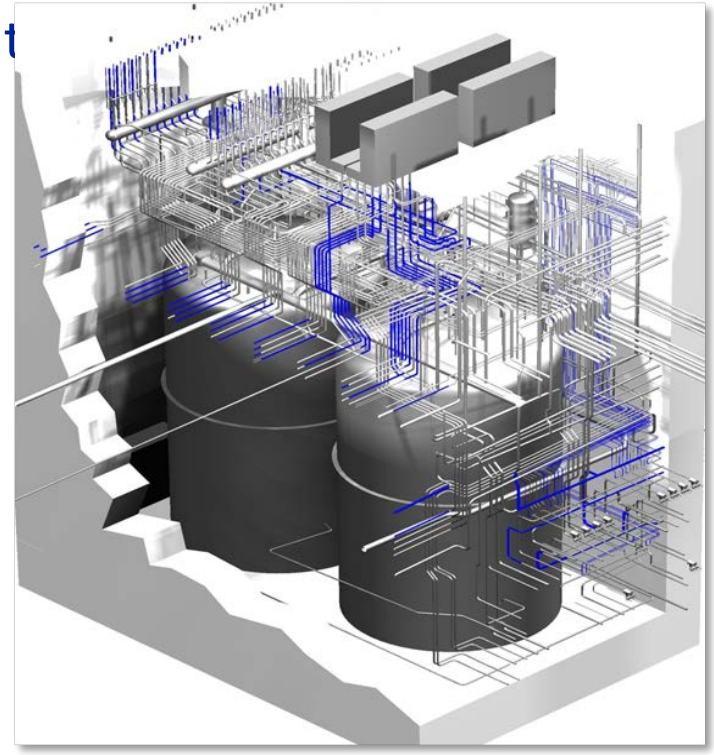
# Hanford Tank Waste Emphasis

- Progress of Direct Feed Low Activity Waste Activities
  - Begin preliminary design of Low Activity Waste Pretreatment System
  - Continue construction of Low Activity Waste Facility and Balance of Facilities
- Tank Farm retrievals (C-Farm, AY-102, A/AX Prep)
- Continue full-scale vessel testing and erosion/corrosion testing for WTP



# Tackling Technical Issues in FY 2015 at Hanford

- Number of technical issues identified on WTP
- PT is most impacted and HLW to a lesser extent
  - Mixing, Criticality, and Hydrogen Generation
  - Erosion/Corrosion
  - In-service inspection (ISI), Vessel Integrity
  - Facility off-gas ventilation
- Approach to resolution varies based on issue
  - Testing – Full Scale Vessel Testing, Erosion/Corrosion
  - Analysis – ISI, Vessel structural integrity, Ventilation
- Standardized design for high-solids vessels
- Tank Farm Vapors



# FY15 Outlook

## *At Idaho:*

- Safely start-up the Integrated Waste Treatment Unit (IWTU) and process 900,000 gallons of sodium bearing waste.

Integrated Waste Treatment Unit

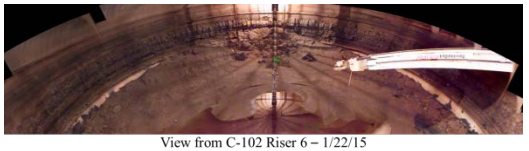
## *At SRS:*

- Establish capability in K-Area to downblend non-MOXable plutonium in preparation for disposition.
- Produce 156 canisters of vitrified HLW at the Defense Waste Processing Facility (DWPF). Will produce the 4,000$^{th}$ canister this summer.
- Continue processing aluminum clad fuel through H-Canyon.
- Continue preparations for receipt of Canadian SNF and HEU target residue materials.
- Continue progress toward closing two more tanks at SRS.

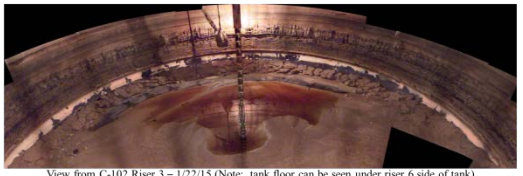
H Canyon

## *At Hanford:*

- Focus on Direct Feed Low Activity Waste.
- Continue C-Farm single-shell retrievals.



View from C-102 Riser 6 – 1/22/15



View from C-102 Riser 3 – 1/22/15 (Note: tank floor can be seen under riser 6 side of tank)

# Continued Emphasis on Projects is Key to Completion of EM Tank Waste Mission

## Hanford: Waste Treatment Plant

- Continue Direct Feed Low Activity Waste Initiative
  - Low Activity Waste Pretreatment System project
  - Modifications to the Low Activity Waste Facility to accept direct feed
  - Effluent Treatment Facility upgrade capital project restart
- Address technical issues at Pretreatment Facility
- Resume engineering and limited construction of High Level Waste Vitrification Facility

- Focus on construction completion
- Continue system turnover from construction to operations
- Commissioning planning and ramp-up
- Maintain integration with Liquid Waste Program

**Savannah River Site: Salt Waste Processing Facility**