

### NAS Continued Analysis of Supplemental Low Activity Waste Treatment

Presented by:

## Kaylin Burnett, Portfolio Coordinator, Department of Energy Office of River Protection July 15, 2021

### **Tank Waste Mission Overview**





#### THE HANFORDSITE





### **Direct-Feed Low-Activity Waste**

Integrated Disposal Facility Accepts containers of vitrified LAW for disposal

10

CESIUM TRANSPORT

Tank-Side Cesium Removal (TSCR) Removes solids and cesium from liquid tank waste to feed the LAW Facility

# DFLAW DIRECT-FEED LOW-ACTIVITY WASTE

Hanford's DFLAW Program integrates a group of individual projects, facilities, and infrastructure upgrades, with involvement from all of Hanford's contractors.

Through DFLAW, the U.S. Department of Energy will retrieve, treat, and immobilize low-activity waste. AP Tank Farm Feeds tank waste to cesium removal system and transfers feed to the LAW Facility Liquid Effluent Retention Facility and Effluent Treatment Facility System providing storage and treatment for a variety of mixed secondary liquid waste

ION EXCHANGE COLUMN STORAGE PAD

storage 1

LIQUID EFFLUENT FROM

Low-Activity Waste (LAW) Facility Mixes LAW feed with glass-forming materials; produces vitrified waste form in stainless steel containers for long-term Effluent Management Facility Evaporates liquid effluent from the LAW Facility

Legend

- Untreated tank waste Pretreated LAW
- Liquid secondary effluent (from LAW Facility) Cesium transport (from TSCR to ion exchange column storage pad)

Picture taken February 2020



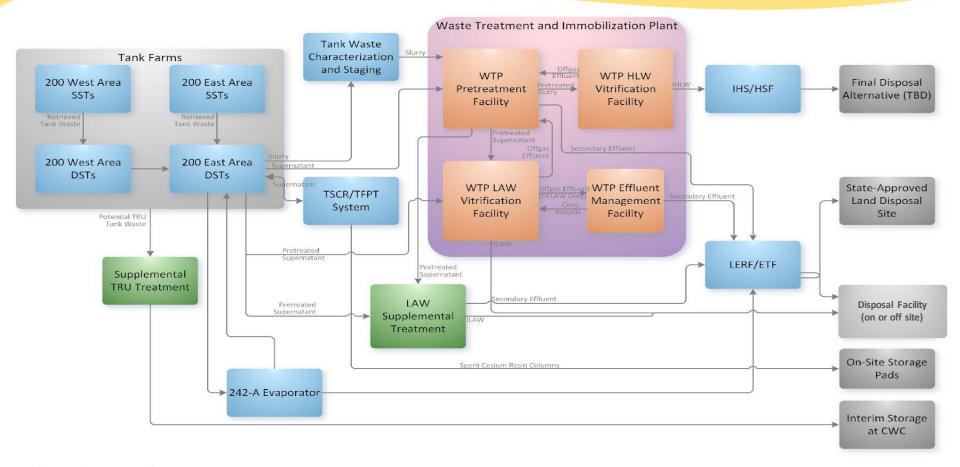
- 2013 record of decision on the Tank Closure and Waste Management Environmental Impact Statement deferred the supplemental low-activity waste (SLAW) decision
- Tri-Party Agreement milestone M-62-045 identified the DOE decision date as April 30, 2015
  - Requires evaluation of vitrification
  - Date extended to April 30, 2021 (in dispute)
  - Included in holistic negotiations



- Conclusion of open issues in 2017 *National Defense Authorization Act,* Section 3134
- Independent recommendation on path forward for treatment of SLAW
  - $_{\odot}\,$  Need SLAW decision supported by facts and data
  - Clear decision framework as per Congressional language
- Regulatory pathway for land disposal of treated waste under the *Resource Conservation and Recovery Act* (RCRA)



#### **Flowsheet**



#### Legend

#### Tank Farms WTP Supp. Treatment Other

#### Acronyms

CWC Central Waste Complex DST double-shell tank ETF Effluent Treatment Facility HLW high-level waste HSF Hanford Shipping Facility IHS Interim Hanford Storage LAW Iow-activity waste

LERF	Liquid Effluent	Retention	Facility
------	-----------------	-----------	----------

- MT metric ton
- SST single-shell tank
- TSCR tank side cesium removal
- TFPT Tank Farm pretreatment
- TBD to be determined
- TRU transuranic
- WTP Hanford Tank Waste Treatment and Immobilization Plant

For illustrative purposes only: The flowsheet presented here has been simplified for presentation purposes.

SP8\_S1SFS\_2017-07-18\_R1

6



- Continued improvement to glass waste loading
- Class A waste options: Crystalline silico-titanate (CST) real waste testing results show very high capture of strontium-90 without affecting cesium-137 retention
- Technetium-99 and iodine-129
  - Continued work on "getters" for grouted waste
  - Offsite options exist without "getters"
- Organics
  - Evaporation has proven to separate most organics
  - Permanganate strike chemically treats



- Direct-Feed LAW treatment anticipated to start in 2023
- Test Bed Initiative Low-Level Waste Offsite Disposal Project demonstration
- Completing High-Level Waste (HLW) Analysis of Alternatives to deliver affordable and achievable treatment pathway for rest of tank waste mission
  - Evaluates Direct-Feed High-Level Waste
  - Evaluates alternate waste conditioning options
- Holistic negotiations ongoing with Washington State Department of Ecology (Ecology) and U.S. EPA



- Completed 3-gallon demonstration in 2017
- Conducting NEPA evaluation for 2,000-gallon demonstration
- Waste Incidental to Reprocessing (WIR) evaluation with NRC review required after NEPA evaluation
- RCRA Research and Development Demonstration permit from Ecology required after WIR evaluation



- Technical progress on many fronts since Section 3134
- Numerous programmatic opportunities to empty tanks sooner and dispose of waste safely and efficiently
- Timing: Need SLAW treatment in time to support HLW
- DOE needs the following:
  - Clear facts-and-data-based recommendations
  - Decision framework per Congressional language
  - Regulatory path forward for RCRA land disposal
  - Proactive and collegial participation in the NAS process to ensure best possible results



#### **Questions?**

