DOE Waste Management Update

Doug Tonkay
DOE-EM Office of Waste Disposal
&
Theresa J. Kliczewski
DOE-EM Office of Waste & Materials Management

LLW Forum Spring Meeting 2021
April 7, 2021

Summary of Topics

Doug:

- EM headquarters (HQ) organization
- Low-level radioactive waste (LLW)
  - Low-Level Waste Disposal Facility Federal Review Group (LFRG)
  - Baseline disposition data
  - Complex-wide LLW/mixed low-level waste (MLLW) disposal volume by disposal location
  - Manifest Information Management System (MIMS)
- Depleted uranium oxide
- Disposal at the Waste Isolation Pilot Plant (WIPP)

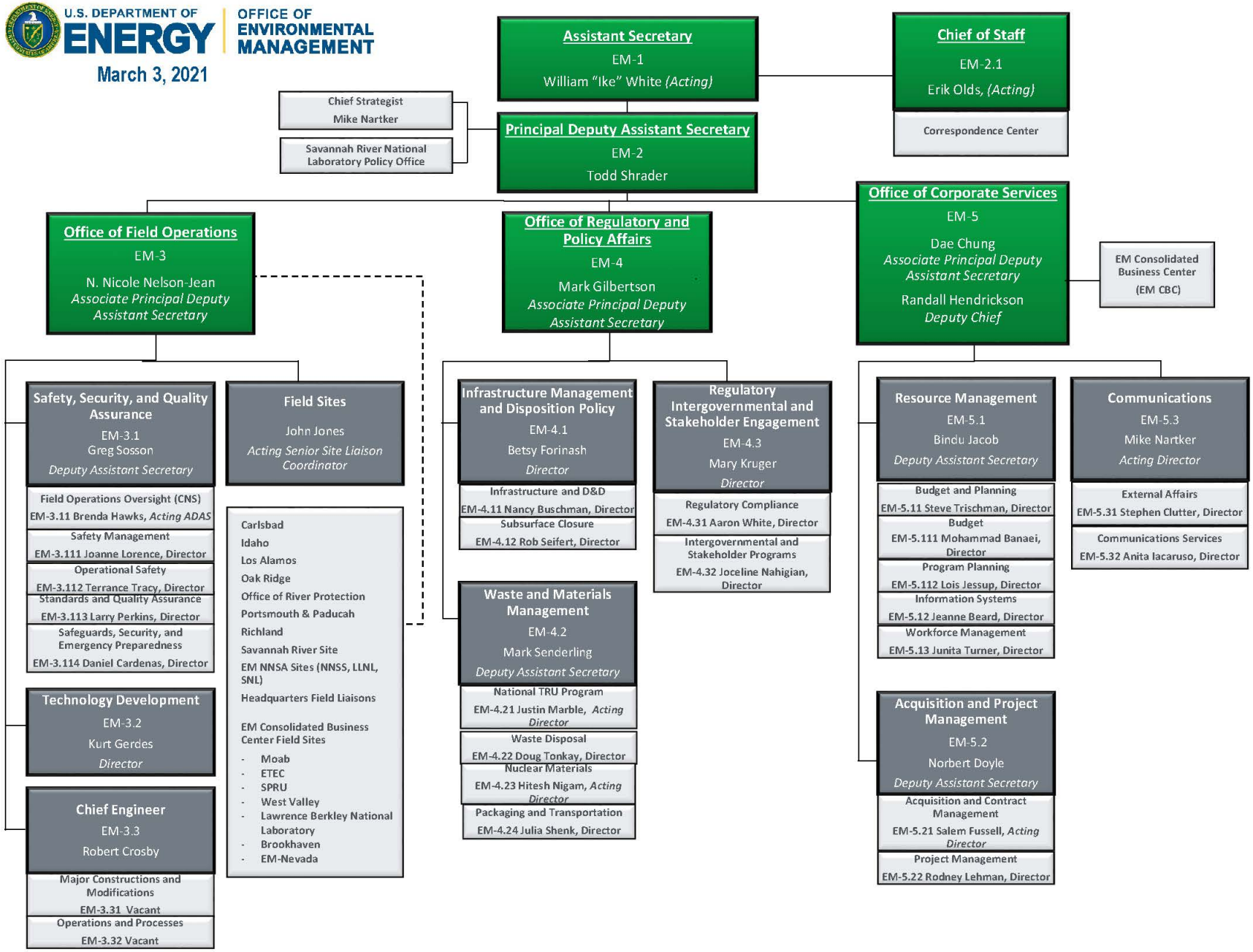
Theresa:

- Greater-than-Class C (GTCC) LLW
- High-level radioactive waste (HLW) interpretation

EM HQ Organization

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

March 3, 2021



LLW: Operating DOE & Commercial Disposal Facilities

- All waste is disposed in accordance with each waste disposal facility's waste acceptance criteria.
- Each waste disposal site is licensed to dispose of specific waste types (see map below for examples).

Hanford Site
- Onsite LLW/MLLW and Naval Reactors LLW
- Integrated Disposal Facility awaiting commissioning (onsite vitrified low-activity waste)

★ DOE Disposal Facility ■ Commercial Disposal Facility

CERCLA – Comprehensive Environmental Response, Compensation and Liability Act; RCRA – Resource Conservation and Recovery Act

LLW: LFRG

- DOE implements Atomic Energy Act of 1954, as amended, in part through DOE Order 435.1, *Radioactive Waste Management*, and the associated DOE Manual 435.1-1.

- LFRG oversees DOE 435.1 requirements for DOE's LLW disposal facilities.

- LFRG has recently reviewed technical basis documents (e.g., Performance Assessment [PA]) at:
  - Portsmouth (new disposal facility)
  - Oak Ridge Reservation (new/additional proposed facility)
  - Savannah River Site (SRS) (revised Saltstone PA)
  - Idaho Site (calcine bin set PA)

- Ongoing reviews are being conducted at Hanford and Los Alamos National Laboratory.

- Future reviews are planned for revised PAs at SRS E-Area and Hanford burial grounds.

Baseline Disposition Data

- Managed by EM/HQ personnel; coordinates with other Program Senior Official (PSO).
- Data call to all DOE sites occurs in the first quarter of each fiscal year (FY).
- Compiled data provided to Florida International University for entry to EM Waste Information Management System (WIMS).
- WIMS provides stakeholder accessible forecast data by FY.
- Current WIMS forecast data for Nevada National Security Site (NNSS) disposal:
  - FY 2020 – 0.58 million cubic feet (ft^3)
  - FY 2021 – 1.14 million ft^3
  - FY 2022 – 1.29 million ft^3
- Site inputs represent planned and budgeted program activities.
- Out-year data reflects uncertainty due to site funding adjustments, federal budget process, DOE priorities.

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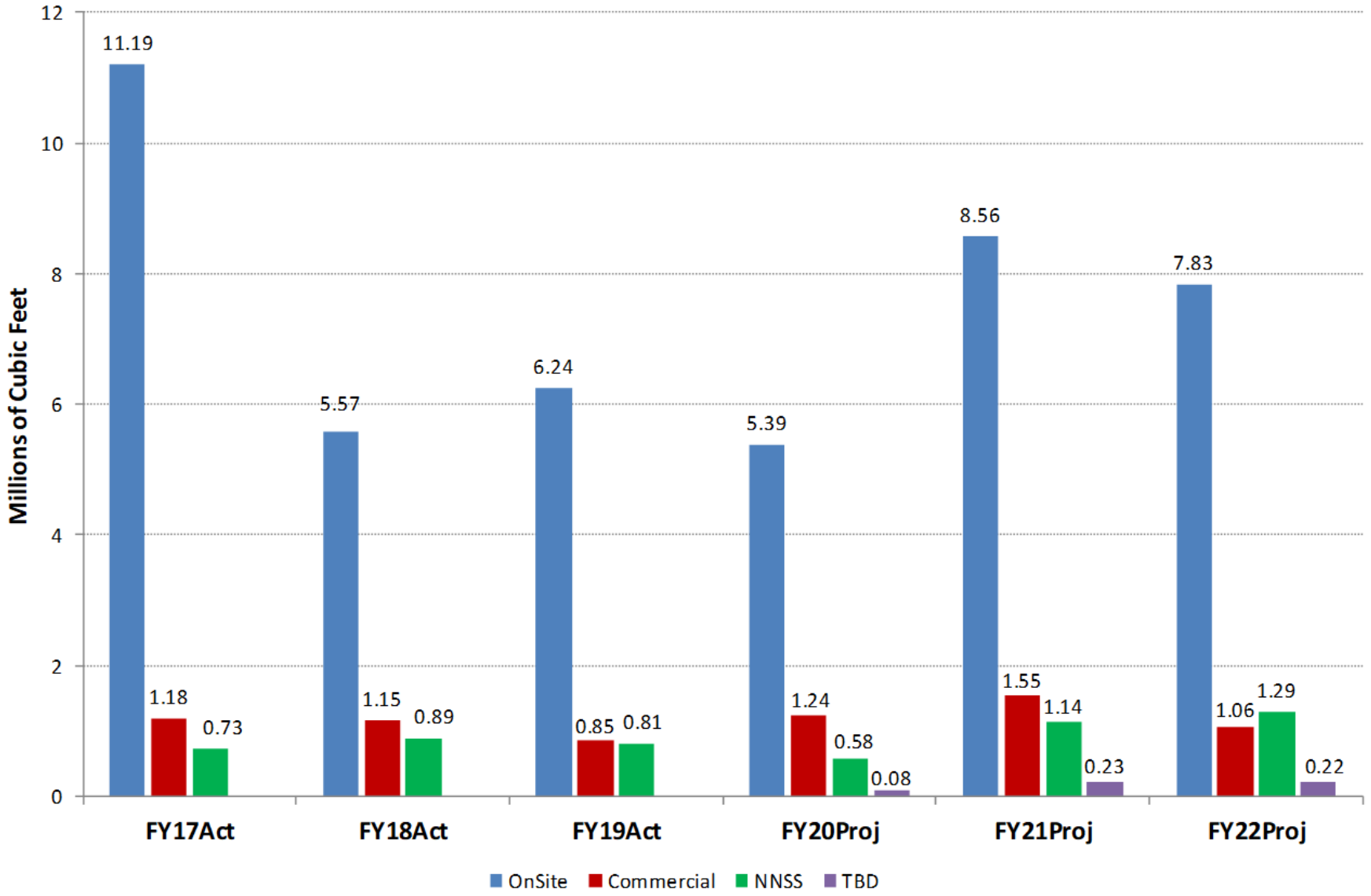
Complex-wide LLW/MLLW Disposal Volume* by Disposal Location



*Based upon data currently compiled in EM WIMS

MIMS

- MIMS is the public source for manifest data of LLW shipped to commercial disposal facilities to meet the provisions in 42 U.S.C. 2021g(a).
- States/compacts are the primary stakeholders.
- **MIMS is 35 years old this year!** Several iterations of operating platforms and upgrades, as recently as last month, have occurred.
- Data is available for currently operating commercial LLW disposal facilities and the closed Beatty, Nevada, site.
  - Barnwell (Atlantic Compact), Energy*Solutions* of Utah, Richland (Northwest Compact/Rocky Mountain Compact), and Waste Control Specialists (Texas Compact).
- In March 2020, the calendar year 2019 data from the 4 commercial facilities was added to MIMS.
- Summary cumulative data was used in the *7th US National Report to the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management* that was published in October 2020.
- Jonathan Kang continues to serve as MIMS administrator.
- Visit WIMS at: https: //mims.doe.gov

Depleted Uranium Oxide

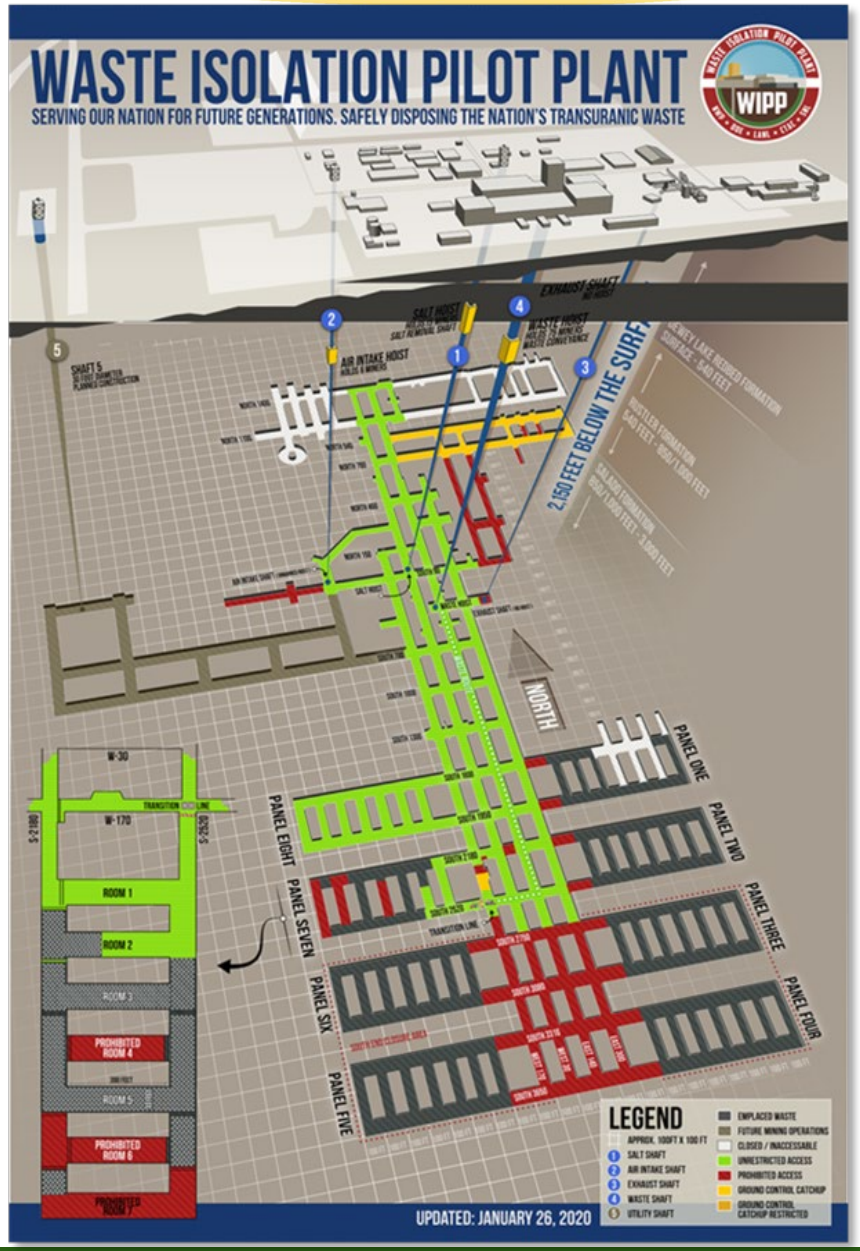
- On April 24, 2020, DOE issued the Final *Supplemental Environmental Impact Statement for Disposition of Depleted Uranium Oxide Conversion Product Generated from DOE's Inventory of Depleted Uranium Hexafluoride.*

- On June 5, 2020, DOE issued a formal Record of Decision (ROD) for the safe shipment and disposal of depleted uranium oxide from former gaseous diffusion plants in Portsmouth, OH and Paducah, KY.
  - The ROD announced DOE's preference to dispose of the material, if declared waste, at one or more locations: the commercial Energy*Solutions* LLC site near Clive, UT; the commercial WCS site near Andrews, TX; and DOE's Nevada National Security Site (NNSS) in Nye County, NV.

- DOE has begun a pilot project to ship several railcars containing cylinders of Depleted uranium oxide to Waste Control Specialists in Texas.
  - Pilot shipment phase 1 – 6 cylinders in a modified gondola car (completed in October 2020).
  - Pilot shipment phase 2 - up to 12 cylinders in an ABC railcar (estimated in FY 2021).

Disposal at WIPP

- Annual Maintenance Outage: Feb. 15 to April 14 (ongoing).
- Received 180 shipments in FY 2020 and more than 12,800 shipments since initial opening.
- Rate of waste shipments up to 5 per week by early February 2021 *(increased shipping rate expected late April after scheduled 2021 WIPP Annual Outage).*
- Shipments have been limited capacity due to COVID-19 pandemic.
- Three ongoing Capital Projects (Safety Significant Confinement Ventilation System, new Utility Shaft #5, and Hoisting Capability for new shaft).
- General Infrastructure Projects in FY 2021:
  - Compressed Air Line Installation to the Underground;
  - Salt Pond 2 Salt Removal (Cleanup);
  - Fire Water Loop Phase 4 (Alarm & Detection System Recapitalization);
  - Salt Hoist Headframe Refurbishment;
  - Underground Electrical Substation Replacement
- In 2021, Idaho National Laboratory (INL), Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), Oak Ridge National Laboratory (ORNL), SRS, Argonne National Laboratory (ANL), and WCS are planning shipments.



GTCC LLW

- In October 2018, EM issued the *Environmental Assessment (EA) for the Disposal of Greater-Than-Class C (GTCC) Low-Level Radioactive Waste and GTCC-Like Waste at Waste Control Specialists, Andrews County, Texas.*
  - The EA provides a site-specific analysis of the potential environmental impacts of disposing the entire inventory- 12,000 cubic meters- of GTCC LLW and GTCC-like waste at Waste Control Specialists LLC (WCS) in Andrews, Texas.
  - The EA is not a decision document.

- DOE continues to coordinate with Congressional staff regarding the intent of "await action by Congress" as noted in Section 631(b)(1)(B)(ii) of the Energy Policy Act of 2005.

- In June 2019, Nuclear Regulatory Commission's (NRC) issuance of the Draft Regulatory Basis for GTCC LLW disposal.
  - NRC issued its Draft Regulatory Basis for public comment in 2019. DOE provided comments to NRC.
  - In October 2020, NRC staff submitted to the Commission a paper on the path forward for the update to 10 CFR Part 61*, Licensing Requirements for Land Disposal of Radioactive Waste*, and whether to consolidate the rulemaking with the draft Regulatory Basis.

HLW Interpretation: Background

- October 10, 2018: DOE issued a Federal Register Notice (FRN) inviting the public to comment on the high-level radioactive waste (HLW) interpretation.
- June 10, 2019: A Supplemental FRN was published providing the HLW interpretation and providing DOE's response to public comments.
  - HLW, as defined in the Atomic Energy Act of 1954, as amended (AEA), and the Nuclear Waste Policy Act of 1982, as amended (NWPA), is properly interpreted to mean that not all radioactive wastes from nuclear fuel reprocessing are HLW, and that some reprocessing wastes can be classified as non-HLW based on the radiological characteristics of the waste**.**
  - Under DOE's Interpretation, a reprocessing waste may be determined to be non-HLW if the waste meets either of the following two criteria:
    - Does not exceed concentration limits for Class C low-level radioactive waste (LLW) as set out in 10 CFR 61.55 and meets the performance objectives of a disposal facility, **or**
    - Does not require disposal in a deep geologic repository and meets the performance objectives of a disposal facility as demonstrated through a performance assessment conducted in accordance with applicable requirements.

HLW Interpretation: Background Cont.

- June 10, 2019: A second FRN was published to announce DOE's intent to prepare National Environmental Policy Act (NEPA) documents to analyze treatment and commercial disposal of up to 10,000-gallons of Savannah River Site (SRS) Defense Waste Processing Facility (DWPF) recycle wastewater.

- December 10, 2019: DOE issued the *Draft Environmental Assessment (EA) for the Commercial Disposal of Defense Waste Processing Facility (DWPF) Recycle Wastewater from Savannah River Site.*

  - Approximately 60-day public comment period occurred.

- August 6, 2020: DOE issued the *Final Environmental Assessment for the Commercial Disposal of Defense Waste Processing Facility (DWPF) Recycle Wastewater from Savannah River Site.*

  - Included a Comment Response Document that addressed all (19) public comments received.

  - DOE also issued technical documents (Technical evaluation and Waste Determination) that demonstrate that up to 8 gallons of stabilized DWPF recycle wastewater meets the HLW interpretation for classification as non-HLW.

HLW Interpretation: Background Cont.

- August 10, 2020: DOE issued a *Finding of No Significant Impact for the Commercial Disposal of Defense Waste Processing Facility Recycle Wastewater From the Savannah River Site*.
  - Based on the information and analysis in the Final EA, DOE made the determination to ship up to 8 gallons of the DWPF recycle wastewater to the Waste Control Specialists, LLC (WCS).

- September 2020: DOE shipped 8 gallons of DWPF recycle wastewater to WCS for stabilization and disposal as LLW.

- January 2021: EM incorporated HLW interpretation into the DOE directive system as the DOE directives are policies and requirements necessary to implement DOE's responsibilities under the Atomic Energy Act of 1954, as amended.

Photo 1: DWPF recycle wastewater retrieval from Tank 22 using sampling vessel and a large crane.

Photo 2: DWPF recycle wastewater shipment leaving SRS to WCS treatment and disposal facility .

Draft EA for the Commercial Disposal of SRS Contaminated Process Equipment

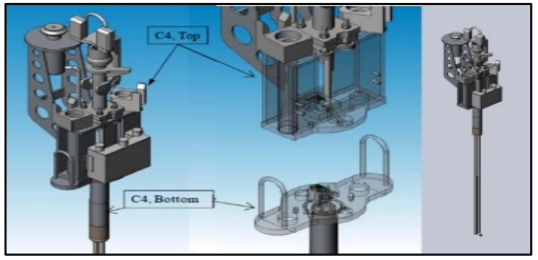
- In January 2021, DOE issued an FRN announcing its intent to prepare a draft EA analyzing the disposal of contaminated process equipment from SRS at a commercial LLW disposal facility located outside of South Carolina licensed by either the Nuclear Regulatory Commission (NRC) or an Agreement State.
  - Alternative 1: If determined to be Class A LLW, stabilize and package the waste at SRS and ship to either Energy*Solutions* in Clive, Utah or WCS for disposal.
  - Alternative 2: If determined to be Class B or C LLW, stabilize and package the waste at SRS and ship to WCS.
    - Energy*Solutions* is not currently licensed to dispose of Class B or C LLW.
  - Alternatives 1 and 2 are dependent upon waste content and compliance with facility waste acceptance criteria.
  - The Draft EA will also analyze a no action alternative under which the contaminated process equipment would remain in storage at SRS until disposition occurs.

Draft EA for the Commercial Disposal of SRS Contaminated Process Equipment Cont.

- **Tank 28F Salt Sampling Drill String**
  - Used to collect reprocessing waste samples from the waste storage tank.
  - Steel piping measuring 2.25 inches outer diameter by 41 feet long, contaminated with reprocessing waste (supernatant) from Tank 28F.

Tank 28F Salt Sampling Drill String in B-36 Box

- **Glass bubblers**
  - Used to increase efficiency of DWPF melter operations.
  - Each bubbler comprised of a 3⁄4-inch Schedule 160 Inconel pipe.
  - Approximately 60 contaminated bubblers in storage at SRS.
  - About 4 contaminated glass bubblers will be generated every 6 months until DWPF operations are completed in 2034 timeframe.



Glass Bubbler

- **Glass Pumps**
  - Used to support melter efficiency and are no longer in use at SRS having been replaced by the glass bubblers.
  - Each pump is comprised of an Inconel pipe, measuring approximately 3 5⁄8 inches in outer diameter.
  - Approximately 10 glass pumps in storage at SRS requiring final disposal.

Glass Pumps

HLW Interpretation: Next Steps

- DOE will continue its work on Draft EA for the SRS contaminated process equipment.
    - DOE anticipates completing the Draft EA for the SRS contaminated process equipment in 2021 and will issue a FRN notifying the public of its completion.
- Information related to the HLW interpretation can be viewed at: https://www.energy.gov/em/program-scope/high-level-radioactive-waste-hlw-interpretation