



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
ENVIRONMENTAL
MANAGEMENT

Presentation to EM Site-Specific Advisory Board: Waste and Transportation Update

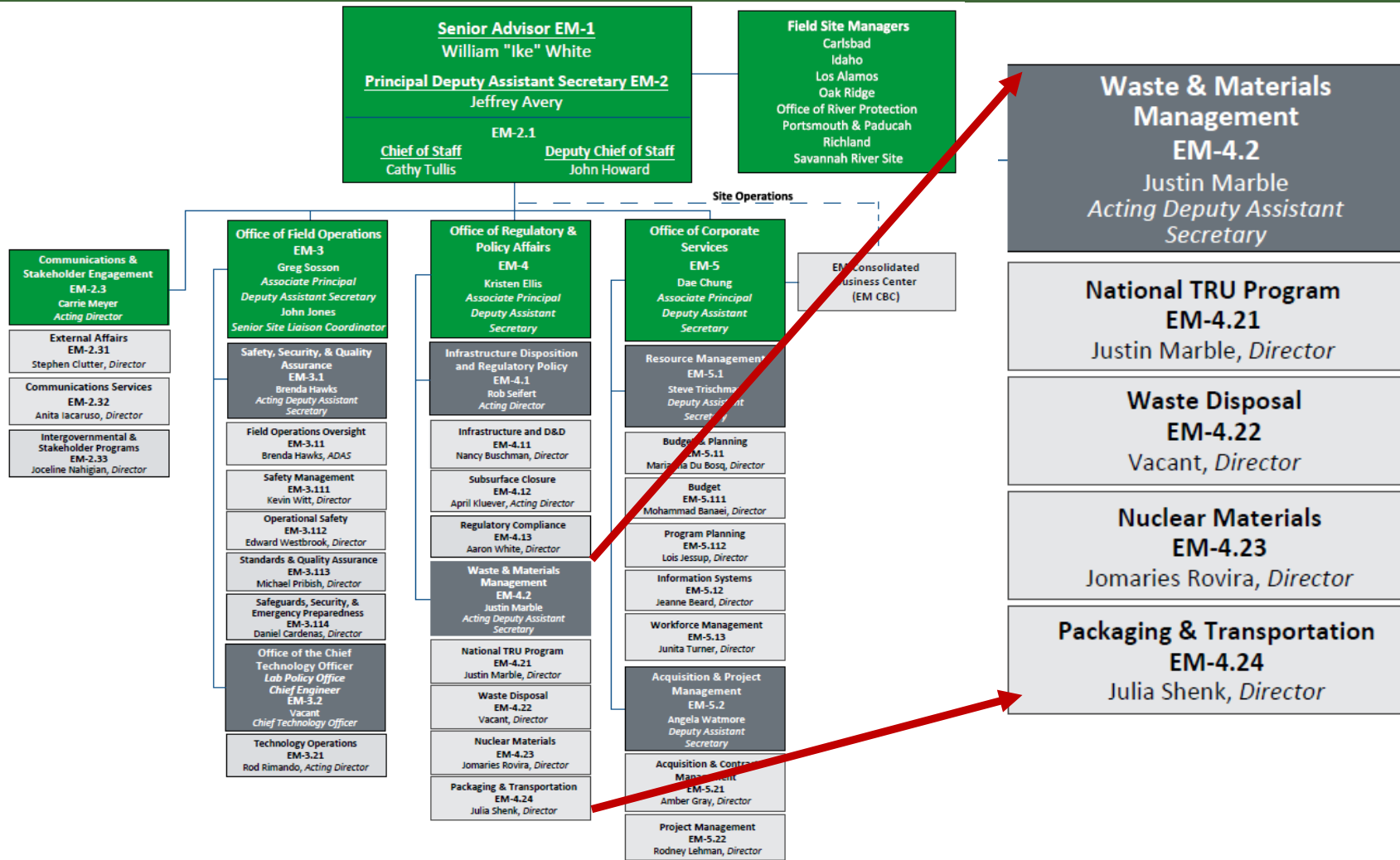
May 1, 2024

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Acting DAS for Waste and Materials Management
Office of Environmental Management

Topics

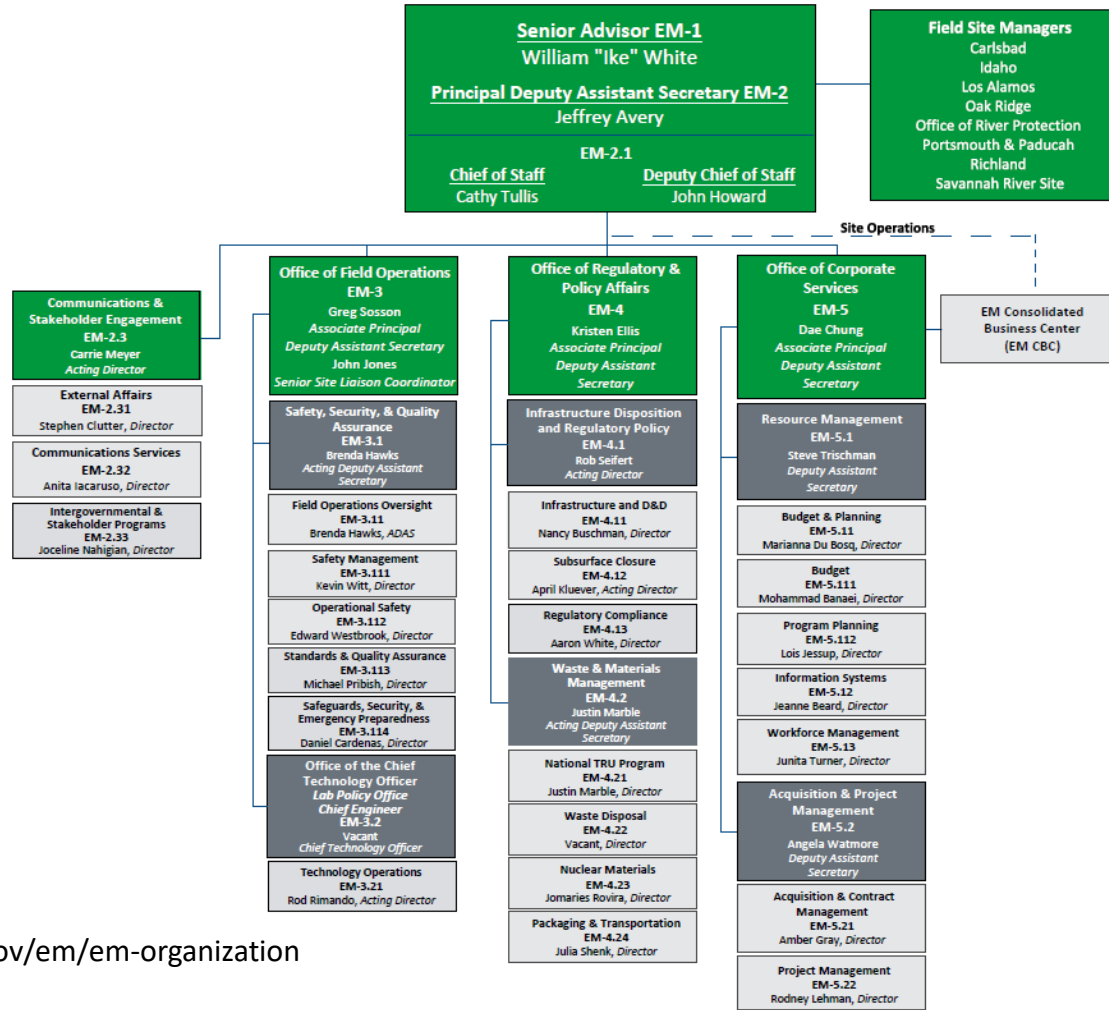
- Introduction
- Quick Radioactive Waste Overview
- Transuranic (TRU) Waste and WIPP updates
- Low-Level Waste (LLW)/Mixed LLW (MLLW) Update
- Transportation Updates
- Mission Accomplishments and 2023 Video

Waste and Materials Management (EM 4.2) in Focus



<https://www.>

EM Organization



<https://www.energy.gov/em/em-organization>

Radioactive Waste Classifications, Regulatory, and current Disposal Paths

Waste Classification and Definition	Regulatory Responsibilities	Disposition Path
<p>High Level Waste (HLW): (A) highly radioactive waste material resulting from the reprocessing of spent nuclear fuel (SNF), including liquid waste produced directly in reprocessing and any solid materials derived from such liquid waste that contains fission products in sufficient concentrations; and (B) other highly radioactive material that the DOE determines requires permanent isolation.</p>	<ul style="list-style-type: none"> • DOE for disposal • US Environmental Protection Agency (EPA) disposal standards • US Nuclear Regulatory Commission (NRC) licensing 	<p>Geologic repository</p>
<p>Transuranic (TRU) waste: Man made elements above 92, greater than 100 nanocuries (nCi/g) of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years.</p>	<ul style="list-style-type: none"> • DOE for disposal • EPA certification • New Mexico permit 	<p>Waste Isolation Pilot Plant (WIPP), DOE owned/operated</p>
<p>Low Level Waste (LLW): Radioactive waste that is <u>NOT</u>: HLW, SNF, TRU waste, byproduct material or naturally occurring radioactive material (NORM).</p> <p>Mixed LLW: Radioactive waste with a hazardous component regulated under the Resource, Conservation and Recovery Act.</p>	<ul style="list-style-type: none"> • DOE for disposal of DOE owned LLW • NRC Agreement State for commercial facilities • EPA/State permit if mixed 	<p>DOE or commercial near-surface disposal facilities</p>
<p>Greater-than-Class C (GTCC) LLW</p>	<ul style="list-style-type: none"> • DOE for disposal • NRC regulates disposal 	<ul style="list-style-type: none"> • Disposal path decision TBD • DOE National Environmental Policy Act (NEPA) analyses evaluated disposal at WIPP and land disposal facilities at generic commercial sites • NRC staff to issue a new proposed rule that consolidates and integrates criteria for licensing the disposal GTCC LLW and 10 CFR Part 61, LLW Disposal rulemaking activities

Waste Disposal Considerations

- DOE's Radioactive Waste Management Manual 435.1-1 has the current "tiered" policy on treatment, storage, and disposal:
 - *DOE waste shall be treated, stored, and in the case of low-level waste, disposed of at the site where the waste is generated, if practical, or at another DOE facility. If DOE capabilities are not practical or cost effective, exemptions may be approved to allow use of non-DOE facilities for the storage, treatment, or disposal of DOE radioactive waste.*
- Waste disposal is always fully protective of worker and public health and the environment and in compliance with applicable Federal, state, and local requirements, with necessary permit(s), license(s), and approval(s) for the specific waste.

Waste Isolation Pilot Plant Mission

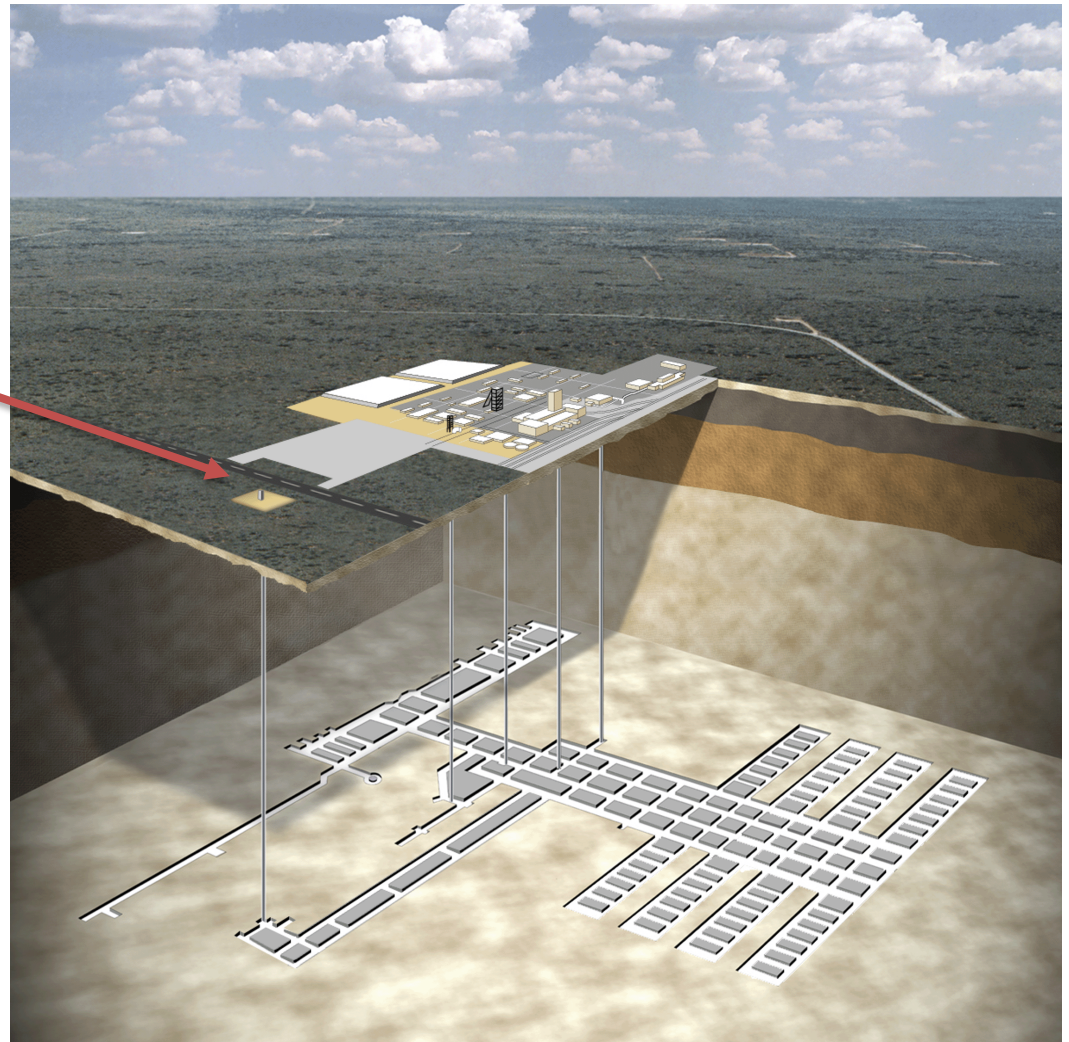


Provide safe and compliant characterization, transportation, and disposal of the United States' defense TRU waste while protecting workers, the public, and the environment



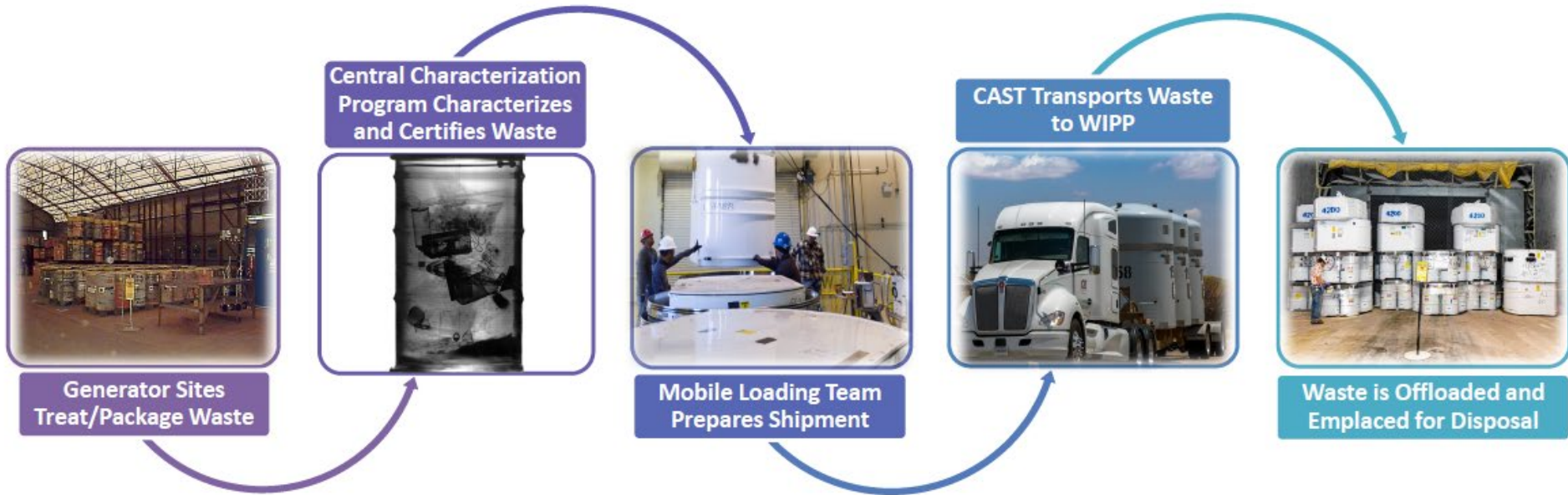
What is WIPP?

- 2,150 feet deep
- Disposal panels
- Four vertical shafts
 - Fifth shaft under construction
- Ventilation system
- Working at the speed of safety



TRU Generation to Disposal

General Process Overview



The WIPP Team



U.S. Department of Energy Carlsbad Field Office

- Leads the Transuranic Waste Program
- Science Program



Salado Isolation Mining Contractors LLC

- Manages and operates the WIPP facility
- Manages transportation logistics and packages
- Manages waste retrieval, characterization and certification
- Mobile loading



Sandia National Laboratories

- Scientific advisor for repository recertification



Los Alamos National Laboratory

- Scientific advisor for waste characterization



CBFO Technical Assistance Contractor

- Technical and Quality Assurance support for the Carlsbad Field Office



Aleut Aerospace Engineering, LLC- TRANSCOM

- Satellite Tracking



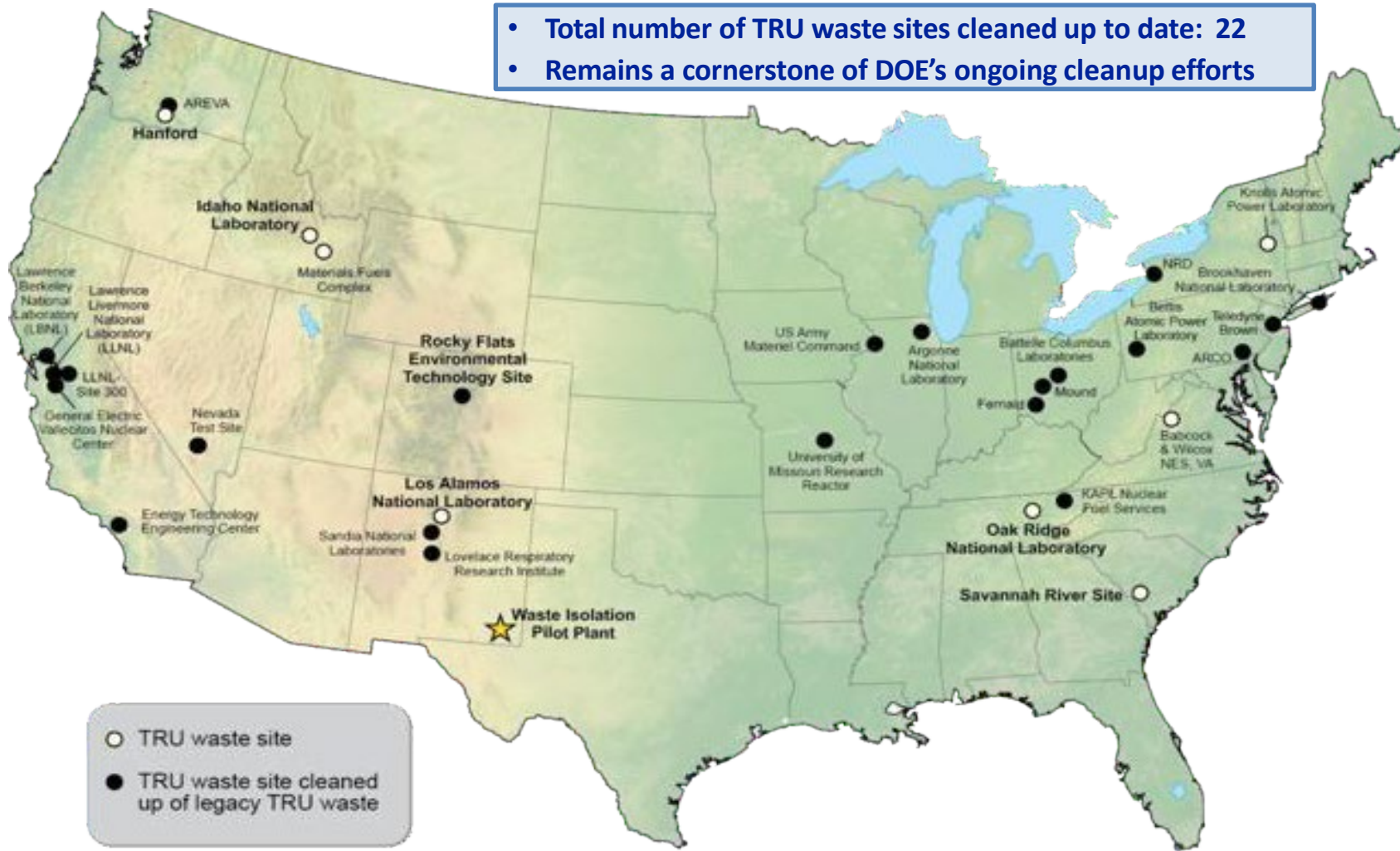
Specialty Transportation, Inc.

CAST Specialty Transportation

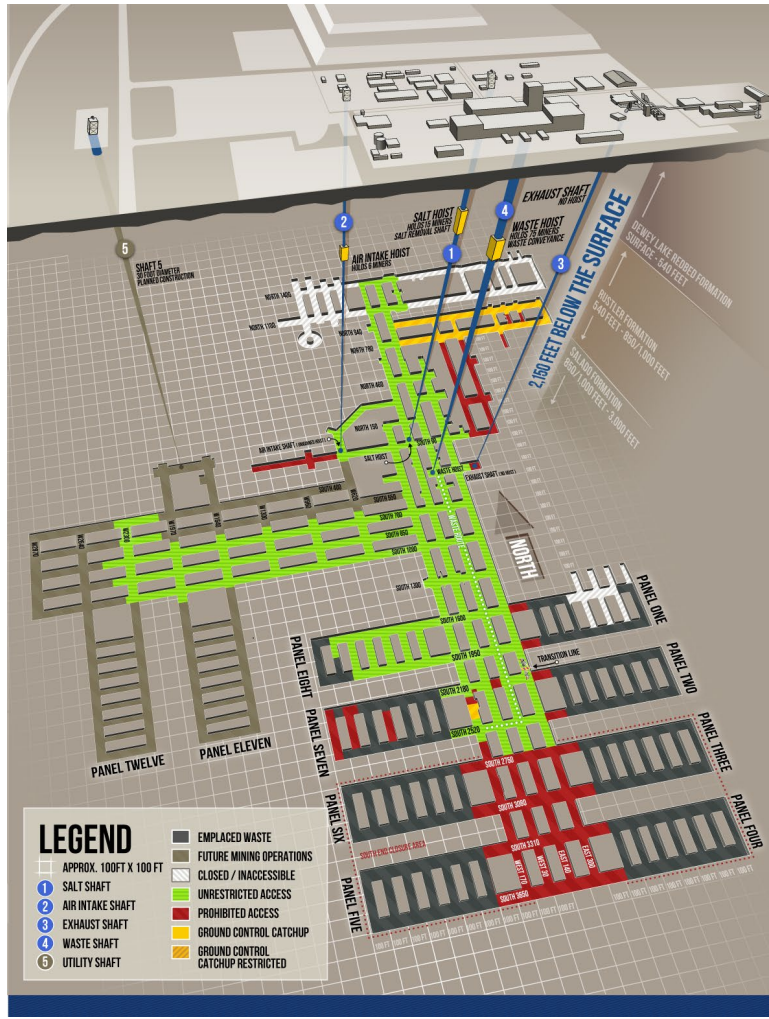
- Transportation carrier

TRU generator sites

- Total number of TRU waste sites cleaned up to date: 22
- Remains a cornerstone of DOE's ongoing cleanup efforts



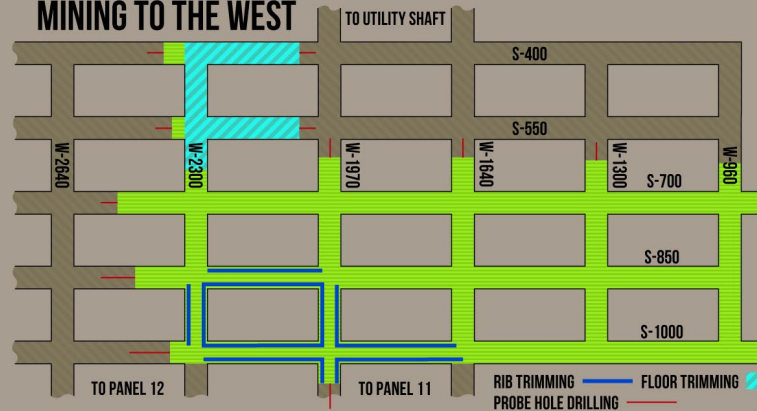
WIPP Layout Overview



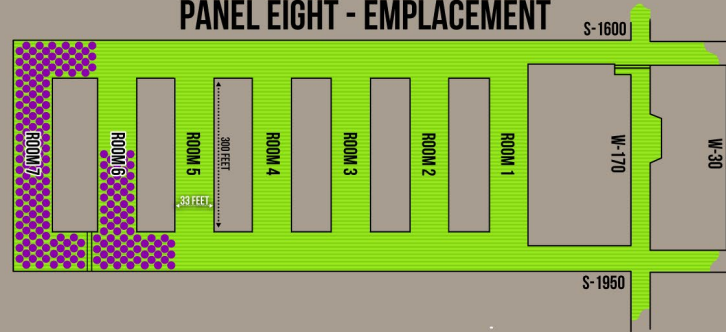
WASTE ISOLATION PILOT PLANT

SERVING OUR NATION FOR FUTURE GENERATIONS. SAFELY DISPOSING THE NATION'S TRANSURANIC WASTE

MINING TO THE WEST



ENLARGEMENT OF PANEL EIGHT - EMPLACEMENT



UPDATED: DECEMBER 20, 2023

Waste Emplacement and Mining Update



Panel 8, Room 6

- Room 6 approximately 88 percent filled
- Final Room 6 emplacement anticipated for early April, then begin Room 5

New Panel 11

- Panel 11 mining began December 2023

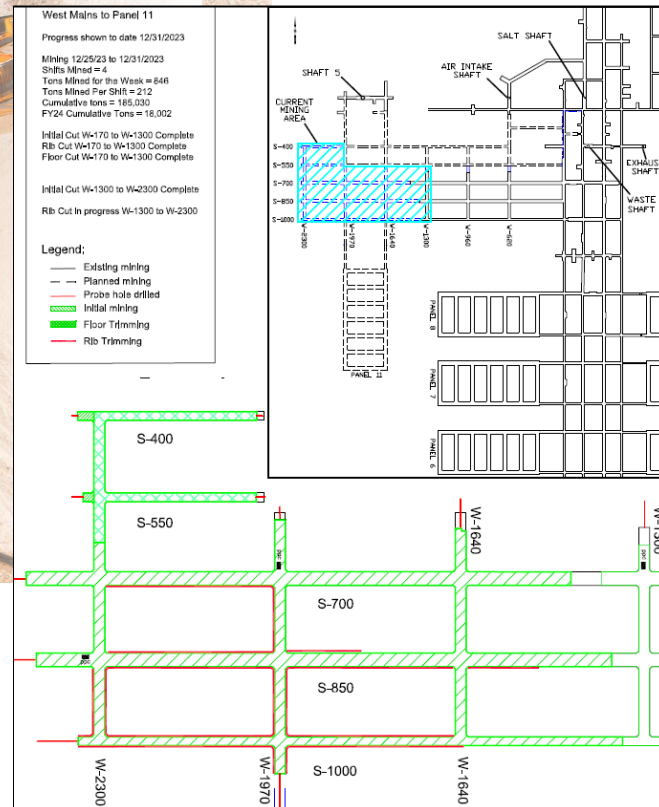
Insert Panel 11 video (small 8MB) here



Above: Panel 8, Room 7 waste emplacement.
Below: Panel 11 first cut with continuous mining machine.

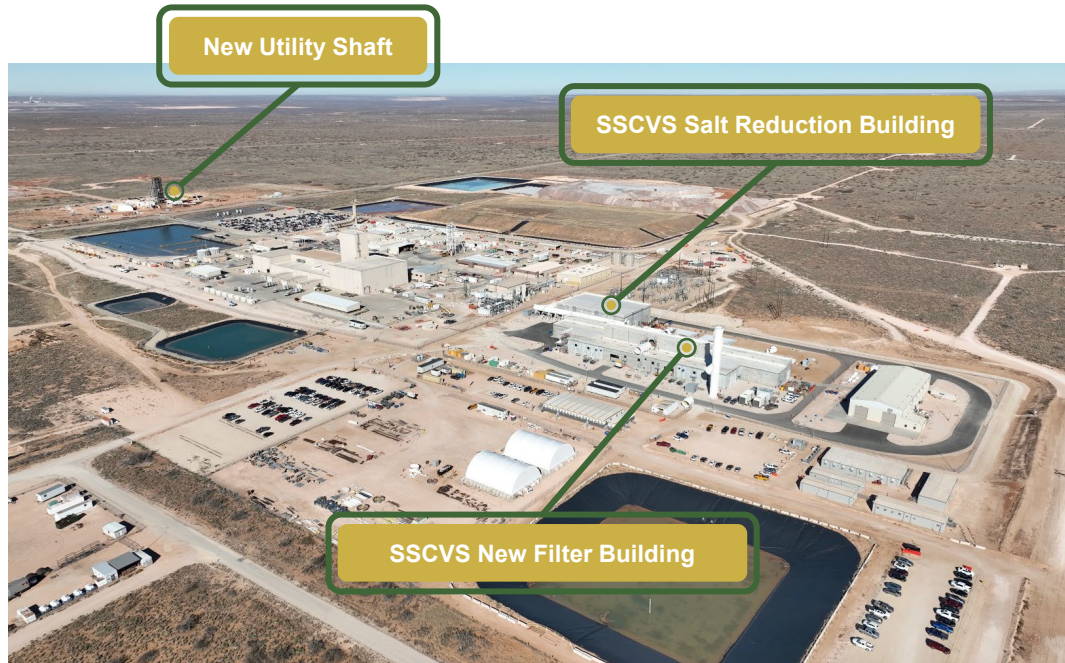
A Closer Look: The West Mains, Panels 11 and 12

- Mining done on just-in-time basis due to salt creep
- Currently mining access drifts to the west
- Drifts will tie into the Utility Shaft and replacement panels 11 and 12
- Preparing to equip west mains with infrastructure



Infrastructure Investments

- Projects will:
 - Reduce maintenance down time
 - Improve operational efficiencies
 - Increase annual shipping rate
- New Utility Shaft
- Safety Significant Confinement Ventilation System (SSCVS)
- General Plant Projects



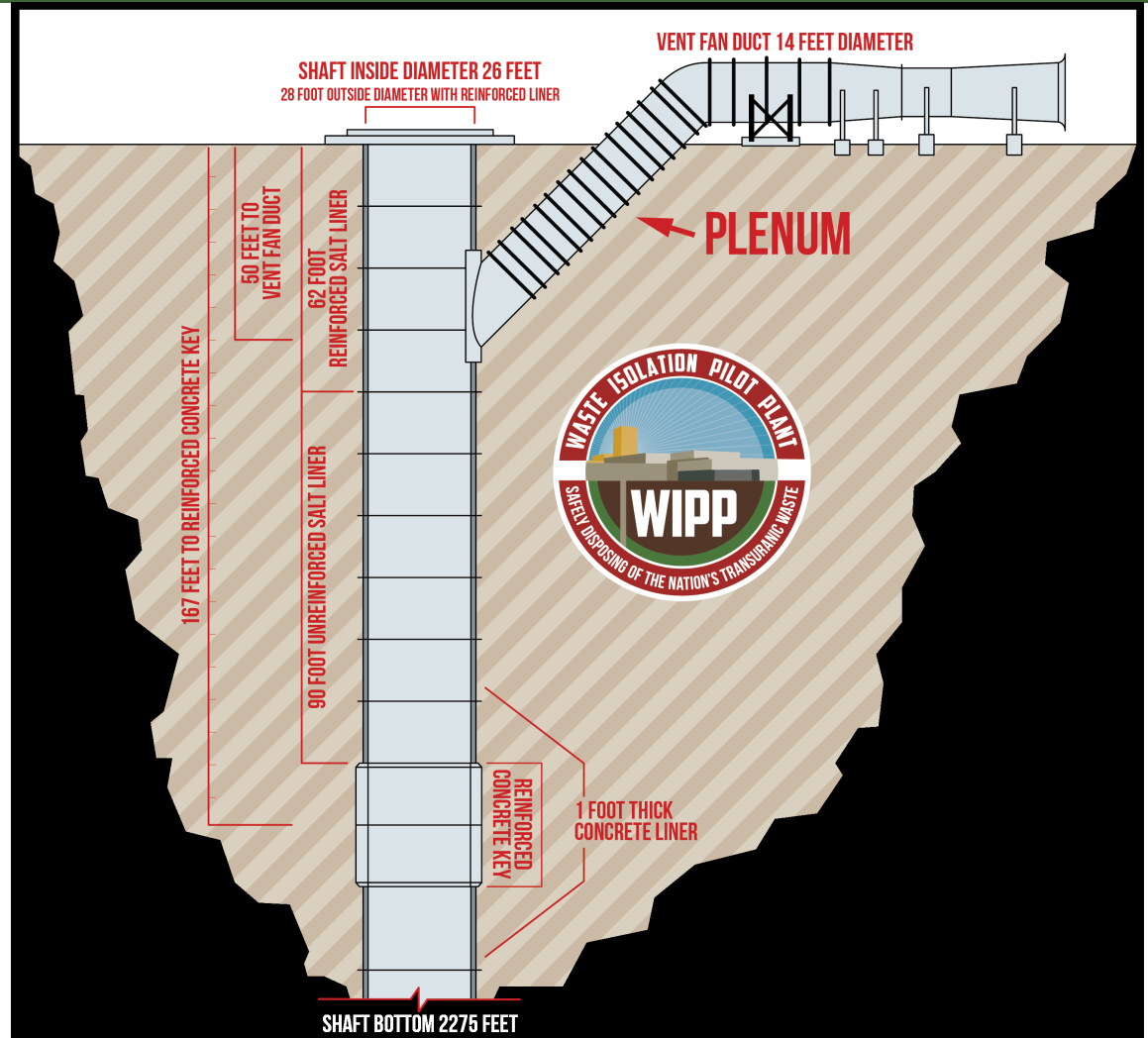
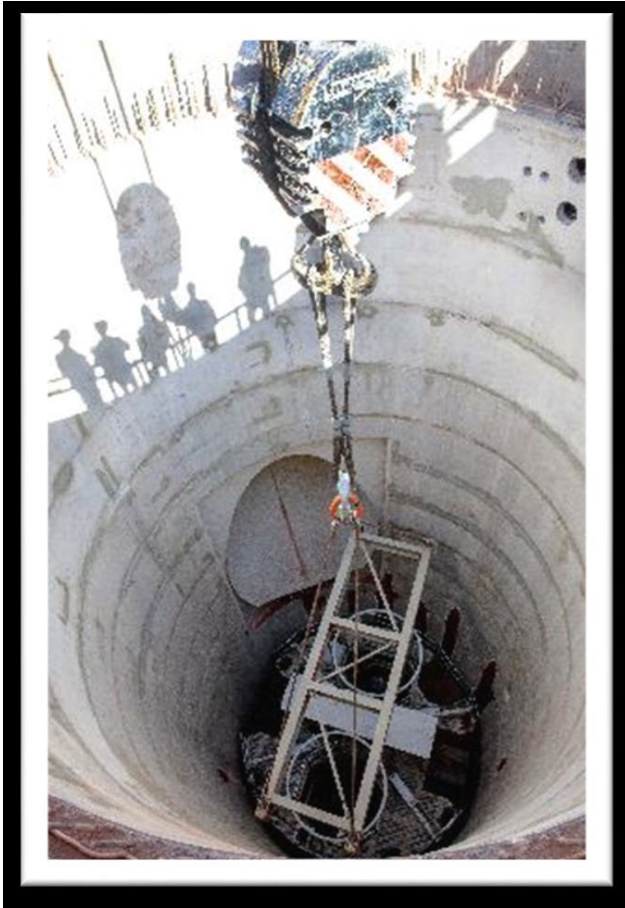
Capital Project – Utility Shaft



- Providing higher-capacity air intake for the underground in conjunction with SSCVS system
 - 30-foot diameter shaft
 - 2,275 feet deep
 - Shaft sinking and station development complete
- Transition from shaft sinking to horizontal excavation of drifts
- Delivery of underground mine power centers

Above: loading mining equipment down the Utility Shaft.
Below: view of Utility Shaft underground drift mining.

Views of the Utility Shaft



Capital Projects

Safety Significant Confinement Ventilation System (SSCVS)

Increasing airflow to the underground to 540,000 cubic feet per minute

Progress

- Overall project about 85 percent complete to include:
 - New Filter Building (NFB)
 - Salt Reduction Building (SRB)
- Overall commission about 23 percent complete



Above: SSCVS large diameter duct work.
Below: testing electrical circuits during SSCVS commissioning.

Annual TRU Waste Inventory Report 2023

- The TRU waste inventory information is used for strategic planning and supports the DOE Carlsbad Field Office (CBFO) input into documents (e.g., WIPP Documented Safety Analysis and National Environmental Policy Act evaluations), performance assessments, planned changes, and other design changes as needed for the WIPP project.
- **Emplaced (~72,525 cubic meters (m³)):** TRU waste that has been disposed in the WIPP repository, in above-ground storage at the WIPP, or in temporary storage at a designated storage location.
- **WIPP-bound (~42,770 m³):** TRU waste that is stored and projected to be generated up through CY 2033.
- **Potential (~9,520 m³):** TRU waste that requires resolution of a regulatory or other constraint before it may be considered for disposal at WIPP, including waste that is stored and projected to be generated up through CY 2033.
- **Projected Beyond CY 2033 (~52,100 m³):** WIPP-bound and potential TRU waste that is projected to be generated after CY 2033.
- Under the WIPP LWA, the authorized volume for disposal is 6.2 million cubic feet (**175,564 m³**). The total estimate is **~153,000 m³**

<https://wipp.energy.gov/national-tru-program-documents.asp>

WIPP Shipment Data

Site	Actual Shipments in FY 2023	Projected Shipments in FY 2024	Actual Shipments to Date in FY 2024
LANL	68	158	23
INL	348	303	168
ORNL	21	27	8
SRS	26	32	21
SQS (SNL, LLNL, ANL)	10	23	0
WCS	--	--	--
Total	473	543	220

FY24 Shipments to Date

- January 2024: **50**
- February 2024: Annual Maintenance Outage
- March 2024: **23**
- April 2024: **33**
- **Possible Impacts Rest of FY24 forward**
- Available Shippable Inventory
- Maintenance Outages (WIPP and TRU sites)
- Security Plan

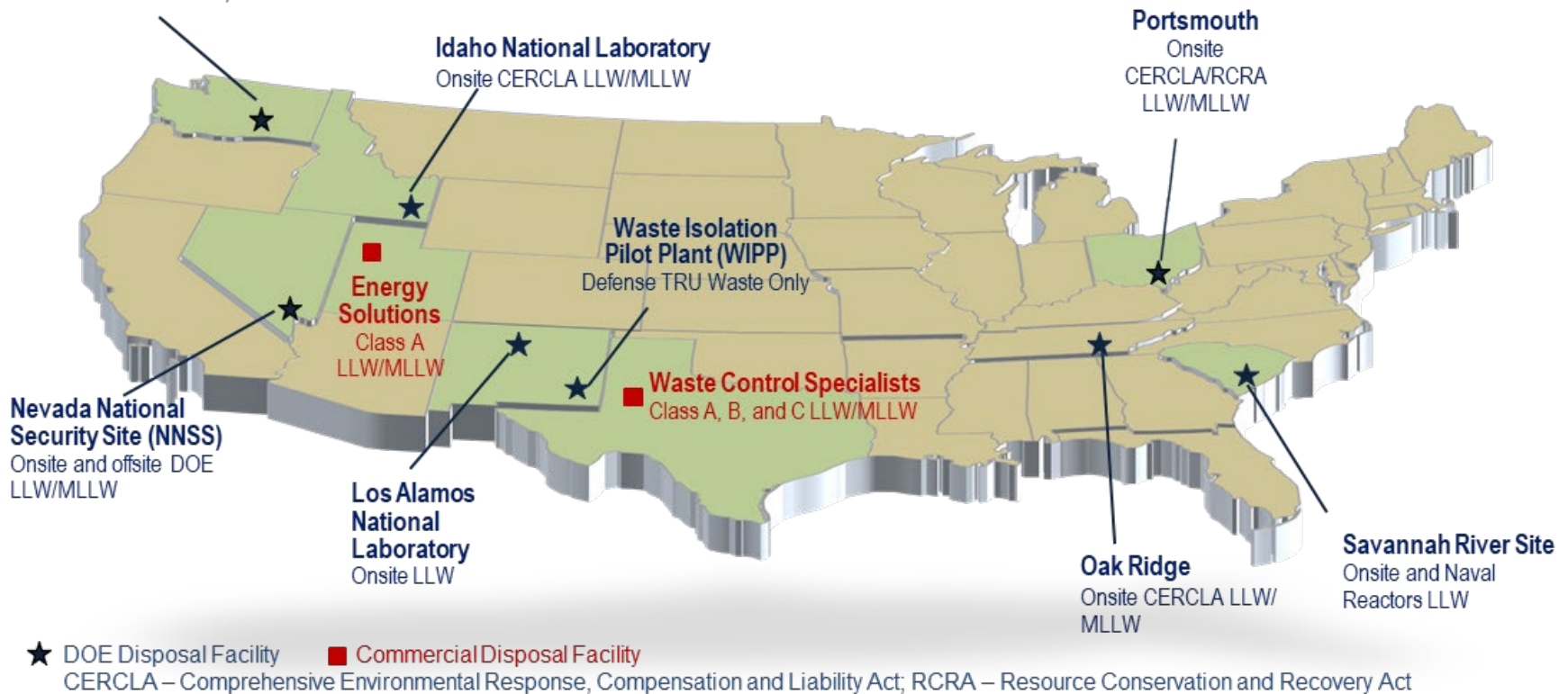


Operating DOE & Commercial Disposal Facilities Used by DOE

Hanford Site

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

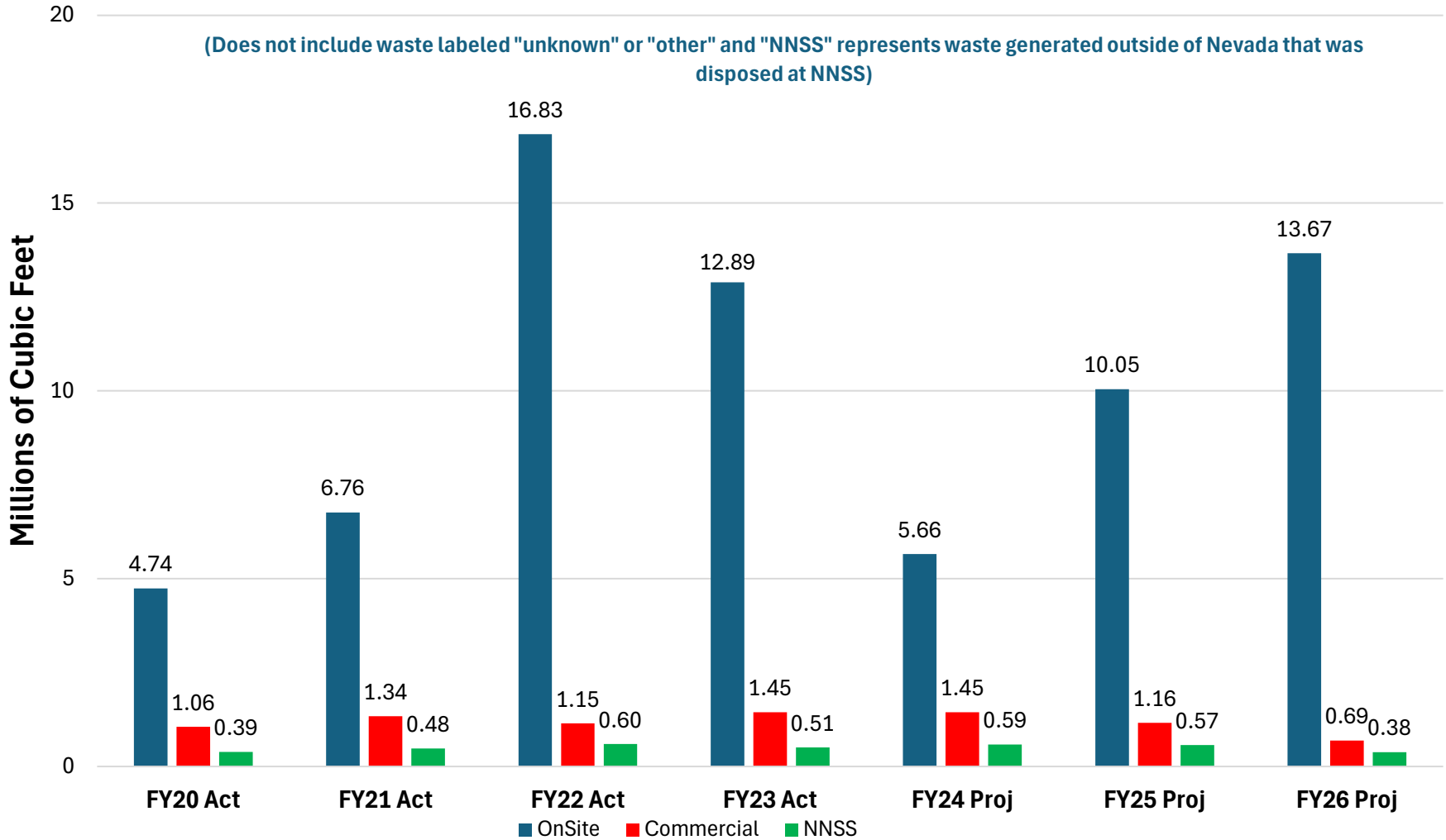
- All waste is disposed in accordance with each waste disposal facility's WAC.
- Each waste disposal site is licensed to dispose of specific waste types (see map below for examples).



Disposal at Nevada National Security Site



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



LLW/MLLW Disposal Considerations

- Sufficient LLW/MLLW disposal capacity exists at DOE and commercial facilities to support the EM cleanup mission.
- With very limited offsite DOE disposal options available, preservation of commercial disposal options remains crucial.
- EM will continue to apply integrated radioactive waste disposal strategies and ensure a sustainable EM cleanup mission while fully protecting the public, workers, and the environment.

DOE LLW/MLLW Baseline Disposition Data

- Managed by EM/HQ personnel; coordinated with other DOE programs.
- Data call to all DOE sites occurs in the first quarter of each fiscal year.
- Compiled data provided to Florida International University for entry into EM Waste Information Management System (WIMS).
- WIMS provides stakeholder accessible forecast data by fiscal year.
- Site inputs represent planned and budgeted program activities at the end of FY23.

<https://www.emwims.org/>

Potentially Challenging Waste Streams

- Treatment and disposal paths exist for the vast majority of DOE LLW and MLLW.
- Challenging LLW/MLLW streams are identified in a variety of forums, such as WIMS data base, DOE Site Treatment Plans, and Energy Facility Contractors Group Challenging Waste Subgroup.
- EM works to develop treatment and disposal paths for this waste through R&D efforts, procurements, and other initiatives.
- Current examples from WIMS data base include radioactive contaminated dioxin waste, tritiated oil/debris with mercury, miscellaneous reactive metals, and some non-organic debris liquids.

Office of Packaging and Transportation Mission

- The EM Office of Packaging and Transportation (OPT) protects people and the environment by promoting safe, compliant and efficient packaging and transportation of materials.
- OPT achieves this mission by conducting oversight on packaging and transportation with assessments through the Packaging Certification Program (PCP); assisting field sites, and developing and managing policies, tools, and technology in accordance with DOE requirements and government regulations.
- OPT facilitates stakeholder engagement in DOE transportation matters through the National Transportation Stakeholders Forum (NTSF) and the Transportation Emergency Preparedness Program (TEPP) which provides training to Federal, State, Tribal, and local first responders for DOE radiological transportation incident.



OPT Key Programs & Responsibilities

- Compliance and safety
 - Motor Carrier Evaluation Program (MCEP); 30+ carriers
 - Transportation Compliance Assurance Program (TCAP) for DOE sites
- Packaging Certification Program (PCP)
 - Supported by specialized teams at seven DOE National Laboratories
 - Type B package Certificates of Compliance and revisions
 - Accredited, graduate-level courses in packaging and transportation
 - Radio-frequency identification (RFID) technology and transportation security innovations
- Stakeholder engagement and training
 - Transportation Emergency Preparedness Program (TEPP)
 - National Transportation Stakeholders Forum (NTSF)

OPT Key Programs & Responsibilities

- **Transportation planning and management tools**
 - ATLAS – transportation management system with capabilities including freight rating and routing, creation of shipping documents, freight invoicing
 - RadAnalysis (formerly RADCALC) – software performing calculations in support of transportation regulatory compliance
 - TRAGIS – transportation routing model
- **Field support**
 - Program support for site transportation managers
 - Transportation Management Council; Packaging Management Council
- **Policy and regulatory support**
 - DOE Orders 460.1D (Hazardous Materials Packaging and Transport Safety) and 460.2B (Departmental Materials and Transportation Management)
 - Primary interface with Nuclear Regulatory Commission, Department of Transportation, and other federal agencies on packaging and transportation matters

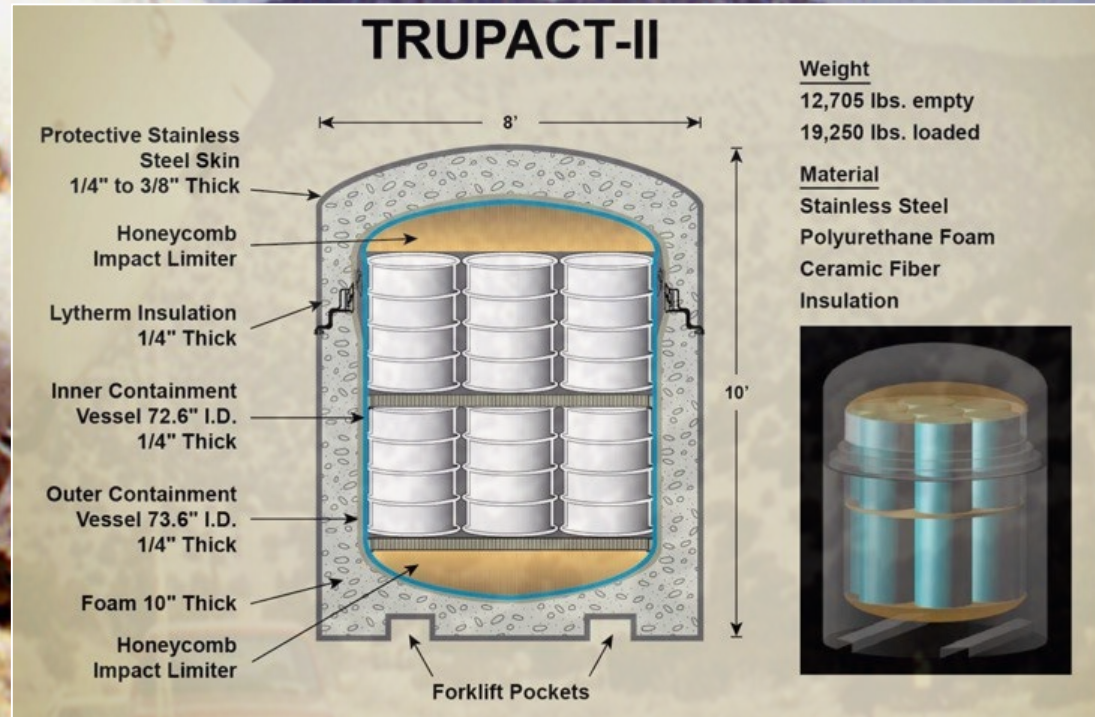
FY23 Transportation Successes

- FY 2023 Packaging and Transportation Accomplishments
 - Safely transported more than 3,800 hazardous materials shipments
 - Trained 2,784 first responders in 195 classes through TEPP
 - Completed 44 Packaging Certification Program dockets
 - Evaluated 8 motor carriers for safety and regulatory compliance

Safe Transportation

TRUPACT Testing Requirements

- TRUPACT-II, TRUPACT-III, HalfPACT & RH-72B CASKS must be certified to:
- 30-foot drop onto a flat, unyielding surface
- 40-inch drop onto a 6-inch diameter steel rod at least 8 inches long
- 1,475 degrees F for 30 minutes
- Immersion test equivalent to external pressure under 50 feet of water



Driver Requirements

- Must be a U.S. citizen
- Must have 325,000 miles in last five years/100,000 per year in two of last five years
- Must not have repeated chargeable incidents, moving violations, or a single DWI/DUI in their private vehicles
- Must not have been charged with a moving violation in a commercial vehicle in last five years
- Must pass background check



Shipment Requirements



- Must pass Commercial Vehicle Safety Alliance Level VI inspection (100% defect free)
- Two drivers per shipment
- Driver inspects within first 50 miles
- Additional inspections every 3 hours or 150 miles
- Shipments not allowed to travel during weather warnings
- States can perform additional inspections (CO and NM)



Mission Accomplishments

- **22** sites completed legacy TRU waste cleanup
- **13,881** shipments received
- **16,627,189** loaded miles traveled
- **489** shipments received and emplaced in 2023
- Over **106** shipments already received and emplaced in 2024
- Recent shipments:
 - November 2023: **30**
 - December 2023: **44**
 - January 2024: **50**
 - February 2024: **Annual Maintenance Outage**
 - March 2024: **23**
 - April 2024: **33**



As of April 7, 2024

2023 WIPP Accomplishments

INSERT Larger video here

Thank you for your time.