RadWaste Summit 2020

National Nuclear Security Administration Prioritization Approach

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NNSA Missions and Crosscutting Capabilities

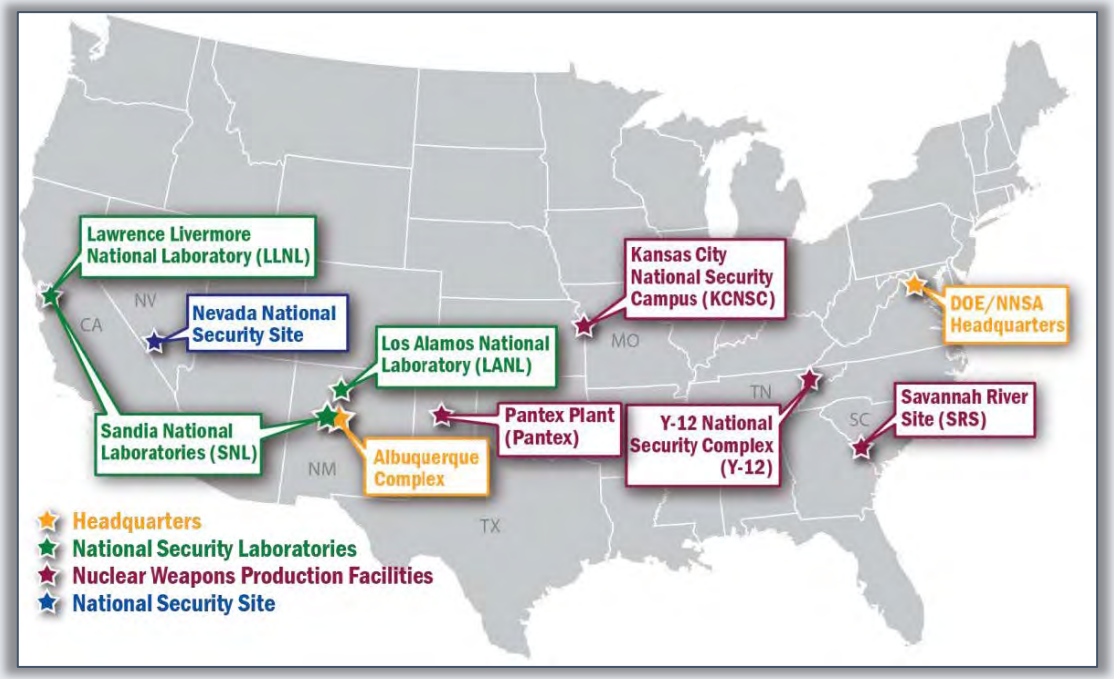
U.S. DEPARTMENT OF ENERGY

A Key Part of the Deterrent is a Responsive Nuclear Security Enterprise

National Nuclear Security Administration

LLNL
- Weapon Design (Nuclear)
- Design agency for the W80, W87, and B83
- High explosive R&D Center of Excellence

NNSS
- Nuclear material and other experiments



KCNSC
- Nonnuclear component manufacturing/ procurement

SRS
- Tritium operations
- TPBAR tritium extraction
- Reservoir processing

LANL
- Weapon Design (Nuclear)
- Design agency for the B61, W76, W78, and W88
- Pit production
- Plutonium sustainment

SNL
- Systems engineering
- Neutron generator design and production
- Weapon Design (Non-nuclear)

Pantex
- Weapons assembly/ disassembly
- High explosive production Center of Excellence

Y-12
- Uranium component and sub-assembly production
- Lithium Processing

Over 50% of NNSA infrastructure is more than 40 years old

Safety, Infrastructure & Operations

Increase Mission

NNSA Pit Production Requirements

- Capability to produce plutonium pits to maintain a healthy stockpile for future decades.
- Alignment with the 2018 Nuclear Posture Review to produce 80 pits per year in 2030.
  - LANL 30 pits per year in 2026
  - SRNL 50 pits per year in 2030
- The Plutonium Pit Production restores the Nations pit production capability.

TRU Waste Processing Requirements

- Beginning in 2026, LANL will generate in excess of 2000 containers of TRU waste per year for the 30 pit per year project and other mission activities
- SRS will repurpose infrastructure for waste processing and develop a Radioactive Waste Management Program to support their 50 pits per year mission

NNSA Waste Management

Mission Objectives

1. **Priority for Timely Off-Site Shipments of NNSA Newly Generated (NGEN) TRU Waste to WIPP**

   Goal: Commitment from CBFO for steady state characterization and certification of waste streams for timely off-site shipping to WIPP (now and to into the future)

2. **Deinventory (TA-55) Stored NNSA NGEN TRU waste**

   Goal: Return TA-55 footprint to NNSA programmatic offices

3. **Manage enduring LLW and TRU waste (*current and projected needs*)**

   Goal: Steady state off-site shipping @ LANL and SRS

4. **Obtain resources to optimize waste processing and disposition**

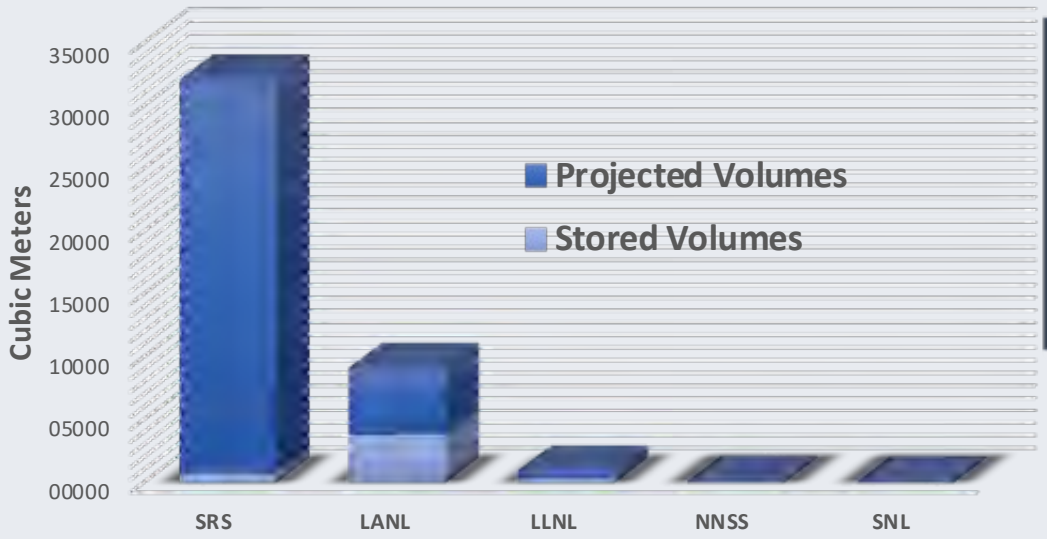
   Goal: Steady state off-site shipping

5. **Six Sigma Process Improvements**

   Goal: Efficient disposition of waste

NNSA TRU Waste Status

NNSA Sites TRU Waste Projected and Stored Volumes



- The 2014 WIPP shutdown forced LANL, LLNL, and SNL to stage all newly generated TRU waste
- In 2019 facilities at these sites were reaching 90% TRU waste storage capacity

LANL-Los Alamos National Laboratory
LLNL-Lawrence Livermore National Laboratory
SNL-Sandia National Laboratories
NNSS-Nevada National Security Site
SRS-Savannah River Site

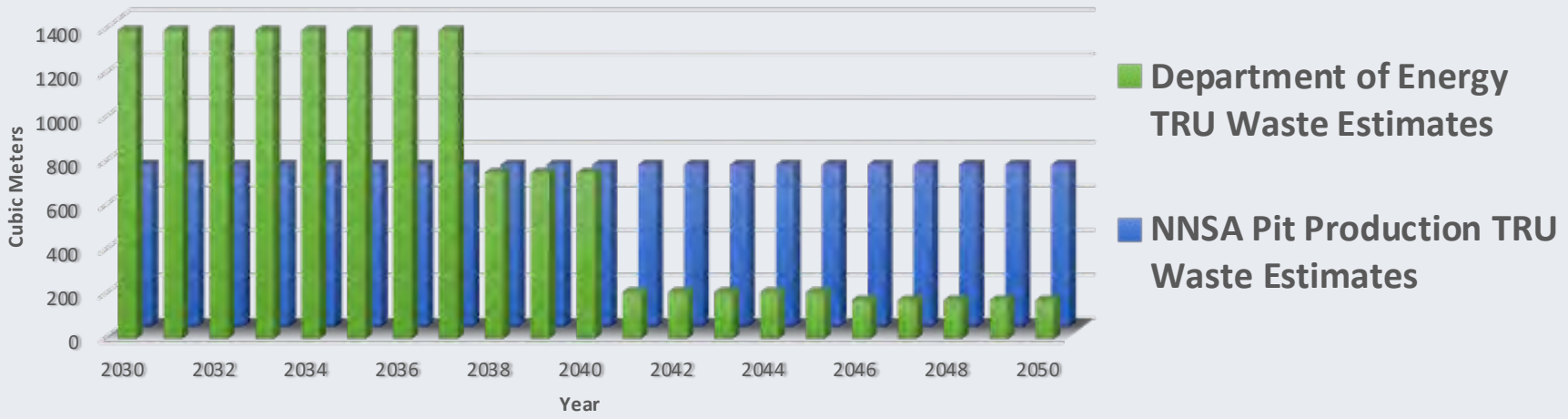
TRU Waste Processing Recovery Efforts: LANL, LLNL, SNL

- LANL:
  - Continue to deinventory stored waste at TA-55 to a manageable level in preparation of the planned WIPP ventilation outage
  - The LANL TRU Waste Facility (TWF) was constructed and placed into service providing additional staging capacity
- LLNL: Initiated a TRU waste campaign to certify and ship 869 containers
- SNL: In July 2020, the site shipped 11 shielded container assemblies (SCA) containing remote handled TRU waste.

NNSA is recovering from the 2014 WIPP shutdown

20 Year TRU Waste Projections

DOE/NNSA TRU Waste 20 Year Projections (2030-2050)



- LANL and SRS pit production activities will collectively generate approximately 734 cubic meters of TRU waste annually beginning 2030, assuming 80 pits per year is achieved
- As sites develop their site-specific contingency plan for unexpected WIPP outages, NNSA is focusing efforts on timely characterization, certification and off-site shipment of newly generated TRU waste
- Continued availability of WIPP to dispose TRU waste for the next 50+ years is of the utmost importance to NNSA's mission
- It estimated that by 2038 NNSA will be largest generator of TRU waste

Challenges

- Sites must ensure that TRU waste is processed compliantly and efficiently so that waste shipments are executed as planned, which requires sufficient waste staff and equipment, and a robust waste training program
- NNSA sites continue to make significant progress on improving container characterization and certification rates (stored containers vice newly generated) with an ongoing effort to ensure these processes achieve optimal certification rates
- There is a need for process optimization as waste is processed at sites

TRU Waste Improvement Efforts

Independent Assessment:

- NNSA is engaging an independent assessment team to conduct a structured improvement activity using Six Sigma methods and tools to optimize TRU waste processing from point of generation to WIPP disposal for LANL TRU waste
- Objective of the assessment is to improve LANL TRU waste processing:
  - Complete deinventory of TA-55 is achieved by CY 2022
  - Improve and sustain monthly certification rates
  - Ensure throughput capacities can support more than six shipments a month
  - Prepare to support the processing of 2000+ containers per year
- This effort will inform SRS as they develop a TRU waste program in support of pit production

LANL and SRS must focus on timely processing of TRU waste and avoid dependence on the development of new TRU waste storage facilities

Questions?