

# Mixed Low-Level Waste at Los Alamos National Laboratory

Ken Hargis

Environmental Programs Directorate

Presented at WM '07 Symposium

Tucson, Arizona

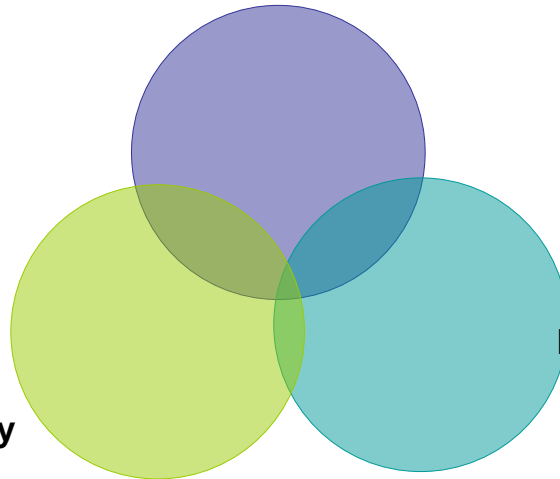
February 28, 2007

# LANL Manages Three Categories of Mixed Waste

---

## MLLW

(mixed low-level waste)  
Can be treated and land-disposed.  
LANL inventory is down to  
about 5 m<sup>3</sup> from 800 m<sup>3</sup> ten years ago



**MTRU Waste**  
(mixed transuranics)  
Greater than 100 nCi/g,  
destined for the WIPP repository

**"Alpha MLLW"**  
(10-100 nCi/g mixed waste)  
MTRU that will be re-classified to MLLW  
Estimated removal of up to 800 m<sup>3</sup>  
from the TRU inventory

# History of Mixed Waste at LANL

---

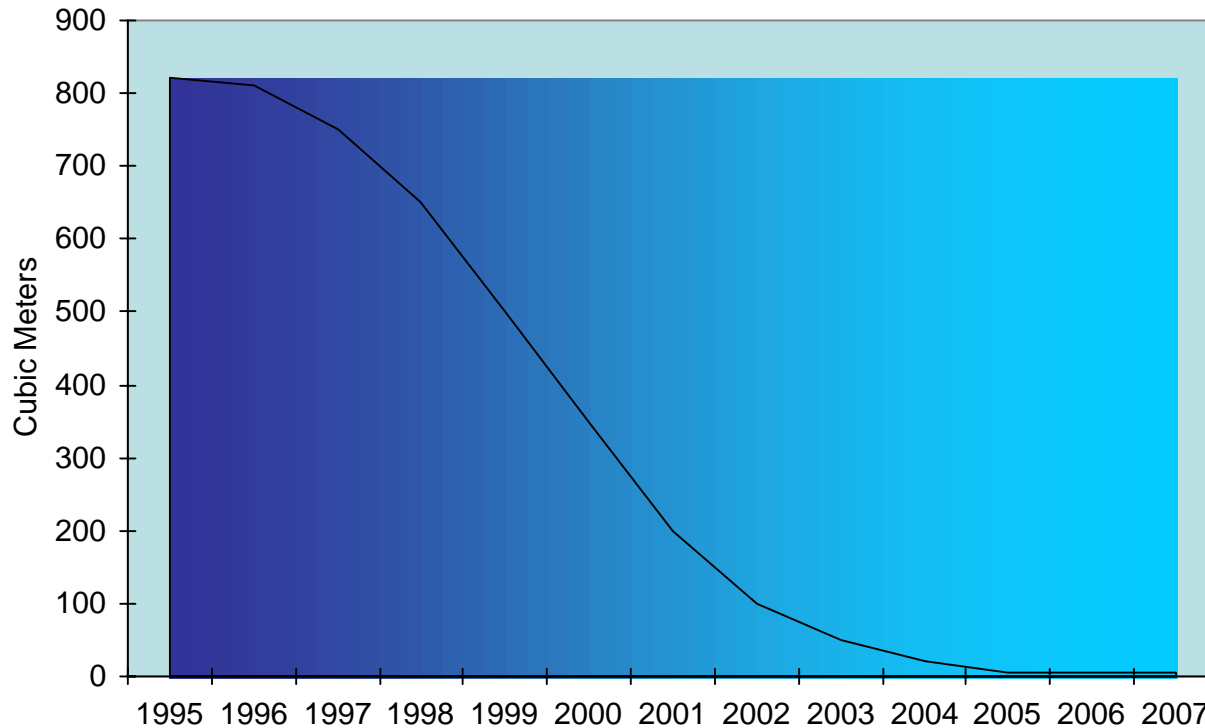
- Under a Federal Facilities Compliance Order, the DOE and NM Environment Department negotiated a Site Treatment Plan (STP) in 1995 that set milestones for disposition of the Laboratory's MLLW. MTRU was also included with a requirement for disposition to WIPP.
  - LANL has completed the first set of milestones by disposing of its 800 m<sup>3</sup> legacy MLLW volume in 2005, one year ahead of schedule.
  - Any MLLW stored over one year must be added to the STP Compliance Plan Volume in the annual update to NMED.

# Technical Area 54, Area L Mixed-Waste Facility (1997)

---



# Mixed Low-Level Waste Volume Decrease since 1995



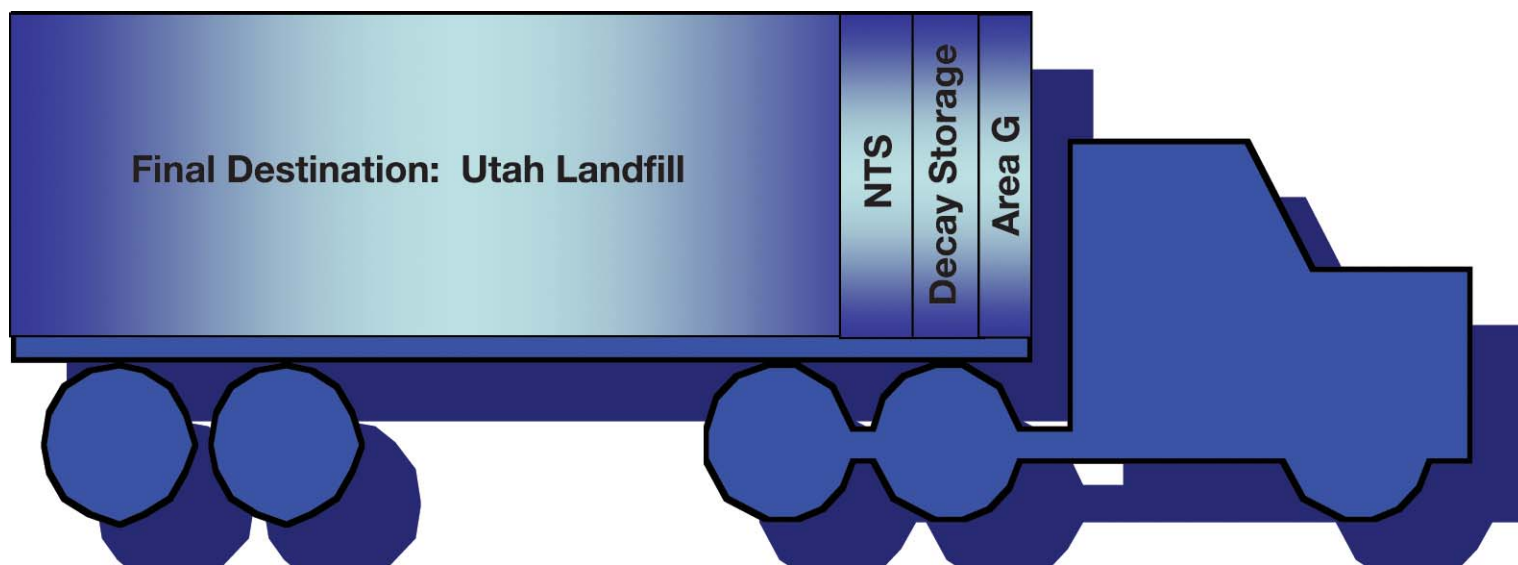
## Technical Area 54 Area L in 2006

- Area L— Mixed Low-Level Waste after inventory reduction (only about 5 m<sup>3</sup> remain)



## Mixed Waste Destination

A small portion, about 5%, of the waste that has been treated to meet the EPA's Land Disposal Restrictions is returned to LANL for disposal at TA-54, Area G.



# Current Mixed-Low-Level Waste Operations

---

- MLLW generation ( $\sim 20 \text{ m}^3/\text{year}$ ) from Lab operations is decreasing each year and is stored an average of 8 months before shipment to off-site commercial facilities. Less than 1% has no current disposal path, and has been added to the STP Compliance Plan volume.
- Substantial amounts ( $\sim 50 \text{ m}^3/\text{year}$ ) of additional MLLW comes from other activities, and is usually sent directly off-site to commercial facilities.
  - Environmental Restoration activities such as soil cleanups
  - Decommissioning, decontamination, and demolition of buildings



# Waste Reduction

---

- Combined strategies have *significantly decreased Mixed Low-Level Waste generation* at LANL over the last decade.
  - **Waste minimization** procedures that substitute non-hazardous materials, reduce reagent use, decrease packaging, etc.
  - Sort-survey-decon procedures that remove surface radioactivity
  - More accurate characterization of suspect waste
  - Labpacking and consolidation of similar waste streams
  - Generator treatment such as neutralization
  - **Recycling** of 50+ cubic meters of steel and lead within DOE

# LANL “Orphan MLLW”

- About 5 cubic meters in inventory
- Primarily high tritium waste
  - “Cryotraps” – Mercury and tritium contamination
  - “Squib Assemblies” – Lead and tritium contamination
  - Other MLLW with tritium
- Tritium levels between 3,000 and 40,000 Curies

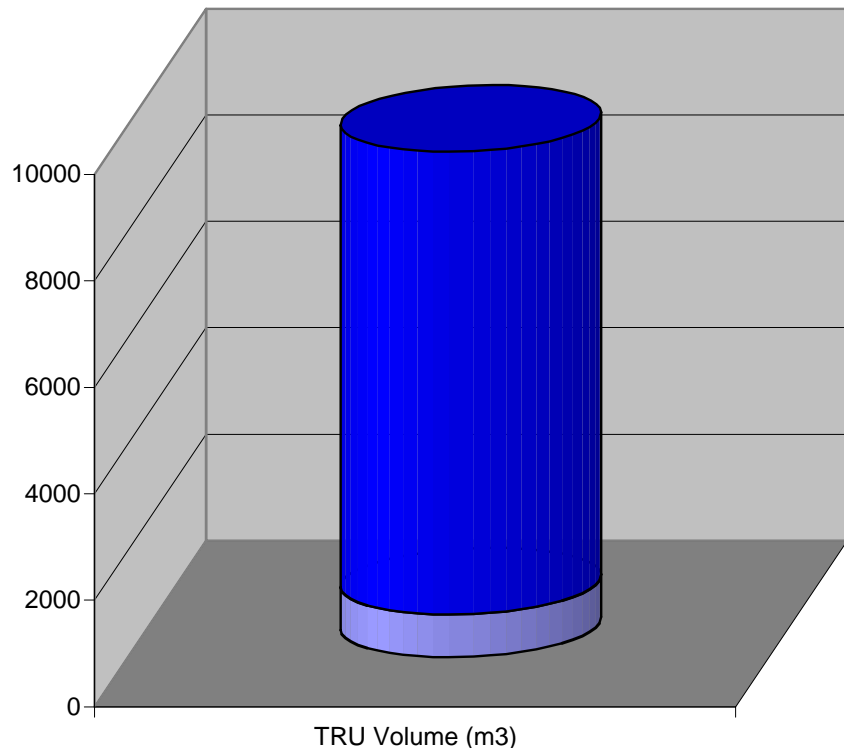


# Additional Examples of “Orphan MLLW”



# MLLW from the LANL TRU Waste Inventory

- Project that about 5,000 drums (1,000 m<sup>3</sup>) of LANL TRU waste (10%) may be < 100 nCi/g after WIPP assay
- 25% to 75% may be mixed waste
- Plan to characterize and ship MLLW to commercial sites for treatment and to NTS for disposal in FY08, FY09, and FY10
- Plan to dispose of most LLW on site at LANL, but some could be disposed at NTS



# High Activity Mixed Waste at LANL

- Includes both debris and homogeneous wastes such as cemented wastewater treatment sludges
- Expect most to fall between 10 to 100 nCi/g, although some could be  $< 10$  nCi/g because some TRU waste was placed into storage when TRU waste was defined as  $> 10$  nCi/g
- Variety of hazardous constituents expected



# Current Status of LANL High Activity MLLW

---

- LANL is evaluating options for management of the 10-100 nCi/g Mixed Low-Level Waste category
  - Estimates of volumes and costs for treatment by commercial treatment facilities are being compiled for planning purposes
  - Prefer to have site that treats waste also ship directly to NTS for disposal, but LANL can ship to NTS from LANL under its certification program if required
  - A pilot waste stream has been profiled to a commercial treatment facility
  - Schedule for MLLW from TRU driven by TRU Waste Disposition Project budget; emphasis primarily on high activity TRU in in FY07. Recognize window for disposal of MLLW at NTS ends in December 2010

# Summary

---

- LANL has successfully used commercial treatment and disposal of MLLW, and believes that this approach will also be successful for orphan and 10-100 nCi/g MLLW (with disposal at NTS)
- LANL continues to dispose of its operational MLLW within one year of generation and is developing options to dispose of all remaining Mixed Low-Level Waste items.
- LANL is preparing to meet the challenge of treating and disposing of the next category of 10-100 nCi/g MLLW