

**Los Alamos National Laboratory's 3,706 TRU Waste Campaign - TRU  
Reclassified Material Disposition Program and Disposal Options at WCS  
Resulting in Significant Cost and Schedule Savings - 14650**

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**ABSTRACT**

The State of New Mexico, the Department of Energy's National Nuclear Security Administration (DOE/NNSA), and Los Alamos National Laboratory (LANL) agreed to remove 3,706 cubic meters of TRU waste stored above ground at Area G under an accelerated 30-month schedule. The original approach was based on either disposal at WIPP for TRU waste and/or commercial offsite treatment of reclassified mixed low-level waste (MLLW) prior to disposal at the NNSA disposal facility near Mercury, NV. The opening of Waste Control Specialists (WCS) provided LANL a more cost effective option that allowed for the reclassification of the transuranic waste as MLLW through a decontamination and advanced characterization process. This new approach eliminated months of processing for WIPP disposal of TRU waste. Reclassifying the waste as MLLW and direct disposal/treatment at the WCS facility in Andrews, TX allowed LANL to realize the following operational efficiencies:

- ALARA savings;
- Safer onsite operations (minimal size reduction);
- \$9M savings on waste currently under contract;
- Saving valuable real estate at the WIPP facility;
- Lower transportation risk for MLLW (10% of the distance, quicker turnarounds for conveyances); and
- Tenfold increase in the waste disposition production rate.

**HISTORY OF THE 3,706 TRU WASTE CAMPAIGN**

In June 2011, a power line that fell in the forest resulted in a fire that roared through more than 150,000 acres and came to within 3.5 miles of Technical Area G, Los Alamos National Laboratory's waste disposal site. Although the fire did not pose an immediate threat and protective measures were in place, the State of New Mexico, the DOE/NNSA, and the Laboratory made removing the waste stored above ground at Area G a top environmental priority. The State and DOE formed a Framework Agreement that realigned environmental priorities to facilitate the removal of 3,706 cubic meters of TRU stored above ground at Technical Area 54 (TA-54).

The purpose of the Framework Agreement was to address the highest risk, above-ground transuranic waste currently located within TA-54 at LANL and to establish an action-oriented approach that made optimum use of available resources. This Framework Agreement was a non-binding agreement in principle entered into voluntarily by both sides.

As part of the agreement, DOE/NNSA committed to continue to accelerate the rate of removal of aboveground TRU at TA-54, Area G, and to focus its efforts to achieve disposition of this TRU waste at the earliest feasible time. Some of the commitments in the agreement included:

- a) DOE/NNSA committed to demonstrating continued progress by increasing shipments of TRU, and thereby achieving decreasing amounts of radioactivity (Pu equivalent Ci) and volume (cubic meters). DOE/NNSA committed to submit to New Mexico Environment Department (NMED) quarterly reports showing this continued progress.
- b) DOE/NNSA committed to the complete removal of all non-cemented aboveground EM Legacy TRU and newly generated TRU currently stored at Area G as of October 1, 2011, by no later than June 30, 2014. This inventory of aboveground TRU is defined as 3,706 cubic meters of material. This commitment is known as the 3706 TRU Waste Campaign.

## **PROJECT PLANNING AND REVIEW OF ALTERNATIVES**

The original approach developed to meet the 3,706 goal was to size reduce and repackage the waste that had been stored since the 1970's above ground in domes. This inventory included primarily drums, large fiberglass-reinforced plywood boxes, and corrugated metal boxes. The planned size reduction was required to fit the waste within a TRUPact II shipping cask for WIPP disposal as well as to meet the WIPP Waste Acceptance Criteria (WIPP-WAC).

Some of the old waste containers--as big as 30 feet long by 12 feet wide and 12 feet high--were initially planned to be size reduced into 55-gallon drums and standard waste boxes (SWBs). See Photo 1 below.

LANL first optimized the TRU waste inventory by re-evaluating the existing composition of some of its containers and recalculating the activity values and comparing them against the 100 nano-curie per gram TRU threshold by re-measuring the total activity through gamma spectroscopy and dividing that activity by a new certified weight for each of the containers. A couple dozen of these large TRU waste containers quickly became reclassified as MLLW, eliminating months of processing for WIPP disposal.

With that initial success beginning in FY2013, LANL retooled their existing facilities toward decontamination of the large waste boxes and internal components so they could be reclassified as MLLW instead of transuranic waste. After the larger waste boxes were decontaminated, they were then shipped offsite for treatment at commercial facilities because of the presence of lead including shielding. The commercial facilities shipped the macro-encapsulated waste for disposal at the Nevada National Security Site disposal facility in Mercury, NV.

In simple terms, the operations were converted from a “chop shop into a car wash.” Under this optimized approach, Los Alamos was able to ship large boxes of MLLW containing intact pieces of large equipment such as glove boxes and drill presses. By doing this, LANL avoided the risky and time-consuming process of cutting up the equipment to fit within smaller WIPP disposal containers. Utilizing this new and innovative approach, LANL has been able to divert forty three percent of the waste associated with the 3706 TRU Waste Campaign for commercial treatment and disposal resulting in an estimated cost savings of \$9M or 25.6% of the processing and disposal costs by not size reducing and treating the waste as TRU at WIPP.



**Photo 1 – Large TRU Waste box known as “The Bus”**

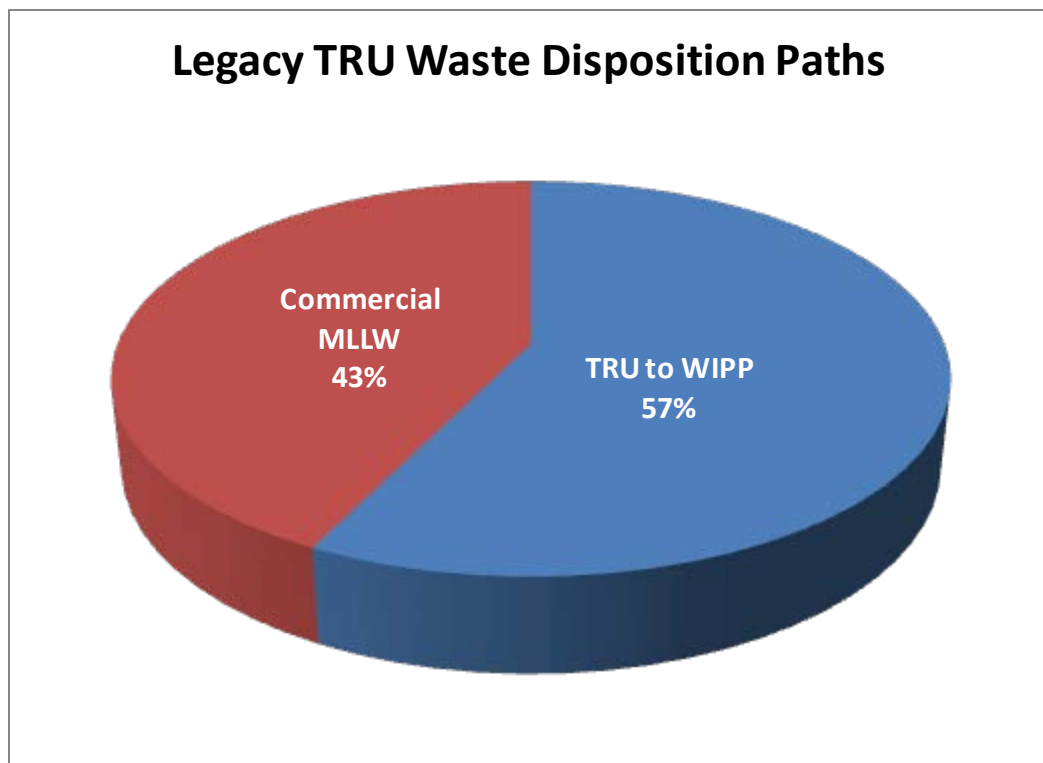


Figure 1. 3,706 TRU Waste Campaign Disposition.

## REVIEW OF COMMERCIAL TREATMENT/DISPOSAL OPERATIONS

About six months before the reclassification processes were initiated, DOE issued the nationwide indefinite delivery, indefinite quantity (IDIQ) contract for the disposal of Class A, B and C LLW/MLLW to WCS. This new disposal option allowed LANL to re-evaluate their treatment and disposal options. Prior to WCS being awarded the DOE IDIQ contract for disposal of Class A, B and C waste in April 2013, LANL awarded two task orders for treatment of Class C MLLW debris at commercial treatment facilities and disposal at NNSS.

After thorough detailed analysis, it was determined that the use of WCS's DOE nationwide disposal IDIQ contract resulted in a significant cost savings compared to commercial treatment followed by disposal at NNSS. In addition to the cost savings, there was a lower transportation risk because of the 395-mile trip from LANL to WCS in Andrews, Texas compared to the 3,219-mile trip from LANL to Oak Ridge, TN followed by the trip to NNSS in Mercury, NV. WCS also provided additional flexibility in managing the receipt and storage of special nuclear material and increased efficiency associated with turnaround of transportation conveyances.

In addition, DOE federalized the disposal contracts allowing DOE to establish task orders directly with the Treatment, Storage, and Disposal Facility (TSDF). By federalizing the disposal contracts, the 26 percent overhead/G&A applied by the management and operations (M&O) contractor was eliminated resulting in additional savings to DOE-EM.

An added benefit with using WCS is that the approved disposal method for Class B or C waste meets the regulatory definition of macro-encapsulation. Therefore, no additional treatment costs were applied to the LANL waste once it arrived at WCS.

## PRODUCTION RATES

The decontamination and reclassification approach resulted in a tenfold production increase in waste being shipped off site.

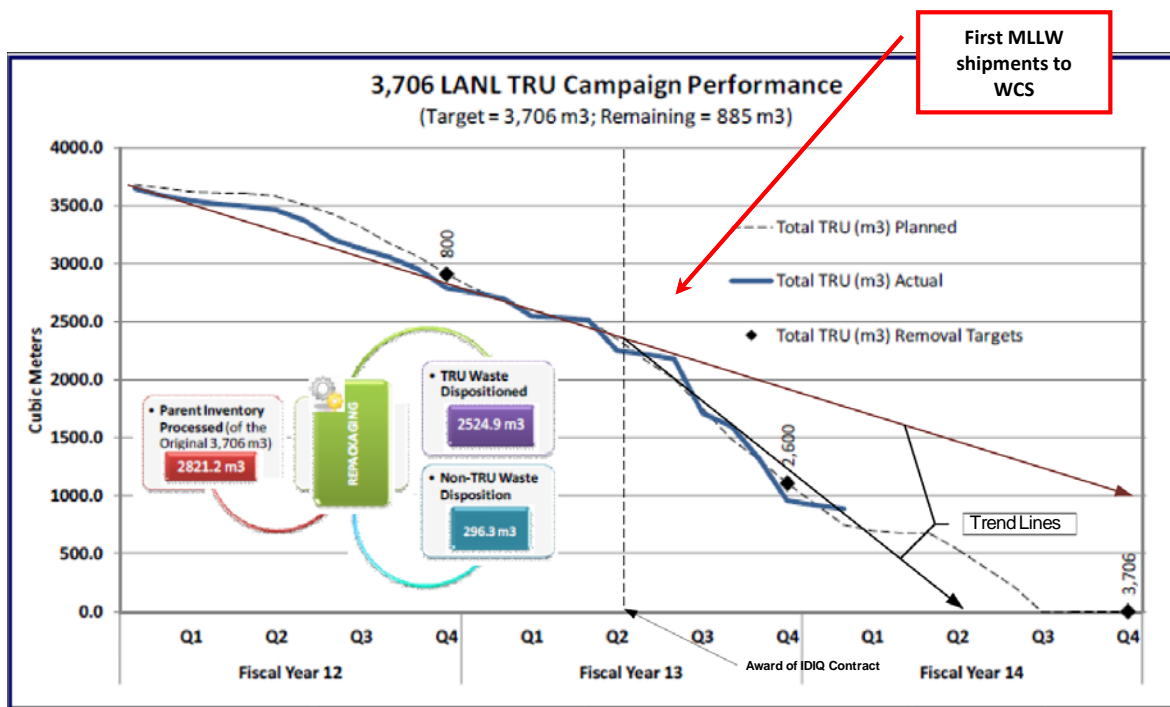


Figure 2. 3,706 TRU Waste Campaign Performance.

## CONCLUSIONS AND LESSONS LEARNED

LANL's original approach for a significant portion of the identified TRU waste was to size reduce the glove boxes to fit into WIPP certified solid waste boxes (SWB) and put them within a WIPP compliant transportation and disposal configuration. At the end of FY2013, LANL redirected their focus to reclassify waste or decontaminate the glove boxes and components and then reclassify them as Class C MLLW. This helped accelerate the schedule. When WCS opened in June 2013, LANL changed their approach again to focus on direct disposal of the resulting Class C mixed waste at WCS. This revised approach resulted in:

- ALARA savings;
- Safer onsite operations (minimal size reduction);
- \$9M savings on waste currently under contract or 25.6% of the processing and disposal costs by not size reducing and treating the waste as TRU at WIPP;

- Eliminates the addition of a 26% overhead/G&A to waste disposal cost;
- Saving valuable real estate at the WIPP facility ;
- Lower transportation risk (10% of the distance, quicker turnarounds for conveyances); and
- Tenfold increase in the waste disposition production rate.