

# Remediated Nitrate Salt Drums Storage at Los Alamos National Laboratory

## Background

Technical Area (TA) 54 is Los Alamos National Laboratory's transuranic (TRU) and low-level waste storage, characterization, and remediation area.

The 63-acre site is located one mile from the community of White Rock and approximately one-eighth mile from the boundary between Pueblo de San Ildefonso and the Laboratory.

As a part of its national security mission, the Laboratory conducts research that generates waste contaminated with radioactive isotopes. During operations, waste is processed, packaged, and shipped to licensed disposal facilities. TRU waste is permanently disposed of at the nation's only TRU waste repository, the Waste Isolation Pilot Plant (WIPP), which is located southeast of Carlsbad, New Mexico. Because WIPP did not open until 1999, the Laboratory stored TRU waste on site at Area G, an area within TA-54.

After the historic Las Conchas wildfire burned within four miles of TA-54 in 2011, reducing the amount of waste in Area G was prioritized. Between October 2011 and May 2014, the Laboratory shipped over 4000 above-ground TRU waste containers.

## Breach at WIPP

In February 2014, a Los Alamos drum breached underground at WIPP. The drum contained nitrate salt waste that was remediated with an organic absorbent. Laboratory scientists conducted experimental and modeling studies to determine what caused the breach. Their investigations indicated that the mixture of nitrate salts and an organic absorbent together with high temperatures and internal pressure can create a potential for exothermic chemical reactions.

After the drum breached, the Laboratory suspended TRU waste shipments and secured the nitrate salt waste drums that remained at the Area G. In addition to the remediated nitrate salt (RNS) waste at the Laboratory, similar drums are underground at WIPP and at Waste Control Specialists (WCS) in Andrews, Texas. The drums at WCS are packed into standard waste boxes inside modular concrete containers. The containers are buried in a disposal cell that is covered with backfill and sand. The remediated nitrate salt waste at WIPP is underground in waste panels that are now sealed.

*TRU waste is stored at Area G within TA-54.*



*The PermaCon at Area G houses the remediated nitrate salt drums.*



*RNS drums are packed inside standard waste boxes inside the PermaCon.*



## Safe Storage of Remediated Nitrate Salt Drums

A significant amount of information was learned through the Laboratory's investigation into the WIPP radiological event. This has helped the Laboratory to develop measures for the safe storage of the RNS drums and their eventual treatment.

The RNS drums at Area G are nested in either steel standard waste boxes or 85-gallon drums and are stored in a contamination-control structure known as a PermaCon. Designed for the storage and handling of radiological waste and kept free of flammable materials, this structure is equipped with fire suppression, a high-efficiency particulate air system (HEPA), and a climate control system. The containers are monitored for temperature, sampled for gases, and visually inspected.

In August 2015, the Laboratory installed a supplemental cooling system where the RNS drums are stored. Although the waste is currently in a safe configuration and is being monitored, controlling the temperature inside the structure adds another layer of protection. This effort is among several layers of precautions designed to secure the waste.

To help further reduce the potential for pressure to contribute to an exothermic chemical reaction, beginning in the spring of 2016 the Laboratory will install supplemental HEPA filtration vents and pressure relief discs on the RNS drums. This will prevent pressure from building up inside an RNS drum.

A plan for the treatment of the RNS drums is being developed. After the drums are treated, they will be ready for shipment offsite.



*A supplemental cooling system was installed where the RNS drums are stored.*



*A 40-ton chiller provides supplemental cooling for the RNS drums inside the PermaCon.*



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