

WM'00 Conference, February 27-March 2, 2000, Tucson, AZ

**COMPONENTS AND PROCESSES THAT ENABLED LOS ALAMOS NATIONAL LABORATORY TO
SHIP TRANSURANIC WASTE TO WIPP
OR**

WHAT IT TOOK TO SMOOTH THE FINAL SPEED BUMPS ON THE ROAD TO WIPP

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ABSTRACT

Los Alamos National Laboratory (LANL) sent the historic first load of transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP) on March 25, 1999. The cheers of supporters and the groans of protesters that night marked the end of the last two years in the effort to open the world's first permitted TRU waste disposal site. Some of the most significant events in the final two years were: 1. LANL became the first site authorized to certify and ship waste to WIPP; 2. the Department of Energy (DOE) decided to legally ship non-mixed TRU waste to WIPP prior to the New Mexico Environment Department (NMED) issuing the mixed waste permit for the facility; 3. LANL and DOE identified a non-mixed waste stream at LANL for shipment to WIPP; 4. LANL characterized and repackaged the waste to meet WIPP requirements; 5. NMED requested a Sampling and Analysis Plan (SAP) that would validate the Acceptable Knowledge (AK) process for the identified waste stream; 6. LANL provided the DOE legal team technical arguments that radiolytic degradation of waste materials did not render the waste hazardous; 7. LANL performed the requested waste sampling and analysis; 8. NMED approved the results of the SAP; 9. the DOE legal team presented the data and defended LANL's certification activities in court; 10. the New Mexico Attorney General (AG) filed a lawsuit attempting to prevent the shipments; 11. Federal Judge Penn's ruling cited NMED's approving the non-mixed waste status of this waste as supporting his lifting of an eight-year injunction against opening WIPP; 12. Judge Penn dismissed the New Mexico AG's lawsuit; 13. LANL certified the waste; 14. LANL loaded the waste into TRUPACT-II containers and sent it to WIPP.

Some activities were required only for the opening of WIPP, e.g.,: the decision to open WIPP for non-mixed waste prior to issuance of the RCRA part B permit; sampling and chemical analysis for AK validation; the legal process to defend LANL certification activities; the legal process to remove the federal injunction and other lawsuits. The other listed activities were normal, and would be expected of any site shipping non-mixed waste to WIPP.

This paper documents the more significant events that occurred in the two years prior to LANL's first shipment to WIPP. In addition, a chronology is provided with further details of the drama associated with LANL's historic first shipment.

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INTRODUCTION

In the two years preceding the first shipment of transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP), there were several times that Los Alamos National Laboratory (LANL) seemed ready to send containers of TRU waste to WIPP for disposal. However, either an agency, an individual, or a process challenged the legality of the pending shipment. LANL and the Department of Energy (DOE) answered all of the challenges while simultaneously building the network of capabilities that any site would be required to have prior to its shipping TRU waste to WIPP. Some special capabilities were built by LANL and DOE for a one-time demonstration of adequacy to certify and ship waste.

DISCUSSION

Events Leading up to the First Shipment

In early 1997, LANL was working toward achieving site certification. This multi-year work plan was finally accomplished on September 12, 1997, when the DOE Carlsbad Area Office Manager declared, "The CAO Manager

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is granting authority to LANL to characterize and certify...waste and transportation authority for the use of the TRUPACT-II.” (1). Certification is composed of approvals for the methods, training, and operation of a host equipment and processes including radioassay, radiography, sampling, chemical analysis, visual examination, transportation, records management, acceptable knowledge (AK), and project management. LANL was also striving to meet a performance measure for DOE to have some certified TRU waste ready to ship to WIPP. Early on, the logical choice of waste appeared to be a mixed waste stream that offered ease of access, good AK, and compliant packaging.

In a move that completely rearranged LANL’s waste stream priority, in March of 1997, DOE requested LANL to select a non-mixed waste stream as the first shipment to WIPP. The decision to ship non-mixed was made because DOE could send it and WIPP could receive it without approval from the New Mexico Environment Department (NMED). NMED would later issue the hazardous waste permit for WIPP, but DOE could make the initial non-mixed shipment because NMED has no authority to regulate purely radioactive waste. The choice of non-mixed waste redirected the LANL effort and greatly increased the difficulty of some aspects of the waste preparation. However, offsetting that was renewed hope that the impasse could be broken and the waste would actually go to WIPP, and not just be stored on a loading dock. LANL retooled its repackaging and radioassay (2) capabilities and began to prepare for 17 shipments of Pu-238 contaminated waste^(a). By May 29, 1998, LANL had loaded three Transuranic Waste Transporter (TRUPACT-II) containers with non-mixed TRU waste for shipment to WIPP, thus satisfying the DOE performance measure.

Meanwhile LANL had to obtain approval to ship the waste as non-mixed waste. The drama of the approval process continued as the NMED requested a totally new Sampling and Analysis Plan (SAP) that would validate the AK process related to chemical constituents (3) for the identified waste stream. Concurrent with this effort, LANL provided technical arguments that radiolytic degradation did not render the waste hazardous. LANL performed the sampling and chemical analysis (4). The NMED approved the results of the SAP and concurred that LANL could manage this waste as non-mixed waste. The DOE legal team defended the data and LANL’s certification activities in court. Then, the New Mexico Attorney General (AG) filed a lawsuit to prevent the shipments. The NMED approved the results of the SAP, leading Federal Judge, Penn, to lift of an eight-year injunction against opening WIPP. At the same time, Judge Penn dismissed the New Mexico AG’s lawsuit and ruled that WIPP had interim status. Now, the final speed bump on the “road to WIPP” had been smoothed. On the evening of March 25, 1999, the world’s first shipment of TRU waste left LANL on its historic one-way trip to WIPP.

Table I provides a list of the core capabilities required for standard shipping to WIPP and also a list of one-time requirements for opening WIPP. Aside from the requirements in Table I, optional future activities can improve certification efficiency and may even obviate the need for some of the infrastructure. One such activity being undertaken by LANL and other sites is data management via automated database. Another improvement being developed by LANL and CAO is mobile visual examination and repackaging (5) and an additional suite of mobile characterization capabilities.

**TABLE I.
DOE Generator Site Requirements for Certifying TRU Waste**

REQUIRED CORE CAPABILITY (Infrastructure)		ADDITIONALLY REQUIRED FOR OPENING WIPP
<ul style="list-style-type: none"> • project management • quality assurance • certification • packaging • radioassay • radiography 	<ul style="list-style-type: none"> • chemical analysis • visual examination • transportation • records management • acceptable knowledge 	<ul style="list-style-type: none"> • sampling and chemical analysis to validate AK process • legal process to remove federal injunction • technical arguments regarding effects of radiolysis • decision to open WIPP with non-mixed waste the RCRA part B permit

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Detailed Chronology of the Last Two Years Prior to LANL's First Shipment

The following is a detailed chronology that is included to help clarify the timing of events and to provide additional interesting details of the drama.

March 25, 1997 – This is an arbitrary 2-year starting point for the chronology.

March 25, 1997 to May 1, 1997

- LANL receives a request from CAO to identify a non-mixed TRU waste stream for disposal at WIPP (WIPP will be able to accept non-mixed TRU waste prior to the issuance of the RCRA Part B permit).
- After an exhaustive search of DOE sites and waste streams, a LANL non-mixed TRU waste stream is chosen for preparation.
- LANL becomes the site of primary effort for certification partly because of the selection of the candidate waste stream.
- An upgrade is made to the Safety Analysis Report (SAR) of the transportation facility to allow shipping activities and facility radionuclide inventory sufficient to prepare shipping payloads.
- The determination was made that the waste was defense waste and was not prohibited at WIPP^(b).

May 1, 1997 to September 12, 1997

- LANL continues to resolve audit issues in the effort to achieve certification authority to dispose of TRU waste at WIPP.

September 12, 1997

- The CAO manager approves certification authority for LANL to dispose of TRU waste at WIPP.
- EPA delays the Compliance Certification Application (CCA).

January 1, 1998 to March 25, 1998

- LANL selects TRU waste drums from among those already radiographed and begins visual examination (VE) and repackaging of 36 drums of Pu-238 contaminated waste(2).
- LANL obtains approval of the Unresolved Safety Question (USQ) for highly loaded Pu-238 waste.
- LANL begins headspace gas analysis (HGAS) of the drums.
- LANL begins first stage repackaging.
- LANL continues radioassay and certification efforts for the waste stream.

March 1998

- LANL begins second stage repackaging to prepare 102 standard waste boxes from the assayed waste.
- LANL continues certified assay with feedback to the repackaging process to refine the method for pre-screening and splitting of radionuclides between drums.

May 25, 1998

- LANL begins loading three TRUPACT-II containers with the first six standard waste boxes (SWB)s to satisfy a DOE performance measure to have certified TRU waste prepared for WIPP.
- A federal court enforces the 1992 injunction prohibiting shipment of any TRU waste to WIPP. Judge Penn's clock for deciding to remove the injunction begins.

June 2, 1998

- Crews unload the TRUPACT-II containers because shipment would be delayed more than 30 days.

June 11, 1998

- NMED requests that sampling and chemical analysis should be done to validate the non-mixed status of chosen waste stream.

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June 25, 1998

- NMED requests supplemental information and responses to questions regarding AK documentation to support the AK Summary Report for LANL Waste Stream TA-55-43, Lot No.1.
- NMED personnel on site for a two week audit of the AK report.

June 30, 1998

- LANL / DOE provide the response to the NMED request for supplemental information on the AK report through the DOE headquarters legal team.

July 6, 1998

- LANL provides additional clarification to NMED's questions on the June 30, 1998 submittal.

July - September 1998

- LANL assembles the sampling and analysis team.
- LANL develops the sampling and analysis plan (SAP).
 - LANL negotiates technical details of the SAP with NMED and its technical subcontractor.
 - LANL renegotiates the SAP with NMED as required to satisfy NMED technical requirements.
 - LANL Grand Junction Project perform numerous chemical analyses on cold, surrogate materials to obtain baseline information for formulating statistics.
 - LANL resolves technical issues raised by NMED on potential impacts of radiolysis on the waste materials.
 - NMED approves the SAP on September 24, 1998

September 28, 1998

- LANL team begins sampling of waste for subsequent chemical analyses.

September 30, 1998

- LANL completes preliminary repackaging of the non-mixed TRU waste.

September to November, 1998

- LANL and CAO personnel have numerous appearances in court defending LANL certification process and data. This includes AK, radioassay, radiography, VE, headspace gas sampling and analysis, TRUPACT-II operations, training, QA, and data entry and transmission. The LANL records management team provides records, records of records, copies of records, etc.
- DOE HQ legal counsel verifies LANL activities are valid.
- Conduct sampling and analysis
 - Waste materials are sampled at LANL Visual Examination Facility.
 - Radioactive samples are shipped to the LANL CMR facility for analysis.

November, 1998

- LANL writes the report on the results of sampling and analysis.
- LANL responds to NMED technical questions regarding the report.
- LANL provides clarifications to the NMED questions.

December, 1998

- The DOE HQ legal team negotiates the court date to defend SAP data.

December 2, 1998

- NMED accepts the SAP report, concurring that the analyzed waste can be managed as non-mixed waste.

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February 25, 1999

- The DOE Los Alamos Area Office (LAAO) issues the 30-day notice of intent to ship waste from LANL to WIPP.
- The Environmental Evaluation Group (EEG) files a lawsuit to block the proposed shipment.

March 1999

- Judge Penn hears the legal briefs of both sides regarding the NM Attorney General's lawsuit claiming WIPP cannot open prior to issuance of the RCRA Part B permit and the lifting of the 1992 federal injunction prohibiting shipment of any TRU waste to WIPP.

March 22, 1999

- Judge Penn rules (based primarily on the NMED concurrence that this waste can be managed as non-mixed waste):
 - To remove the 1992 federal injunction.
 - To dismiss the New Mexico Attorney General's lawsuit.
- Judge Penn further rules that WIPP has interim status.

March 22, 1999

- LANL begins loading three TRUPACT-II containers with six standard waste boxes.

March 24, 1999

- DOE / LANL close public access to the road outside the shipping building for several hours while armed guards in marked and unmarked vehicles, as well as on bicycle, patrol the road for suspicious activities.
- LANL, DOE, supporters, and protesters stand by as a dense fog near Clines Corners, New Mexico delays the first shipment.
- Personnel leave the building at 5 a.m. to return later for the rescheduled shipment.

March 25, 1999

- 5:30 p.m. – DOE / LANL close public access to the road outside the shipping building while patrols continue to sweep the road in the early evening darkness.
- 7:51 p.m. - Randy and Mike drive the TRUPACT-II truck out of the gates of LANL TA-54 West.
- LANL and DOE personnel watch the truck's progress on TRANSCOM.
- 8:05 p.m. - The truck passes cheering crowds as it leaves DOE property and hits the open road at White Rock, New Mexico.
- 9:00 p.m. – The truck reaches its first "Safe Haven." The road closure is lifted from LANL, and the jubilant, but exhausted workers go home to watch live television coverage of the truck's progress.
- 10:00 p.m. - Sparse protestors earnestly object to the passing shipment. South of Santa Fe, New Mexico, a state police escort pushes a protester's Yugo automobile out of the highway right of way.

March 26, 1999

- 3:30 a.m. – The TRUPACT-II truck arrives at WIPP amidst the cheers (primarily) of Carlsbad residents and WIPP workers.

CONCLUSIONS

Steps required to smooth the final speed bumps on the road to WIPP for LANL's first shipment of TRU waste to WIPP were taken in the two years between March 1997 and March 1999. The effort included cooperation, contention, compromise, negotiation, and dedication by DOE, DOE contractor sites, federal courts, EPA, and NMED. While not always amicable, the parties followed a laborious technical and legal process that made the long-awaited opening of WIPP a piece of history. As Secretary of Energy, Bill Richardson, later stated in a commendation letter (6) to the LANL Director, "... the Waste Isolation Pilot Plant is an important component in the Department of Energy's plan to clean up nuclear waste throughout the complex. This marked an historic moment

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for the Department of Energy, the Waste Isolation Pilot Plant, the Los Alamos National Laboratory, and New Mexico.”

FOOTNOTES

^(a) Waste containing significant amounts of Pu-238 is more difficult to manage than waste containing only Pu-239 and requires additional controls to prevent inadvertent contamination. Furthermore, the tiny amounts of Pu-238 allowed in the waste (owing to strict decay heat limits) required very long count times with then approved assay methods. The difficulties led to approval of new assay methods and development of innovative packaging techniques.

^(b) Senator Pete Domenici's (R-NM) office argued that the waste from the Cassini space mission was non-defense. The argument against civilian waste claimed that the same reactor that produced weapons plutonium produced civilian plutonium.

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