

THE ROAD TO CLOSURE FOR THE LOVELACE RESPIRATORY RESEARCH INSTITUTE

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ABSTRACT

This paper details the intricate road traveled to prepare, document, and obtain approval to transfer 29 drums of transuranic (TRU) waste from the Lovelace Respiratory Research Institute (LRRI) to Sandia National Laboratories, New Mexico (SNL/NM), thus allowing closure of LRRI. Ultimately the drums will be transported to Los Alamos National Laboratory (LANL) for characterization, certification, and transportation to and disposal at the Waste Isolation Pilot Plant (WIPP). The discussion includes lessons learned and cooperation successes encountered along the path.

The LRRI, formerly known as the Inhalation Toxicology Research Institute, conducted inhalation studies for the Department of Energy (DOE) from 1984 through 1994. During that time, LRRI generated 26 208-liter (55-gallon) drums of TRU waste from the preparation of aerosols using TRU isotopes. The waste consists of combustible and non-combustible debris, and is defined as a retrievably stored non-mixed waste stream. During subsequent decontamination and decommissioning at the LRRI, three additional drums were generated for a total of 29 drums.

Managing the drums toward closure required transferring them from LRRI to SNL/NM for interim storage until they could be transported to LANL for final characterization, certification, and shipment to WIPP. This paper discusses the starts, holds, and restarts of the project, including the documents prepared, interfaces initiated, and lessons learned. Currently, the LRRI has been closed as a DOE TRU waste generator site, and SNL/NM is preparing for shipment of the LRRI waste to LANL in FY05 if possible.

INTRODUCTION

The Lovelace Respiratory Research Institute (LRRI) is located on Kirtland Air Force Base in Albuquerque, New Mexico. Founded in New Mexico in 1947 as a not-for-profit corporation, LRRI is currently a private biomedical research institute housed in several facilities totaling 41,850 square meters (450,000 square feet). Research conducted by LRRI is aimed at reducing the nation's respiratory burden. The research is designed to understand the causes and

mechanisms, eliminate exposures to causal agents, and develop improved treatments for respiratory diseases [1].

Initially, research at LRRI, formerly known as the Inhalation Toxicology Research Institute (ITRI), was focused on the human health consequences associated with inhalation of airborne radioactive fission products. In the late 1960s and early 1970s, the research program expanded to include research on the transuranic (TRU) alpha-emitting radionuclides. In the 1970s, the research program was broadened further to examine the potential health effects of airborne chemicals released from energy use and energy production sources. Beginning in 1980, their focus shifted to include more basic research, with an emphasis on understanding the fundamental biological response of the respiratory tract to inhaled materials [2].

From 1984 through 1994, LRRI conducted inhalation studies for the Department of Energy (DOE). The mission was to develop experimental data that contribute to an improved understanding of the short- and long-term biological consequences of inhaling radioactive and other toxic materials associated with various energy technologies. The research included preparing aerosols using TRU isotopes. For TRU waste management purposes, LRRI was considered a TRU waste generator organization within the Los Alamos National Laboratory (LANL) system [2]. LRRI was also identified as a small quantity site (SQS) for closure in fiscal year (FY) 03.

Initial Waste Generated

Originally, 26 drums of TRU waste were generated and packaged in 208-L (55-gal) drums with rigid 2.3 mm (90-mil) liners. The waste is classified as non-mixed debris consisting primarily of iron brackets, tubing, wire, tin cans, small laboratory equipment, paper towels, cardboard boxes, wood, sandpaper, sponges, pipettes, petri dishes, bags, plastic bottles, centrifuge tubes, latex gloves, stoppers, pipette bulbs, glass, and small bottles of solidified generator solutions used to prepare the aerosols. The LRRI waste was generated under an established and controlled waste management program documented in the Quality Assurance Plan for Certification of ITRI-Generated TRU Waste [3]. The waste was packaged under approved LRRI waste management procedures [4, 5] prohibiting liquids, toxic substances, corrosives without neutralization, pyrophorics, explosives, compressed gases, or free liquids. A TRU Waste Drum Record form or TRU Waste Package Record form was required to be completed before the health physicist signed that the drum was approved for storage [6].

Disposal Options

At the time the waste was generated and packaged, the only path forward for disposal was the Waste Isolation Pilot Plant (WIPP), which was still several years from opening. As an SQS, LRRI did not have the storage capacity or the resources to develop a WIPP certification program. It was determined that Sandia National Laboratory/New Mexico (SNL/NM) would store the waste until options were examined and a path forward was determined. In the early stages of this project, LANL was identified as one option where the waste could be transported from SNL/NM for final characterization, certification, and shipment to WIPP.

Path Forward

In 1995, the 26 drums were transported to SNL/NM. Disposal request forms were prepared by LRRRI personnel and reviewed by SNL/NM staff, and the drums were transported by SNL/NM. The drums were packaged in 17C 208-L (55-gal) drums, with 2.3 mm (90-mil) rigid liners. However, the drums were not vented with approved filters, and in 1996, SNL/NM in conjunction with LRRRI personnel, performed real time radiography (RTR), installed WIPP-approved Nuclear Filter Technology (NFT) filters, opened the drums to remove any prohibited items, and punctured all of the inner bags to reduce the layers of confinement. This activity was documented on TRU Waste Inspection and Venting Log forms [7]. After this campaign the drums were placed back in storage at SNL/NM.

In 1998, DOE and LANL initiated an effort to prepare an acceptable knowledge (AK) report to enable the 26 drums to be transported to LANL for final characterization and certification. A draft AK Summary Report was prepared. At this time, the WIPP Hazardous Waste Permit did not exist, hence no Waste Analysis Plan (WAP) [8] was available; therefore, the draft AK Summary Report was prepared under the requirements of the WIPP Quality Assurance Program Plan (QAPP) [9]. The LRRRI document control and records management system contained many of the procedures (i.e., protocols) used to conduct the research and prepare the aerosols. In addition, several of the researchers and waste management personnel who were conducting research and were responsible for waste management activities, respectively, were available for interviews. A draft document was prepared [2], but other priorities were identified, and the project was put on hold.

In 1999, another effort was initiated to prepare the 26 drums for shipment to LANL. The draft AK Summary Report was resurrected. Since the previous effort, WIPP had opened and many of the requirements were changing. Because the radionuclide information obtained from LRRRI was several years old, SNL/NM performed nondestructive assay (NDA) using gamma spectroscopy on each of the 26 drums. Also, the drums were inspected and prepared to meet the requirements of the LANL Waste Acceptance Criteria (WAC) [10]. The radionuclide information (e.g., specific radionuclides, associated activity, calculated decay heat, and fissile gram equivalent [FGE]) was updated in the AK Summary Report to reflect the new NDA results that identified additional radionuclides and concentrations. The project seemed to be making progress in 1999. Determining a shipping container for transporting the waste from SNL/NM to LANL was the last step to success.

During this same time period, Pantex had shipped three drums to LANL in a “Super Tiger” shipping container. As the precedent had been set, it was decided that the drums could be shipped to LANL using the Super Tiger. SNL/NM prepared a transportation plan using the Super Tiger as the shipping container and sent it to DOE for approval.

DOE imposed an immediate halt to the project as the Western Governors Association became involved, and some DOE reviewers disapproved of using the Super Tiger. They wanted to ship only in a Transuranic Package Transporter-II (TRUPACT-II). Therefore, the project was placed on hold again until the requirements of transporting in a TRUPACT-II could be met. Interest and resources were directed to other activities, and nothing moved forward until 2003.

Another Attempt

In early 2003, the DOE emphasis on closure of SQSs brought this project to the table for the third time. Combinations of LRRI, SNL/NM, and SNL/NM subcontractors participated in SQS conference calls with the Carlsbad Field Office (CBFO). The AK Summary Report needed significant changes to meet the more definitive AK requirements in the WAP. The staff in the LANL office located in Carlsbad, NM (LANL/CB) began assembling more documentation to update the AK Summary Report.

The 26 original drums were still being stored at SNL/NM, but 3 new drums of TRU waste had been generated during the decontamination and demolition (D&D) of the Alpha Wing at LRRI. These 3 new waste containers were not D&D waste, such as gloveboxes, but consisted of combustible and noncombustible waste that remained from the plutonium aerosol projects. It was the same type of waste that had been generated in the past and stored at SNL/NM. Waste materials included paper filters used in the plutonium exposure operations, solidified generator solutions in 10-mL (0.34-oz) to 0.95-L (1-qt) containers, and various laboratory equipment and supplies. SNL/NM had performed RTR at LRRI and Eberline Services had performed NDA in late 2002. The following three figures are RTR images representative of the waste stream.



Fig. 1. Drum 79 debris – upper view.

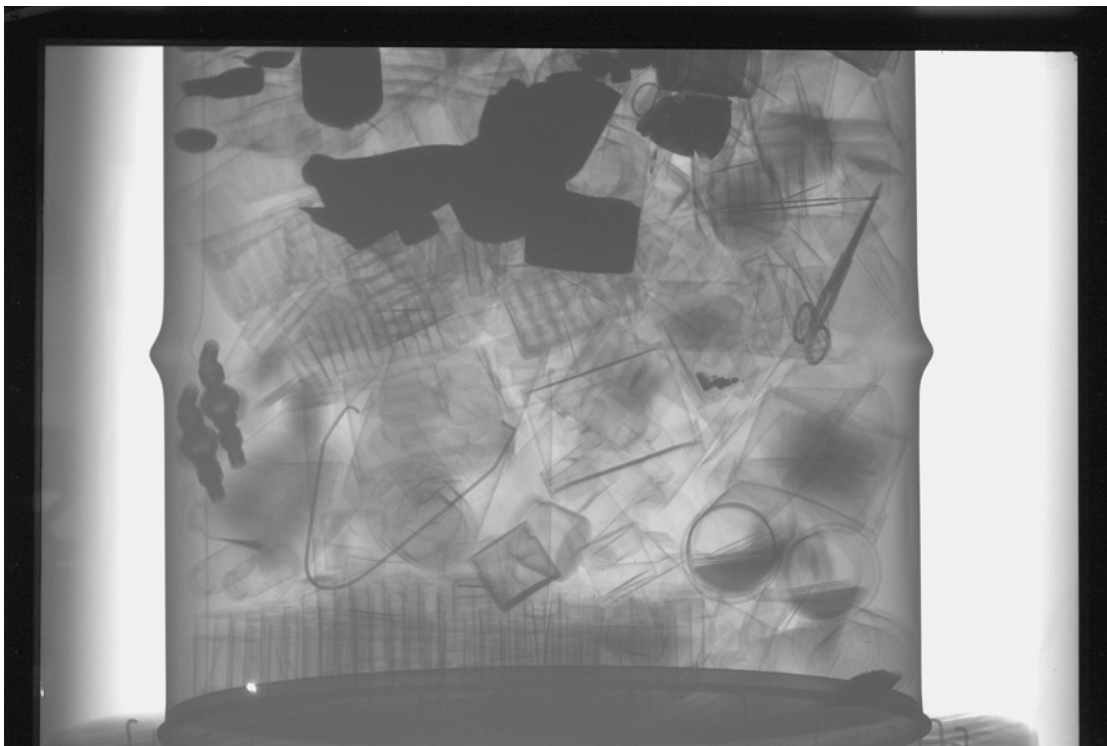


Fig. 2. Drum 79 debris – lower view.

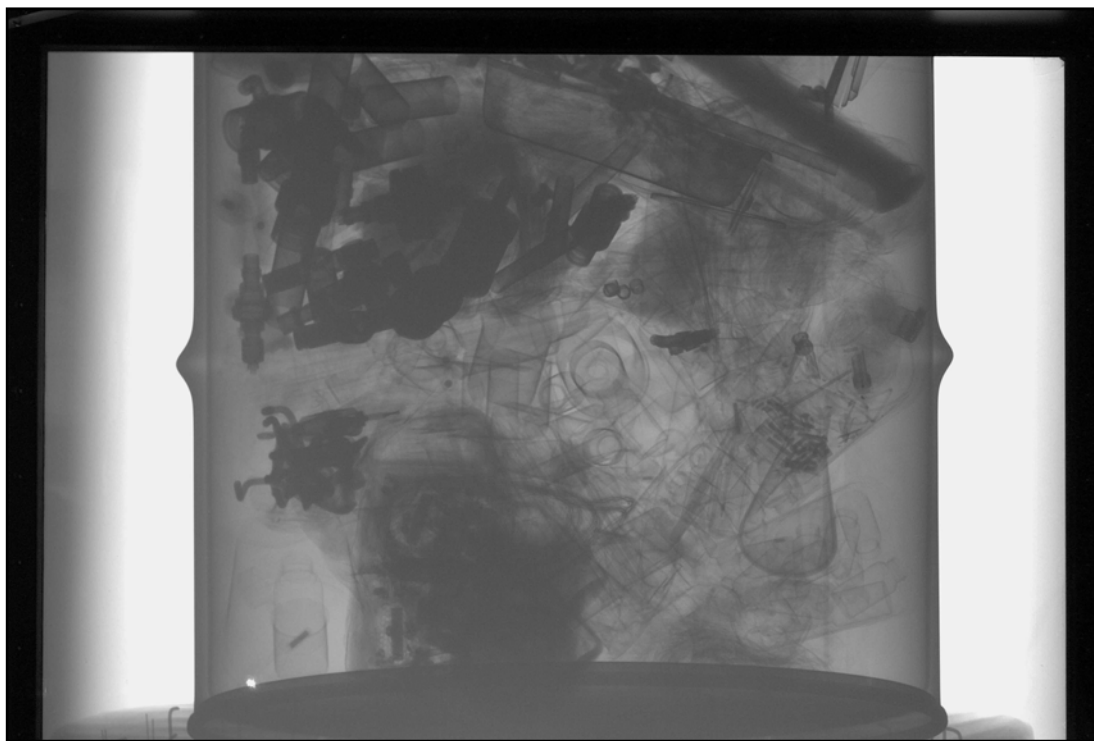


Fig. 3. Drum 82 debris and solidified generator solutions – lower view.

During the course of preparing the AK documentation, it became evident that the process was not moving at a pace that would allow closure of the LRRRI site on schedule. It was already FY04, so a slip in the schedule had already occurred. A decision was made to prepare a TRU Waste Authorized Methods for Payload Control (TRAMPAC) document, since the waste was going to be shipped to LANL for characterization and certification. The available characterization information appeared to be sufficient for transportation purposes. Information in the draft AK Summary Report and the additional information gathered by LANL/CB for the original 26 drums were integrated into a Waste-Specific Data Package CH-TRAMPAC for Lovelace Respiratory Research Institute (LRRRI TRAMPAC) [11]. This document is being prepared under the Centralized Characterization Project (CCP) Transuranic Waste Characterization Quality Assurance Project Plan [12].

The next two hurdles were to transfer the 3 new waste containers to SNL/NM for storage and to assemble, review, and integrate the associated data into the LRRRI TRAMPAC, in that order. Moving the waste containers to SNL/NM would close LRRRI, which was a milestone for DOE and Washington TRU Solutions (WTS). This turned out to be more of a challenge than anticipated.

Examination of the waste containers revealed that filters had not been inserted in the lids. Therefore, the drums could not be transferred to SNL/NM until filters were installed. In addition, one container had a 2.3 mm (90-mil) rigid liner with a lid that did not have an opening. SNL/NM, LRRRI, and WTS worked together to prepare and execute a plan where LRRRI would replace each drum lid with a drum lid and filter supplied by SNL/NM. While replacing the drum lids, LRRRI would also remove the rigid liner lid. These activities were completed on September 27 and 28, 2004. LRRRI notified SNL/NM that the waste containers were ready to be picked up.

While these activities were taking place, disposal requests were prepared, reviewed, and approved by SNL/NM. It finally appeared that everything was in place for the transfer of the final 3 TRU waste containers to SNL/NM and the closure of LRRRI. On September 30, 2004, SNL/NM went to pick up the containers from LRRRI. The SNL/NM waste handlers noticed that the waste containers did not have the required stamp indicating they were Type A containers. The SNL/NM Radioactive and Mixed Waste Management Facility (RMWMF) WAC [13] cannot accept 208-L (55-gal) drums that are not Type A. Documents could not be located that demonstrated they were Type A containers. The waste containers were then placed in Type A 322-L (85-gal) overpacks with WIPP approved filters and transported to SNL/NM. SNL/NM notified WTS and followed with documentation that the containers had indeed been picked up. LRRRI was officially closed as an SQS.

The work continues to complete the LRRRI TRAMPAC document and schedule the transportation to LANL.

Challenges

The challenges faced during this project were many. Some of the more notable challenges are listed below.

- Staff members originally interviewed at LRRRI were no longer employed at LRRRI.
- New waste management personnel at LRRRI were now responsible.
- Protocols, plans, and procedures were in a records management system, but had to be identified, retrieved, copied, and reviewed.
- Three new drums had to be added to the data package.
- Requirements changed, and old documentation did not address current requirements.
- The LRRRI TRAMPAC will have to be approved by CBFO.
- TRUPACT-II loading requirements need to be listed and implemented.
- SNL/NM will have to designate an area for loading the TRUPACT-II.
- Project staff will need to schedule the TRUPACT-II by coordinating with CBFO.
- Training for SNL/NM personnel must be identified and documented.
- SNL/NM training for CCP personnel must be identified and documented.
- Authorization basis documentation must be prepared, reviewed, and approved.

Interfaces

Interfaces were key and continue to be key to the success of this project. DOE had identified a path forward by sending the LRRRI and SNL/NM TRU waste to LANL for final certification and shipment to WIPP. Discussions at the initial meetings between LANL and SNL/NM were not about the LRRRI waste, but for the most part about SNL/NM TRU waste. Later, the LRRRI waste was identified as a prime candidate. LRRRI personnel were contacted to provide historical and technical information regarding the LRRRI mission, waste generating process, and waste management practices needed to prepare the AK Summary Report. LANL and SNL/NM also interfaced to ensure that the LANL WAC would be met.

The Sandia Site Office (SSO) (formerly DOE-Albuquerque), CBFO, and WTS were instrumental in placing the issue of closing SQSs on the radar screen and providing resources to move ahead. During the SQS conference calls, they identified the existence of the Basis for Interim Operation (BIO) for the WIPP Mobile Characterization Units [14], which will allow the TRUPACT-II to be loaded at SNL/NM without **full scale** authorization basis updates and reviews. WTS has provided significant technical assistance with preparation of the LRRRI TRAMPAC and closure of LRRRI in FY04.

The SNL/NM waste management group was identified as a key player because they currently store the waste, maintain the disposal requests from the generator, and will ultimately be

responsible for preparing the waste for shipment to LANL. They have provided resources and guidance throughout this project.

LANL/CB played an important role by updating to current standards the information needed to develop a LRRRI TRAMPAC. They obtained many source documents and conducted numerous interviews, documented the results, and met with SNL/NM and LRRRI to resolve issues and discrepancies.

LANL TRU program management and waste management personnel have been involved since the beginning. They have provided guidance regarding the requirements of their WAC, reviewed the draft LANL disposal requests, provided barcodes with unique ID numbers, and answered many questions regarding the steps necessary to meet the LANL WAC.

Lessons Learned

Although the road to close LRRRI as an SQS has had many hurdles, positive outcomes include the guidance and support from CBFO and WTS. The hurdles, for the most part, have been placed in the road to see if the parties involved could jump that high, that is, to test the cooperative response to changing requirements over time.

Although the 29 waste containers have not been transported to LANL for final certification, the following observations from the LRRRI closure project may be helpful to other sites.

1. Begin assembling documentation, listing options, identifying resources, making contacts as early as possible.
2. Educate project members on all requirements and changes throughout the entire project. Requirements may change the direction of the project.
3. Consider the schedules and other obligations of all parties involved. Other parties have commitments and milestones and cannot always accommodate requests.
4. Examine all options, and no matter what option is initially chosen, be prepared to change course in the middle of the road.
5. Communicate with the TRU waste community. They will help with ideas, suggestions, and help to resolve issues.

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