ESHID-603929

Los Alamos NATIONAL LABORATORY

Environmental Protection and Compliance Division **National Nuclear Security Administration**

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Symbol: EPC-DO: 25-334
Date: November 20, 2025

Mr. JohnDavid Nance, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Subject: Fiscal Year 2025 Los Alamos National Laboratory Hazardous Waste Minimization Report

Dear Mr. Nance:

The United States Department of Energy (DOE) National Nuclear Security Administration, Los Alamos Field Office (NA-LA) and Triad National Security, LLC (Triad) submit the enclosed report titled, *Fiscal Year 2025 Los Alamos National Laboratory Hazardous Waste Minimization Report*, to the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB). The report is required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (the Permit), EPA ID# NM0890010515, Permit Section 2.9, *Waste Minimization Program*. The Permit authorizes NA-LA; the DOE Environmental Management-Los Alamos Field Office (EM-LA); Triad; and Newport News Nuclear BWXT-Los Alamos, LLC (N3B), collectively the Permittees, to manage, store, and treat hazardous waste at LANL.

This report includes the required content for Fiscal Year 2025, as outlined in Permit Section 2.9 for the Permittees at NA-LA and Triad to satisfy the reporting requirement. The enclosure also contains a signed certification from the responsible co-Permittees. The report is required to be submitted annually to the NMED-HWB by December 1 for the previous fiscal year, ending September 30.

If you have any questions for Triad or NA-LA, please contact Naveen Chennubhotla (Triad) at (505) 629-7401, naveenc@lanl.gov or Robert Gallegos (NA-LA) at (505) 901-3824, robert.gallegos@nnsa.doe.gov.

Sincerely,

STEVEN STORY (Affiliate)
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Steven L. Story
Division Leader
Environmental Protection and Compliance
Triad National Security, LLC

Sincerely,

ROBERT GALLEGOS
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Robert A. Gallegos
Program Manager
Environmental Permitting and Compliance
U.S. Department of Energy
National Nuclear Security Administration
Los Alamos Field Office

SLS/RAG

Enclosures: *Fiscal Year 2025 Los Alamos National Laboratory Hazardous Waste Minimization Report*

Copy w/enclosure:

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NMED Hazardous Waste Bureau

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ENCLOSURE

Fiscal Year 2025 Los Alamos National Laboratory
Hazardous Waste Minimization Report

Date: November 20, 2025

U.S. Department of Energy,
National Nuclear Security Administration Los Alamos Field Office and
Triad National Security, LLC

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Approved for public release;
distribution is unlimited.
November 2025

Fiscal Year 2025
Los Alamos National Laboratory
Hazardous Waste Minimization Report

Los Alamos
NATIONAL LABORATORY

Prepared for: New Mexico Environment Department

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Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

STEVEN STORY (Affiliate) Digitally signed by STEVEN STORY (Affiliate) Date: 2025.11.13 09:00:00 -07'00'

11/13/25

Steven L. Story
Division Leader
Environmental Protection and Compliance Division
Triad National Security, LLC
Los Alamos National Laboratory

Date Signed

ROBERT GALLEGOS Digitally signed by ROBERT GALLEGOS Date: 2025.11.20 08:19:27 -07'00'

11/20/25

Robert A. Gallegos
Program Manager
Environmental Permitting and Compliance Programs
National Nuclear Security Administration
Los Alamos Field Office
U.S. Department of Energy

Date Signed

Contents

Figures

Tables

1 Hazardous Waste Minimization

1.1 Introduction

Waste minimization and pollution prevention (P2) are goals for Los Alamos National Laboratory (LANL or Laboratory) and are included in the operating procedures of Triad National Security, LLC (Triad). The U.S. Department of Energy (DOE) National Nuclear Security Administration-Los Alamos Field Office (NA-LA) and Triad are required to submit an annual hazardous waste minimization report to the New Mexico Environment Department (NMED) in accordance with the LANL Hazardous Waste Facility Permit. This report was prepared pursuant to the requirements of the LANL Hazardous Waste Facility Permit, Section 2.9, Waste Minimization Program, and describes the hazardous waste minimization program for LANL under the management and operations contract for Triad, which is implemented by the Environmental Protection and Compliance Division and the Pollution Prevention (P2) Program.

In 2018, Newport News Nuclear BWXT Los Alamos, LLC (N3B) assumed responsibility as the legacy cleanup contractor for the DOE Environmental Management Los Alamos (EM-LA) office at LANL. This report does not include any descriptions of waste minimization associated with transuranic waste or environmental remediation activities under the legacy cleanup contract.

Triad is responsible for current or new-generation[a] mixed transuranic waste (MTRU) generated at several sites at the Laboratory, such as the Chemistry and Metallurgy Research (CMR) Facility at Technical Area (TA) 3 and TA-55, including the Plutonium Facility (TA-55 PF-4). Triad is also responsible for new-generation hazardous waste and mixed low-level waste (MLLW) generated at various facilities across the entire LANL complex.

Minimization of hazardous waste and tracking of hazardous waste generation continued in fiscal year (FY) 2025 (October 2024–September 2025). Projects, summarized later in this report, targeted minimization of hazardous waste as part of the planning process. In FY 2025, debris waste from TA-55 PF-4 operating activities that support the plutonium pit mission is a significant component of Triad's MTRU waste. For hazardous waste in FY 2025, a significant waste by volume is trace high-explosives-contaminated debris from demolition of TA-16-0380. For MLLW, cadmium- and lead-contaminated debris from TA-55 operating activities is the highest component by volume. The Laboratory's waste minimization efforts and analysis of waste streams from reoccurring operations[b] are discussed in detail in this report.

Figure 1-1 depicts the total hazardous, MLLW, and MTRU wastes generated in FY 2024 and FY 2025 from reoccurring operations.

[a] New-generation waste refers to Triad hazardous waste, MLLW, or MTRU wastes.
[b] Reoccurring operations includes LANL waste streams and generation amounts by volume that are expected on a year-over-year basis.

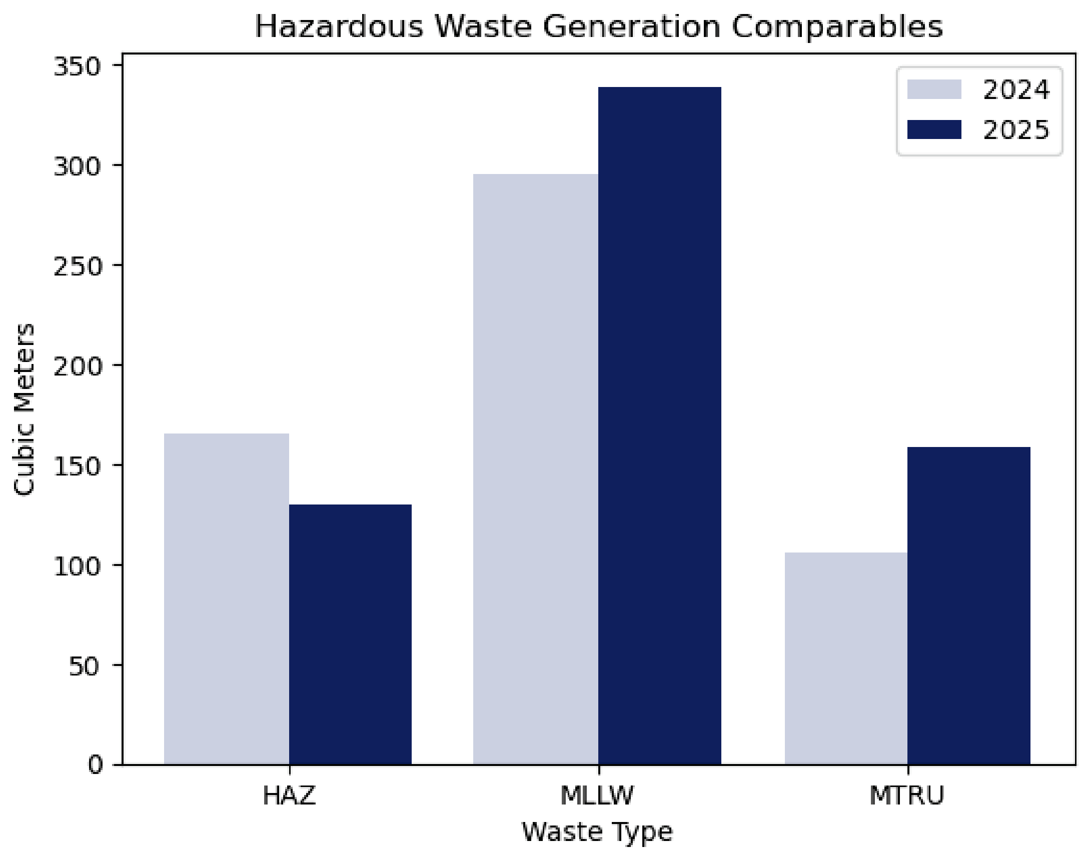

Figure 1-1. Total hazardous waste, mixed low-level waste, and mixed transuranic waste for Triad in fiscal years 2024 and 2025.

1.2 Purpose and Scope

The purpose of this report is to describe the implementation and maintenance of the waste minimization program at LANL. This program reduces the volume and toxicity of hazardous wastes generated, thereby minimizing potential threats to human health and the environment. This report discusses the main components of hazardous waste, MTRU, and MLLW from reoccurring operations in FY 2025 and the waste minimization efforts for those wastes. In addition, this report documents FY 2025 waste quantities processed in comparison with FY 2024.

1.3 LANL's Hazardous Waste Facility Permit Requirements

As a permitted facility, LANL must fulfill operating permit requirements. According to Title 40, Code of Federal Regulations (CFR), Section 264.73(b)(9), a certification process is required to demonstrate that LANL has a plan in place to reduce the volumes and toxicity of hazardous waste. LANL certifies its waste minimization program through this written document, which is submitted annually to the NMED in lieu of the U.S. Environmental Protection Agency (EPA).

Table 1-1 lists permit requirements and corresponding sections of this report that address the requirement.

Table 1-1. LANL Hazardous Waste Facility Permit Section 2.9

Permit Requirement	Topic	Report Section
Section 2.9 (1)	Policy statement	Section 2.1
Section 2.9 (2)	Employee training and incentives	Section 2.2
Section 2.9 (3)	Past and planned source reduction and recycling	Sections 2.3.1, 3.4, 5.3
Section 2.9 (4)	Itemized capital expenditures	Sections 2.3.1, 3.4
Section 2.9 (5)	Barriers to implementation	Sections 3.5, 4.3, 5.4
Section 2.9 (6)	Investigation of additional waste minimization efforts	Sections 2.3.1, 3.4, 5.3
Section 2.9 (7)	Waste stream flow charts, tables, and analyses	Sections 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 5.1, 5.2
Section 2.9 (8)	Justification of waste generation	Section 2.4

The governing document for waste management at the Laboratory is Policy (P)409, *LANL Waste Management*. Figure 1-2 provides the flow of the waste management process at LANL.

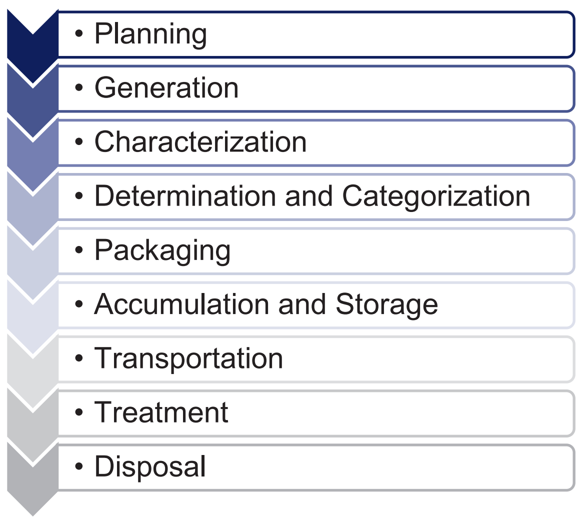

Figure 1-2. P409 Waste Management Process.

2 Waste Minimization Elements

2.1 Governing Policy on Environment

LANL's Environmental Governing Policy states the following:

> We are committed to act as stewards of our environment to achieve our mission in accordance with all applicable environmental requirements. We set continual improvement objectives and targets, measure and document our progress, and share our results with our workforce, sponsors, and public. We reduce our environmental risk through legacy cleanup, pollution prevention, and long-term sustainability programs.

Regulatory drivers for waste minimization include the Resource Conservation and Recovery Act (RCRA), the Pollution Prevention Act of 1990, 40 CFR Parts 260–280, and the Environmental Management System implemented at the Laboratory per DOE requirements.

2.2 Employee Training and Incentive Programs

Several employee training and incentive programs identify and implement opportunities for recycling, sustainability, waste minimization, and source reduction of various waste types. Training courses that address waste minimization and P2 requirements include

- General Employee Training,
- Waste Generator Overview,
- Radiological Worker II,
- LANL and third party RCRA personnel training, and
- Environmental Management System awareness training.

The Laboratory and NA-LA sponsor annual sustainability award competitions that recognize personnel who implement P2 projects. In FY 2025, the P2 Program facilitated a LANL environmental awards program that emphasized source reduction of all types of waste. Award winners were recognized by senior management, presented a certificate, and received a small cash award - all to serve as incentives for participation in future years.

2.3 Investigation of Additional Waste Minimization and P2 Efforts

The Laboratory's P2 Program monitors waste trends and works with other programs to develop process improvement projects. In addition, the P2 Program provides financial analysis support for these projects to better understand the return on investment. Project ideas often come directly from researchers, waste management coordinators, and the P2 Program staff. Because project ideas come from different sources who have different levels of P2 expertise, the program makes support decisions based on a comparative ranking that uses scoring criteria to emphasize source reduction, return on investment, transferability, and waste minimization, all of which support the LANL mission.

Funding for Projects

In response to DOE PFAS[c] Strategic Roadmap guidance, the P2 Program committed to fund PFAS proof-of-concept research projects in FY 2025. RCRA does not include PFAS as hazardous waste; however, it is appropriate to mention these projects in this report because New Mexico Governor Michelle Lujan Grisham requested EPA to list PFAS as a hazardous substance under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The following projects are not associated with waste stream profile (WSP) numbers. The goal behind the research is to use the science talent at a national laboratory to better understand PFAS contaminants in accordance with the DOE PFAS Strategic Roadmap.

- Combustion Ion Scoping Study for PFAS ($90,000)

  This effort will attempt to use combustion ion chromatography as a screening tool to determine total fluorine levels in groundwater sources. Based on results, other analytical techniques can then be used to determine specific PFAS analytes.

[c] per- and polyfluoroalkyl substances

- Electrochemical Oxidation to Destroy PFAS ($100,000)

  This bench-scale investigation is aimed at determining the effectiveness of electrochemical oxidation as a treatment technology in destroying PFAS in water media.

- PFAS Characterization in Explosives ($100,000)

  This proof-of-concept research project focuses on developing chemical techniques to identify PFAS analytes in materials associated with high-explosives testing.

2.4 Utilization and Justification for the Use of Hazardous Materials

LANL is a research and development facility that executes thousands of experiments that require the use of chemicals and materials that could create hazardous waste. P2 and waste minimization requirements for waste generators include source reduction and material substitution techniques through process improvements and best management practices. However, customer requirements, project specifications, validated protocols, or the nature of the research could demand the use of specific chemicals that are hazardous. To encourage the use of nontoxic or less hazardous substitutes whenever possible, P2 Program staff help LANL workers identify—using waste process and input alternative analysis—the least-toxic chemicals that have the desired characteristics for their particular project.

3 Hazardous Waste

3.1 Introduction

The reported annual hazardous waste quantity is based on the total amount of waste by volume and accumulation start dates of wastes within the FY recorded in LANL's Waste Compliance and Tracking System (WCATS) database. Regarding universal waste for recycle, the total amount of waste is recorded by weight. A query about specific wastes is entered into WCATS using WSP numbers. This report does not include waste quantities generated before onsite treatment, which is why waste quantities do not match those reported in LANL's biennial report. Additionally, this report uses FY data, whereas the biennial report uses calendar year data. The WCATS data used in this report is collected for FY 2025 on October 1, 2025.

Briefly, 40 CFR 261.3 (adopted by the NMED as 20.4.1.200 New Mexico Administrative Code) defines hazardous waste as any solid waste that

- is not specifically excluded from the regulations as hazardous waste;
- is listed in the regulations as a hazardous waste;
- exhibits any of the defined characteristics of hazardous waste (i.e., ignitability, corrosiveness, reactivity, or toxicity);
- is a mixture of solid and hazardous wastes; or
- is a used oil that has more than 1,000 parts per million of total halogens.

3.2 Hazardous Waste Minimization Performance

Hazardous waste volumes processed at LANL in FY 2025 and FY 2024 are shown in Table 3-1. The volumes are sorted by the amount of waste that originated in each technical area and then further sorted for FY 2025 to show the quantity of waste generated from highest to lowest.

Table 3-1. Hazardous Waste Generation by Technical Area in Fiscal Years 2025 and 2024

Technical Area (TA)	FY 2025 Hazardous Waste Ranked by Volume (m^3)	FY 2024 Hazardous Waste (m^3)
16	58.6	92.3
03	29.5	56.3
35	11	6.4
09	8.8	6
48	4.2	1.5
08	3.8	30.7
53	3.4	2.7
46	2.8	2.8
43	2.3	0.78
22	1.8	2.2
00	0.8	0.04
59	0.8	1.3
50	0.7	1.2
40	0.5	0.06
52	0.3	0
55	0.2	0.8
36	0.1	0
51	0.1	0.03
60	0.1	2.2
33	0.02	0

3.3 Waste Stream Analysis

Commonly generated hazardous waste includes many types of research chemicals, solvents, acids, bases, carcinogens, compressed gases, metals, and other solid waste contaminated with hazardous material. Hazardous waste could include equipment, containers, structures, and other items intended for disposal that are considered hazardous (e.g., compressed gas cylinders). Some wastewaters that may not be sent to the sanitary wastewater system or to the high-explosives (HE; hazardous-waste-containing) wastewater treatment plant could also qualify as hazardous waste. After material is declared a waste, the hazardous waste is characterized, labeled, and collected in appropriate storage areas. The waste is ultimately shipped to offsite RCRA hazardous waste treatment, storage, and disposal facilities for final treatment or disposal. Some hazardous wastes—aerosol cans, light bulbs, batteries, mercury, and ferric chloride solution—may be recycled.

The largest non-recyclable hazardous waste streams are described in this section. HE waste is treated on site and is excluded from the analysis.

Unused/Unspent Chemicals: The volume of unused and unspent chemicals varies each year. New chemical tracking strategies at LANL will prevent unnecessary chemicals from coming on site and increase utilization of chemicals already in inventory.

Solvents: EPA-listed and characteristic solvents and solvent-water mixtures are used widely in research, maintenance, and production operations, especially for cleaning and extraction. Nontoxic replacements for solvents are used whenever possible. New procedures that either require less solvent than before or eliminate the need for solvent altogether are also adopted where possible; however, solvents are still required for many procedures, and solvents persist as a component of the hazardous waste stream.

Acids and Bases: A variety of strong acids and bases are routinely used in research, testing, and production operations. During the past decade, the overall volume of hazardous acid and base waste has been reduced mainly by using new procedures that require less acid or base, by recycling acids on site for internal reuse, and by reusing spent acids and bases as part of established onsite neutralization procedures.

Hazardous Solids: This waste stream includes inert barium simulants used in HE research, electronics, contaminated equipment, broken leaded glass, firing-site debris, ash, and various solid chemical residues from experiments. Metals such as lead can also be a hazardous solid waste.

Hazardous Liquids: This waste stream is primarily aqueous, neutral liquids that are generated from a variety of analytical chemistry procedures. This waste stream also includes aqueous waste from chemical synthesis, spent photochemicals, electroplating solutions, refrigerant oil, and ethylene glycol.

Laboratory Trash and Spill Clean-up: Laboratory trash consists mostly of paper towels, pipettes, personal protective equipment, and disposable lab supplies. Rags are used for cleaning parts, equipment, and various spills. Equipment improvements have reduced the number of oil spills from heavy equipment, and new cleaning technologies have eliminated some processes where manual cleaning with rags was required in the past.

FY 2025 and FY 2024 Hazardous Waste Generation

The amount of hazardous waste generated at LANL in FY 2024 was 164.7 m^3 compared with 129.9 m^3 of hazardous waste generated in FY 2025. The significant component of hazardous waste was debris contaminated with HE and lead—generated during demolition projects.

See Table 3-2 and Table 3-3 for waste details by year.

Table 3-2. Fiscal Year 2025 Hazardous Waste Generation

WSP Number	Volume (m^3)	% Total	Waste Description
55155	17.8	13.7	Hazardous waste containing trace HE and asbestos debris generated from demolition of TA-16-0380
56135	15.3	11.8	Lead-contaminated debris generated from TA-16-0054 Building Occupancy Project
56459	15.3	11.8	Lead/mercury-contaminated debris waste from Stairway Pillar Replacement Repair Project at TA-16-0016
Various	81.45	62.7	Consistent with waste streams described in Section 3.3

Table 3-3. Fiscal Year 2024 Hazardous Waste Generation

WSP Number	Volume (m^3)	% Total	Waste Description
54783	30.6	18.5	TA-16-0516/0517 building abatement and roofing project generated lead-contaminated debris wastes
53393	15.3	9.3	Machining equipment contaminated with lead removed from TA-03-0034
53817	15.3	9.3	HE-containing debris generated from TA-11-0024 demolition
Various	103.5	62.9	Consistent with waste streams described in Section 3.3

3.4 Hazardous Waste Minimization and Operational Funding

Starting in FY 2011, special recycling operations were established in TA-60-0086 at LANL. Spent bulbs and batteries are collected from various sites and brought to TA-60, where used bulbs are packaged together, and batteries are packaged for recycling. Consolidating these operations at one location is cost effective and maximizes recycling potential. Lead-acid battery recycling is managed by the salvage organization at LANL. Table 3-4 and Table 3-5 list the waste weights and costs in FY 2025 and FY 2024. Pricing information is shown in dollars per pound ($/lb) and is provided by a treatment, storage, and disposal facility.

Table 3-4. Universal Waste Recycled at LANL in Fiscal Year 2025

Universal Waste Type	$/lb	Weight (lb)	Cost ($)
Lamps/bulbs/tubes	1.18	15,854	18,707.7
Mixed batteries (dry nickel-cadmium and alkaline)	1.305	379.5	495.2
Lithium and lithium-ion batteries	12.8	503.3	6,442.24

Table 3-5. Universal Waste Recycled at LANL in Fiscal Year 2024

Universal Waste Type	$/lb	Weight (lb)	Cost ($)
Lamps/bulbs/tubes	1.18	5,993.5	7,072.3
Mixed batteries (dry nickel-cadmium and alkaline)	1.305	498	650.0
Lithium and lithium-ion batteries	12.8	1,109.5	14,201.6

Solvent Waste Reduction

Scientists in Analytical Earth Science (EES-15) required in-tact lipids for experiments; however, these lipids are most frequently available in chloroform, which is a hazardous substance. As a RCRA waste minimization strategy, the researchers substituted lipids in chloroform with a nontoxic powder form. As such, the experiments generate nonhazardous waste instead of a RCRA spent solvent. This effort avoided creation of a hazardous waste stream.

Hazardous Solid Waste

Automation, Robotics, and Controls (E-3) received spare parts from the National Criticality Experiments Research Center Facility Operations (NCERC-FO). By reusing spare parts that comprise lead soldering, the generation of hazardous solid waste is avoided and saves $200,000 in waste management costs for the federal government. Furthermore, by having the spare parts in case of equipment failure, reliability of two mission-critical operations is supported: TA-55 pit production and Advanced Recovery and Integrated Extraction System.

Sigma Division Waste Minimization

Sigma Division uses metallurgical science to support mission-critical operations. To support the space footprint reduction strategy at the Sigma Facility (TA-03-0066), waste management personnel have been working diligently to clean out materials and avoid generation of new waste streams. This effort implemented RCRA hazardous waste minimization strategies. For example, acceptable knowledge indicated a waste to be hazardous due to its association with electroplating operations. After further investigation by the waste generators—using in-house analytical data—the waste was reclassified to a nonhazardous waste stream. This change avoids 100 gallons of hazardous waste generation each year and is represented by WSP 56254. In another example, since March of 2025, about 175 gallons of unused chemicals was rehomed for later use, avoiding generation of unused/unspent chemical waste (WSP 56590). Furthermore, waste generators and waste management personnel are actively identifying ways to minimize use of P-listed (acutely hazardous, unused commercial chemicals that are being discarded) and F-listed (wastes from common manufacturing and industrial processes) chemicals at TA-03-0066.

Unused/Unspent Chemical Waste Reduction

Established in 2020, the Chemical Management Program consolidates all hazardous chemical inventories into a centralized database, enabling chemical owners to effectively monitor materials and reduce unnecessary procurement. This initiative supports RCRA waste minimization and source reduction objectives by improving visibility of chemical holdings, promoting efficient use of existing materials, and preventing the accumulation and expiration of surplus chemicals. These efforts directly reduce the generation of WSP 56590 (unused/unspent chemical waste) and contribute to the Laboratory's overall waste reduction goals.

Current waste reduction measures include evaluating and refining procurement processes to minimize pathways that bypass institutional controls for barcoding and tracking hazardous chemicals. Strengthening these controls ensures that all hazardous materials are captured in the centralized database upon receipt, maintaining accountability throughout the chemical life cycle and supporting accurate, sitewide inventory management.

In addition, the program is piloting a first-in/first-out system to optimize storage and usage practices. This pilot focuses on implementing simple, cost-effective methods that enable workers to use older products before newer ones, thereby reducing the disposal of aged or unusable materials. Upon successful completion, these strategies will be implemented sitewide to further advance chemical life cycle management, source reduction, and compliance with RCRA waste minimization requirements.

3.5 Barriers to Hazardous Waste Minimization

LANL has a long history of successful hazardous waste minimization. However, the next stage of waste minimization will require more research, investment, and time to accomplish than past efforts because the remaining hazardous wastes—if they can be minimized—will require changes to core processes rather than support processes, which is always a difficult undertaking in a research and laboratory environment. In the future, every waste minimization project will be unique and will require innovation to enhance LANL's mission. These challenges will require researcher engagement. Early integration of P2 strategies into program and project design and life cycle planning is LANL's approach going forward.

4 Mixed Transuranic Waste

4.1 Legacy and Current Mixed Transuranic Waste

MTRU contains hazardous constituents in addition to high levels of radiation. Triad is a current generator of MTRU waste that must ultimately be shipped to the Waste Isolation Pilot Plant (WIPP). Triad generated a total of 158.4 m^3 of MTRU in FY 2025 in support of the plutonium pit mission; MTRU totaled 105.8 m^3 in FY 2024. Generating facilities can include TA-55, TA-55 PF-4, TA-03 CMR, and TA-50. The generation of MTRU is consistent with homogeneous and debris wastes generated from chloride, metal, nitrate, plutonium-238, and pyrochemical plutonium pit mission operations.

In FY 2025 and FY 2024, Triad and N3B together coordinated shipment of MTRU waste to create the most efficient use of the available shipment opportunities to WIPP.

4.2 Waste Stream Analysis

Table 4-1 and Table 4-2 list the significant MTRU generation from TA-55, TA-55 PF-4, TA-03 CMR, and TA-50—the Triad facilities responsible for new-generation waste. Most of these wastes are located at LANL, awaiting shipment to WIPP.

Table 4-1. Fiscal Year 2025 Mixed Transuranic Waste Stream Analysis

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
54150	91.03	57.4	TA-55 PF-4	Debris wastes from Plutonium Facility operations; wastes include filters, glass, graphite, rubber gloves, metals, plastic, and resins
54196	44.14	27.8	TA-55	Homogeneous inorganic wastes from Plutonium Facility operations; wastes include ash, ceramics, leached solids, oxides, precipitates, salts, and sludges
54200	8.9	5.6	TA-55 PF-4	Debris wastes from Plutonium Facility operations; wastes include filters, glass, graphite, rubber gloves, metals, plastic, and resins
Various	14.38	9.1	TA-55, TA-55 PF-4, TA-03 CMR, and TA-50	Small-volume MTRU waste generation from reoccurring operations

Table 4-2. Fiscal Year 2024 Mixed Transuranic Waste Stream Analysis

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
54150	53.3	50.4	TA-55 PF-4	Debris wastes from Plutonium Facility operations; wastes include filters, glass, graphite, rubber gloves, metals, plastic, and resins
54196	28.7	27.2	TA-55	Homogeneous inorganic wastes from Plutonium Facility operations; wastes include ash, ceramics, leached solids, oxides, precipitates, salts, and sludges
54200	14.6	13.8	TA-55 PF-4	Debris wastes from Plutonium Facility operations; wastes include filters, glass, graphite, rubber gloves, metals, plastic, and resins

Various	9.16	8.7	TA-55, TA-55 PF-4, TA-03 CMR, and TA-50	Small-volume MTRU waste generation from reoccurring operations

4.3 Mixed Transuranic Waste Minimization

To support plutonium pit development, large items (such as glove boxes classified as MTRU[d]) must be removed from TA-55 PF-4 and TA-55. However, due to space constraints at WIPP and the difficult task of size-reducing glove boxes for transport to WIPP, LANL management will use decontamination techniques to reduce the radiation levels and to reclassify the large items as surface-contaminated object[e] (SCO) low-level (radioactive) waste (LLW). The SCO protocol is an economically viable option for removing oversized MTRU waste items from TA-55 PF-4. This protocol verifies reclassification of MTRU to SCO LLW, allowing the oversized waste to be shipped to a commercial disposal facility without additional size reduction. By applying the SCO protocol to the MTRU waste items, the volume of MTRU can be significantly reduced; however, 43 MTRU large items are lead lined. Because of this D008 characteristic, once decontaminated to SCO LLW, these items will be disposed of as MLLW, which will increase volumes of that waste type. Once the process is online, a WSP will be created.

4.4 Barriers to Mixed Transuranic Waste Minimization

A majority of MTRU waste located at the Laboratory consists of legacy waste and falls under the responsibility of N3B and EM-LA. This waste type is already generated and cannot be minimized in an efficient and cost-effective manner. In fact, legacy waste disposal often involves increasing waste volumes because historical parent containers require repackaging and waste treatment into daughter containers (e.g., one container can turn into two or three containers) to dispose of the waste compliantly. This practice increases the number of drums shipped for disposal and leads to generation of more debris waste from the repackaging and treatment activities.

5 Mixed Low-Level Waste

5.1 Current Mixed Low-Level Waste

MLLW contains hazardous constituents in addition to low levels of radiation. Triad generated 295.4 m^3 of MLLW new-generation waste in FY 2024. In FY 2025, Triad generated 339.01 m^3 of MLLW. The year-over-year increase is due in part to waste generation from mission-critical operations at TA-55.

Table 5-1 lists MLLW by location during FY 2025 and FY 2024.

Table 5-1. Mixed Low-Level Waste Generation by Technical Area in Fiscal Years 2025 and 2024

Technical Area	FY 2025 MLLW Ranked by Volume (m^3)	FY 2024 MLLW (m^3)
55	219.96*	150.0*
03-CMR	60.70	59.3
50-WCRRF**	45.16	7.7

[d] Acceptable knowledge from deactivation and decommissioning operations; WSP 49765, Process Status Codes XO, with Group D RCRA hazardous codes.
[e] A surface-contaminated object is not radioactive itself but contains radioactive material on its surface.

Technical Area	FY 2025 MLLW Ranked by Volume (m^3)	FY 2024 MLLW (m^3)
48	44.51	15.8
03	21.55	101.1
15	17.84	10.2
35	11.71	27.9
36	7.65	0
50	7.58	3.8
59	3.04	0.2
53	2.55	194.5*
08	2.55	0
43	2.55	0
55-PF-4	1.45	20.7
16	0.23	0.1
46	0.04	0

*See Section 5.5 for explanation of high-volume waste streams not from reoccurring operations.
**Waste Characterization, Reduction, and Repackaging Facility

5.2 Waste Stream Analysis

Table 5-2 and Table 5-3 list the significant MLLW generated by Triad for FY 2025 and FY 2024.

Table 5-2. Fiscal Year 2025 Mixed Low-Level Waste Stream Analysis

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
51993	83.5	24.6	TA-55	Lead- and cadmium-contaminated debris from housekeeping, research, and maintenance operations
54721	40.5	11.9	TA-48	Lead contaminated materials from maintenance operations
55219	37.97	11.2	TA-50 WCRRF	Lead-and cadmium-contaminated materials from housekeeping, research, and maintenance operations
53550	33.1	9.8	TA-03 CMR	Lead-and cadmium-contaminated materials from housekeeping, research, and maintenance operations
Various	143.85	42.4	Triad Facilities	Small-volume MLLW waste streams

Table 5-3. Fiscal Year 2024 Mixed Low-Level Waste Stream Analysis

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
54729	84.1	28.5	TA-03-0102	Baghouse system contaminated with radioactive and hazardous constituents from machining operations
53085	49.7	16.8	TA-03 CMR	Waste generated during maintenance and housekeeping, material processing, and research and development activities
51993	40.04	13.6	TA-55	Lead- and cadmium-contaminated debris from housekeeping, research, and maintenance operations
52164	18.1	6.1	TA-55 PF4	Disposition of glove boxes lined with lead as part of the facility upgrade project
Various	103.5	35.0	Triad Facilities	Small-volume MLLW waste streams

5.3 Mixed Low-Level Waste Minimization

An effective method of realizing MLLW minimization during decommissioning operations at nuclear facilities can be removing electronic components that contain materials that meet the definition of hazardous waste from the equipment in which the components are contained. The components are then tested for radiological contamination and, when determined to be free of radiological contamination, may be recycled through the universal waste process. Items from analytical equipment, overhead lights, switches, and electronic equipment can be disassembled; batteries, circuit boards, capacitors, and power supplies can be recycled; and the surrounding material can be disposed of as LLW. Although this method is not quantified at this time, it is estimated to have reduced MLLW generation at TA-03 CMR.

Through analysis of tritium exit signs used for emergency lighting across LANL, waste management personnel authorized a contract with a receiving facility to recycle the signs. If not recycled, they would have been dispositioned as MLLW because of the radioactive constituent tritium and the metal makeup of the signs. LANL waste professionals estimate that this effort avoided disposition of 8,000 MLLW signs and saved at least $812,000 for the Laboratory. The signs were recycled and not dispositioned as MLLW; therefore, there is no WSP. In the future, an MLLW WSP will be created for signs that may not be recycled.

Chemists at Sigma Division (TA-03-0066) use Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) in analytical operations. Acceptable knowledge classified the spent solvent waste as MLLW because it showed the corrosive characteristic combined with uranium and thorium contamination. However, upon detailed investigation, the waste stream was reclassified to a RCRA hazardous waste; uranium and thorium are present but at naturally occurring levels. This change avoids the generation of 110 gallons of MLLW each year and is represented by WSP 56130. Although still RCRA hazardous, there are benefits to not managing waste that is both hazardous and radioactive.

5.4 Barriers to MLLW Minimization

In many instances, MLLW minimization is difficult to implement because it requires procedural changes. This process can take multiple years because safety for personnel and efficacy of a new process must be ensured. Because certain processes are already in place, the waste minimization change might not be cost effective.

5.5 Special Clean-Out Projects

For FY 2024, the high-volume MLLW WSP 52954 represents clean-up operations at TA-53, which consists of legacy materials characterized as MLLW stored in areas around the accelerator facility. The effort created space for new experiments and generated 190 m^3 of waste during FY 2024.

In FY 2025, three WSP numbers represent disposition of oversized MLLW equipment at TA-55 (WSP 53054, 55926, and 52164); this high-volume generation type represents 110.04 m^3 of the 219.96 m^3 of MLLW from TA-55. In FY 2024, the same waste type generated 108.65 m^3 of MLLW and is represented by WSP 53054.

The high-volume disposal of old materials, items, and equipment discussed here for FY 2024 and FY 2025 is not representative of reoccurring operations at LANL and therefore is not included in Figure 1-1 or in Section 5.2.

6 Acronyms

Acronym	Definition
CFR	Code of Federal Regulations
CMR	Chemistry and Metallurgy Research Facility
DOE	(U.S.) Department of Energy
EM-LA	DOE/Environmental Management Los Alamos
EPA	(U.S.) Environmental Protection Agency
FY	fiscal year
HE	high explosives
LANL	Los Alamos National Laboratory
LLW	low-level (radioactive) waste
MLLW	mixed low-level waste
MTRU	mixed transuranic waste
N3B	Newport News Nuclear BWXT-Los Alamos, LLC
NA-LA	DOE/National Nuclear Security Administration-Los Alamos Field Office
NMED	New Mexico Environment Department
P	Policy
P2	Pollution Prevention (Program); also pollution prevention
PF-4	Plutonium Facility (TA-55-0004)
PFAS	per- and polyfluoroalkyl substances
RCRA	Resource Conservation and Recovery Act
SCO	surface-contaminated object
TA	technical area
U.S.	United States
WCATS	Waste Compliance and Tracking System
WCRRF	Waste Characterization, Reduction, Repackaging Facility
WIPP	Waste Isolation Pilot Plant
WSP	waste stream profile