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November 18, 2024

Mr. JohnDavid Nance, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Fiscal Year 2024 Los Alamos National Laboratory Hazardous Waste Minimization Report

Dear Mr. Nance:

The purpose of this letter is to transmit to the New Mexico Environment Department-Hazardous Waste Bureau (NMED-HWB) a report required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (the Permit), EPA ID# NM0890010515. The Permit authorizes the United States Department of Energy (DOE) National Nuclear Security Administration-Los Alamos Field Office (NA-LA); the DOE Environmental Management-Los Alamos Field Office (EM-LA); Triad National Security, LLC (Triad); and Newport News Nuclear BWXT-Los Alamos, LLC (N3B), collectively the Permittees, to manage, store, and treat hazardous waste at LANL.

The report, as required by Permit Section 2.9, Waste Minimization Program, is submitted annually to the NMED-HWB by December 1 for the previous fiscal year, ending September 30.

Enclosures 1 and 2 provide the Fiscal Year 2024 Los Alamos National Laboratory Hazardous Waste Minimization Report drafted by NA-LA/Triad and EM-LA/N3B, respectively, to satisfy the reporting requirements in Permit Section 2.9. Each enclosure also contains a signed certification from the responsible Co-Permittees.

If you have any questions for Triad or NA-LA, please contact Jason Hill (Triad) at (505) 551-2218, jshill@lanl.gov or Robert Gallegos (NA-LA) at (505) 901-3824, robert.gallegos@nnsa.doe.gov.

If you have any questions for N3B or EM-LA, please contact Christian Maupin (N3B) at (505) 695-4281, christian.maupin@em-la.doe.gov or Arturo Duran (EM-LA) at (575) 373-5966, arturo.duran@em.doe.gov.

Sincerely,

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

Sincerely,


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Brian G. Harcek, Director
Office of Quality and Regulatory Compliance
Environmental Management
Los Alamos Field Office
U.S. Department of Energy

Enclosures: 1) Fiscal Year 2024 Los Alamos National Laboratory Hazardous Waste Minimization Report, Triad/NA-LA

2) Fiscal Year 2024 Los Alamos National Laboratory Hazardous Waste Minimization Report, N3B/EM-LA

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ENCLOSURE 1

Fiscal Year 2024 Los Alamos National Laboratory Hazardous Waste Minimization Report

Date: November 18, 2024

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

LA-UR-24-31952
Approved for public release; distribution is unlimited.
November 2024

Fiscal Year 2024
Los Alamos National Laboratory
Hazardous Waste Minimization Report

Los Alamos
NATIONAL LABORATORY

Prepared for: New Mexico Environment Department

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Environmental Protection and Compliance-Environmental Stewardship (EPC-ES)

Editing and Layout by: Tamara Hawman, Communications Specialist
Communications and External Affairs-Technical Editing and Communications (CEA-TEC)

Cover image: Permitted Unit at Technical Area 60, Building 0017.

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: 2024.11.13 07:26:15 -07'00'

11/13/2024

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: 2024.11.18 10:53:05 -07'00'

11/18/2024

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

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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 (EPC) 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) 2024 (October 2023–September 2024). Projects, summarized later in this report, targeted minimization of hazardous waste as part of the planning process. In FY 2024, 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 2024, a significant waste by volume is lead contaminated debris materials from a building abatement project at TA-16. For MLLW, waste from clean-out efforts of the TA-03-0102 machine shops represents the largest amount 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 2023 and FY 2024 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.

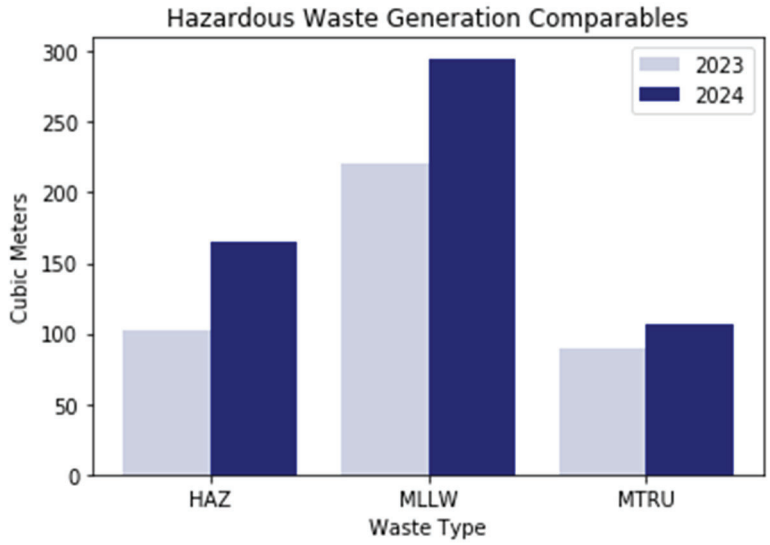

Figure 1-1. Total hazardous waste, mixed low-level waste, and mixed transuranic waste for Triad in fiscal years 2023 and 2024.

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 2024 and the waste minimization efforts for those wastes. In addition, this report documents FY 2024 waste quantities processed in comparison with FY 2023.

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

Permit Requirement	Topic	Report Section
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.

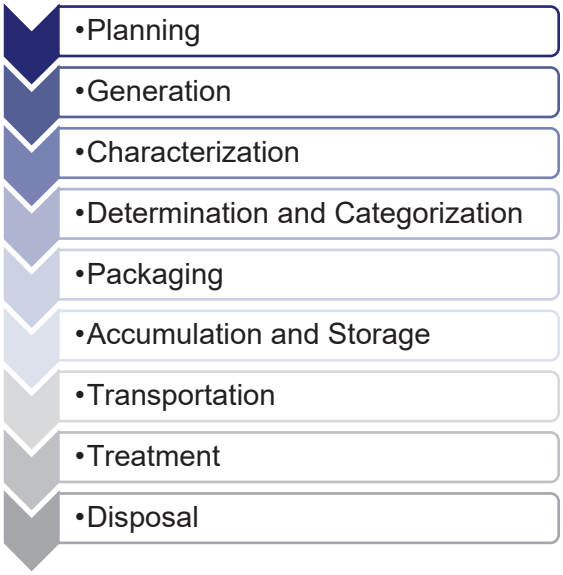

Figure 1-2. P409 Waste Management Process.

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 International Organization for Standardization 14001:2015 Standard for Environmental Management Systems implemented at the Laboratory.

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 McCoy 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 2024, the P2 Program facilitated a LANL environmental awards program that emphasized source reduction of all types of waste. The award winners were recognized by Steven Coleman, a senior manager from Environment, Safety, Health, and Quality, and presented with a certificate and a small cash award, which both 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

P2 projects implemented at the Laboratory address all types of waste and pollutants; however, the list includes projects designed to reduce hazardous waste, MLLW, or MTRU. Projects that address other waste types are not described in this report.

In FY 2024, P2 funds were allocated to the following project:

- Copper bioleaching to minimize nitric acid waste for target development ($115,000)

  Researchers in MST-7 (Engineered Materials) are studying use of a bacteria to remove copper deposits on target components formed during assembly. The current process requires use of 35 percent nitric acid for copper removal that generates a hazardous waste stream represented by Waste Stream Profile (WSP) 55382. In FY 2024, researchers continued work toward understanding the bacterial solution's impact on components during the copper removal process.

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 or 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 were collected for FY 2024 on October 1, 2024.

In brief, 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 2024 and FY 2023 are shown in Table 3-1. The volumes are sorted by the amount of waste that originated in each TA and then further sorted for FY 2024 to show the quantity of waste generated from highest to lowest.

Table 3-1. Hazardous Waste Generation by Technical Area in Fiscal Years 2024 and 2023

Technical Area (TA)	FY 2024 Hazardous Waste Ranked by Volume (m^3)	FY 2023 Hazardous Waste (m^3)
16	92.3*	765.5*
03	56.3	28.6
08	30.7	5.5
11	17.8	0
35	6.4	5.9
09	6.0	5.6
46	2.8	3.2
53	2.7	4.0
22	2.2	2.4
60	2.2	0.5
48	1.5	1.6
59	1.3	1.8
50	1.2	4.9
55	0.8	0.5
43	0.78	0.7
63	0.4	0

Technical Area (TA)	FY 2024 Hazardous Waste Ranked by Volume (m^3)	FY 2023 Hazardous Waste (m^3)
68	0.27	0.1
40	0.06	0.1
00	0.04	0
51	0.03	0
49	0.005	0

* See Section 3.6 for explanation of this high-volume waste generation from TA-16 (not from reoccurring operations) in FY 2023 and FY 2024.

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 waste waters that may not be sent to the sanitary waste water system or to the high-explosives (HE; hazardous-waste-containing) waste water 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 nonrecyclable 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 neutralization procedures on site.

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 2024 and FY 2023 Hazardous Waste Generation

The amount of hazardous waste generated at LANL in FY 2023 was 102.3 m^3 compared with 164.7 m^3 of hazardous waste generated in FY 2024 - the significant component of hazardous waste being debris contaminated with lead or HE.

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

Table 3-2. Fiscal Year 2024 Hazardous Waste Generation

WSP Number	Volume (m^3)	% Total	Waste Description
54783	30.6	18.5	TA-16-516/517 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 wastes generated from TA-11-0024 demolition
Various	103.5	62.9	Consistent with waste streams described in Section 3.3

Table 3-3. Fiscal Year 2023 Hazardous Waste Generation

WSP Number	Volume (m^3)	% Total	Waste Description
51217	30.6	29.9	Waste generated from the TA-18 Manhattan Building Restoration Project; debris material contaminated with lead and asbestos
53577	4.92	4.8	Diesel (containing benzene) drained from compressor fuel tank at TA-50
53578	4.92	4.8	Diesel (containing benzene) drained from underground tank at TA-64
Various	61.9	60.5	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-60-86 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 2024 and FY 2023. Pricing information is in dollars per pound ($/lb) and provided by a treatment, storage, and disposal facility.

Table 3-4. 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
Batteries (dry nickel-cadmium and alkaline)	1.305	498	650.0
Lithium and lithium-ion batteries	12.8	1,109.5	14,201.6

Table 3-5. Universal Waste Recycled at LANL in Fiscal Year 2023

Universal Waste Type	$/lb	Weight (lb)	Cost ($)
Lamps/bulbs/tubes	1.18	15,852	18,705.4
Mixed batteries (dry nickel-cadmium and alkaline)	1.305	769.5	1,004.2
Lithium and lithium-ion batteries	12.8	1,154.5	14,777.6

Solvent Waste Reduction and Recycling

EPC-CP (Compliance Programs) is scaling up PCB (polychlorinated biphenyls) analysis of LANL waste waters for outfall monitoring. Using a new extractor and evaporator, a LANL technologist modernized the chemical analysis process used for the samples. Through these upgrades, the spent solvent hazardous WSP 52885 will be minimized.

Acids and Bases Reduction

The P2 Program is funding a project related to copper bioleaching that aims to reduce acid waste. See Section 2.3 for more information on this research project.

Hazardous Solid Waste

Weapons scientists in Q-5 (High Explosives Science and Technology) collaborated with waste management personnel to reclassify a hazardous waste generated from the synthesis of diaminoazoxyfurazan (DAAF), a mission-critical operation. Because of the high-explosives nature of DAAF synthesis, acceptable knowledge determined the waste stream to be hazardous; however, based on due diligence with the waste characterization effort, the waste was reclassified as a nonhazardous waste (represented by WSP 51253).

Unused/Unspent Chemical Waste Reduction

The Chemical Management Program, established in 2020, works to optimize purchase of hazardous chemicals and to support proper chemical inventory practices site wide. In current efforts, the Program is improving the tracking of chemicals from pre-purchase to waste disposal in the Laboratory's chemical database. Since employees can determine if certain chemicals are in inventory, the purchase of unnecessary chemicals is being prevented. In addition, the number of chemicals that go unused and expire is being reduced contributing to the minimization of WSP 52017 (unused/unspent chemical waste). In addition, efficient chemical management is generating a cost savings for the Laboratory – disposal of an unused chemical costs more than purchase of that chemical. Looking to the future, issues in the distribution of chemicals will be addressed by a team of stakeholders in the Logistics Division.

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 lifecycle planning is LANL's approach going forward.

3.6 Special Clean-Out Project

Hazardous WSP 50503 represents clean-up operations of the TA-16-399 Burn Tray and generated 764.5 m^3 of soil, sand, brick, and metal waste during FY 2023; the high-volume generation amount is not representative of reoccurring operations at LANL and therefore not included in Figure 1-1 or in Section 3.3. In FY 2024, Burn Tray closure efforts generated 61.2 m^3 of hazardous waste; this is anticipated to be the final volume of waste from WSP 50503, as the excavation portion of the closure activities at the unit has been completed.

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 105.8 m^3 of MTRU in FY 2024 in support of the plutonium pit mission; MTRU totaled 88.7 m^3 in FY 2023. 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 2024 and FY 2023, shipment of MTRU waste was coordinated between Triad and N3B 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 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

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
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

Table 4-2. Fiscal Year 2023 Mixed Transuranic Waste Stream Analysis

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
50614	37.9	43.0	TA-55	Debris wastes from Plutonium Facility operations; wastes include filters, glass, graphite, rubber gloves, metals, plastic, and resins
50609	28.5	32.1	TA-55 PF-4	Homogeneous inorganic wastes from Plutonium Facility operations; wastes include ash, ceramics, leached solids, oxides, precipitates, salts, and sludges
50467	18.3	20.6	TA-55 PF-4	Debris wastes from Plutonium Facility operations; wastes include filters, glass, graphite, rubber gloves, metals, plastic, and resins
Various	4.0	4.3	TA-55, TA-55 PF-4, and TA-03 CMR	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[c]) 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[d] (SCO) low-level 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 is 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 compliantly dispose of the waste.

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

This practice increases the number of drums shipped for disposal and also leads to generation of more debris waste from the repackaging and treatment activities.

Operations at TA-55 PF-4 are working to implement waste minimization strategies for the waste currently being generated. These strategies include limitations on material inputs into TA-55 PF-4 and glove boxes and implementation of purchasing and inventory controls on tools, materials, and chemicals introduced into glove boxes. Other strategies include purchasing longer-life-span materials and avoiding disposal of serviceable instruments such as balances and ovens. In addition, plutonium pit development process changes are underway to reduce MTRU generation, but those changes are in the early research phase.

5 Mixed Low-Level Waste

5.1 Current Mixed Low-Level Waste

MLLW contains hazardous constituents in addition to low levels of radiation; the term "activated" describes materials that contain low levels of radiation. Triad generated 220.8 m^3 of MLLW new-generation waste in FY 2023. In FY 2024, Triad generated 295.4 m^3 of MLLW. The year-over-year increase is due in part to waste generation from clean-out efforts of the TA-03-0102 machine shops.

Table 5-1 lists MLLW by location during FY 2024 and FY 2023.

Table 5-1. Mixed Low-Level Waste Generation by Technical Area in Fiscal Years 2024 and 2023

Technical Area	FY 2024 MLLW Ranked by Volume (m^3)	FY 2023 MLLW (m^3)
53	194.5*	38.1
55	150.0*	41.1
03	101.1	46.4
03-CMR	59.3	124.1*
35	27.9	4.6
55 PF-4	20.7	2.5
48	15.8	36
15	10.2	0
50-WCRRF**	7.7	2.5
50	3.8	1.3
54	2.7	0.42
59	0.2	0.22
16	0.1	0.8

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

5.2 Waste Stream Analysis

Table 5-2 and Table 5-3 list the significant MLLW generated by Triad for FY 2024 and FY 2023.

Table 5-2. 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 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

* Chemistry and Metallurgy Research Facility

Table 5-3. Fiscal Year 2023 Mixed Low-Level Waste Stream Analysis

WSP Number	Volume (m^3)	Percent Total	Generating Facility	Waste Description
51123	35.4	16	TA-48-01	Activated lead materials generated from housekeeping, maintenance, processing, and research and development activities
53173	30.6	14	TA-03-0102	Baghouse system contaminated with radioactive and hazardous constituents from machining operations
52954	17.8	8	TA-53 (LANSCE*)	Clean-up of activated electrical equipment and contaminated lead materials in Area A to make room for new experiments
52320	15.3	7	TA-41	Debris generated from demolition of the Ice House; contaminated with mercury and lead
49525	13.6	6.2	TA-55	Lead-lined glove box disposition
Various	107.9	48.8	Triad Facilities	Small-volume MLLW waste streams

*Los Alamos Neutron Science Center

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; and batteries, circuit boards, capacitors, and power supplies can be recycled; 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 future years, an MLLW WSP will be created for signs that may not be recycled.

5.4 Barriers to Mixed Low-Level Waste 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 Project

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. Another high-volume waste stream is disposition of oversized MLLW equipment at TA-55; this decommissioning activity (WSP 53054) generated 108.65 m^3 of MLLW.

For FY 2023, the high-volume MLLW WSP 52537 represents clean-up of old materials and items at the CMR facility and generated 97.6 m^3 of waste. In FY 2024, WSP 52537 did not generate waste.

The high-volume disposal of old materials, items, and equipment discussed here for FY 2023 and FY 2024 is not representative of reoccurring operations at LANL and therefore are not included in Figure 1-1 or in Section 5.2. In addition, if wastes are generated from the mentioned profiles in future years, the generation amounts are expected to be lower by volume on an annual basis.

6 Acronyms and Abbreviations

Acronym	Definition
CFR	Code of Federal Regulations
CMR	Chemistry and Metallurgy Research Facility
DAAF	diaminoazoxyfurazan
DOE	(U.S.) Department of Energy
EM-LA	DOE/Environmental Management Los Alamos
EPA	(U.S.) Environmental Protection Agency
EPC	Environmental Protection and Compliance Division
FY	fiscal year
HE	high explosives
LANL	Los Alamos National Laboratory
LLW	low-level 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

Acronym	Definition
PF-4	Plutonium Facility (TA-55-0004)
RCRA	Resource Conservation and Recovery Act
SCO	surface-contaminated object
TA	Technical Area
WCATS	Waste Compliance and Tracking System
WIPP	Waste Isolation Pilot Plant
WSP	waste stream profile

ENCLOSURE 2

Fiscal Year 2024 Los Alamos National Laboratory
National Laboratory for Newport News Nuclear
BWXT-Los Alamos, LLC

Date: October 29, 2024

November 2024
EM2024-0758

Fiscal Year 2024 Hazardous Waste Minimization at Los Alamos National Laboratory for Newport News Nuclear BWXT-Los Alamos, LLC

Los Alamos National Laboratory Hazardous Waste Facility Permit

CERTIFICATION

NEWPORT NEWS NUCLEAR BWXT-LOS ALAMOS, LLC

Fiscal Year 2024 Hazardous Waste Minimization at Los Alamos National Laboratory for Newport News Nuclear BWXT-Los Alamos, LLC

CERTIFICATION STATEMENT OF AUTHORIZATION

In accordance with the New Mexico Administrative Code Title 20, Chapter 4, Part 1 (incorporating the Code of Federal Regulations, Title 40 CFR § 270.11):

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with 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."

Robert E. Edwards III — October 23, 2024

Robert Edwards III, Program Manager
Environment, Safety, Health and Quality
Newport News Nuclear BWXT-Los Alamos, LLC

Date

Digitally signed by Brian G. Harcek
Date: 2024.10.29 10:47:28 -06'00'

Brian Harcek, Director
Office of Quality and Regulatory Compliance
U.S. Department of Energy
Environmental Management
Los Alamos Field Office

Date

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Attachment 1 Fiscal Year 2024 Environmental Management System Objectives and Targets

1.0 INTRODUCTION

Newport News Nuclear BWXT-Los Alamos, LLC (N3B) is the contractor selected by the U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office (EM-LA) to implement the Los Alamos Legacy Cleanup Contract (LLCC). Work conducted under the LLCC includes implementation of the Los Alamos National Laboratory (LANL or the Laboratory) Hazardous Waste Facility Permit (Permit) issued to DOE; Triad National Security, LLC; and N3B, collectively the Permittees. This report has been prepared in accordance with Part 2.9 of the LANL Permit to describe the N3B Hazardous Waste Minimization Program and to detail N3B's waste reduction achievements for Fiscal Year (FY) 2024.

FY 2024 includes the 12 months from October 1, 2023, through September 30, 2024.

During FY 2024, N3B conducted hazardous waste minimization and pollution prevention efforts in conjunction with investigative and remedial efforts and disposition of stored legacy wastes. Through this work, N3B shipped hazardous waste, mixed transuranic (MTRU) waste, mixed low-level waste (MLLW), and remediation waste off-site. Additionally, scrap metal and other items were recycled by N3B during FY 2024. N3B's FY 2024 accomplishments and analysis of the waste streams are discussed in the following sections.

A depiction of wastes disposed of by N3B during FY 2024 by type is presented in Figure 1. In total, 1908.58 m^3 of waste was disposed of during FY 2024, including low-level waste (LLW), MTRU, solid waste (nonhazardous and nonsolid waste), New Mexico Special Waste, universal waste, MLLW and hazardous waste. Approximately 260 m^3 of scrap metal was recycled by N3B during FY 2024.

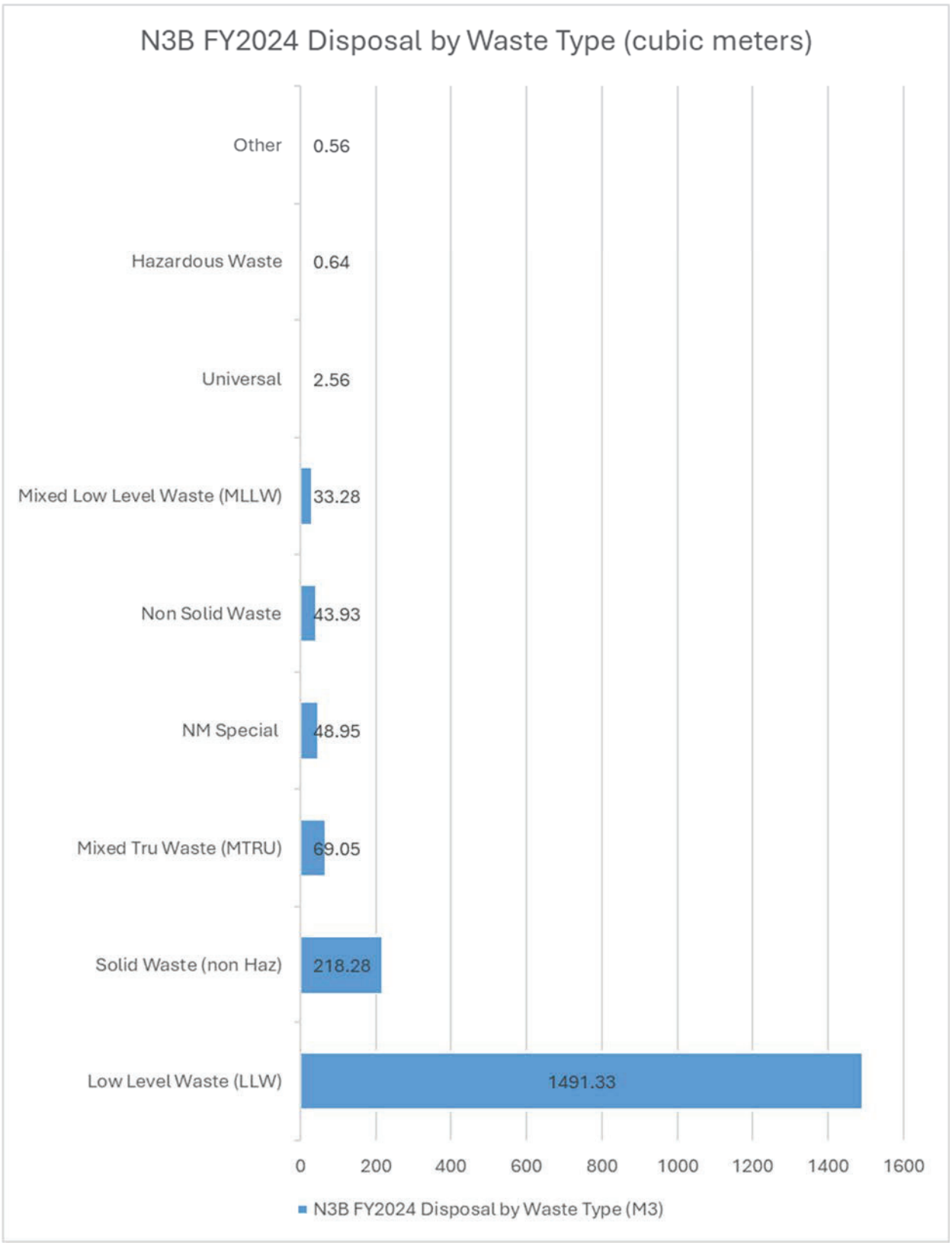

Figure 1 Wastes disposed of by N3B during FY 2024

1.1 Background

The 1990 Pollution Prevention Act changed the focus of environmental policy from "end-of-pipe" regulation to source reduction and waste generation minimization. Under the provisions of the Resource Conservation and Recovery Act (RCRA), and in compliance with the Pollution Prevention Act of 1990 and other institutional requirements for treatment, storage, and disposal of wastes, all waste generators must certify that they have a waste minimization program in place.

Specific DOE pollution prevention requirements are found in DOE Order 436.1A, "Departmental Sustainability." The order contains goals for reduction of greenhouse gas emissions and conservation of energy and water and places a strong emphasis on pollution prevention and sustainable acquisition. DOE Order 436.1 requirements are executed through N3B's Environmental Management System (EMS).

1.2 Purpose and Scope

This report describes the measures N3B implemented throughout FY 2024 to reduce the volume and toxicity of waste generated in conjunction with its work scope. This report also describes the barriers to implementing waste reduction efforts.

1.3 Operating Permit Requirements

Section 2.9 of the LANL Permit requires that a waste minimization program be in place and that a certified progress report be submitted annually to the New Mexico Environment Department (NMED). The Permit requirements listed in Table 1.3-1 correspond with the section(s) of this report that address each requirement.

Table 1
Crosswalk of Permit Requirements and Corresponding Report Section

Permit Requirement	Item	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 2.4, 3.3, 4.3, 5.3, 6.3, and 6.4
Section 2.9 (4)	Capital Expenditures and Operating Costs	Section 2.5
Section 2.9 (5)	Barriers to Implementation	Sections 3.4, 4.4, 5.4, and 6.5
Section 2.9 (6)	Investigation of Additional Waste Minimization Efforts	Section 2.4
Section 2.9 (7)	Waste Stream Flow Charts, Tables, and Analysis	Sections 3.2, 4.2, 5.2, and 6.2
Section 2.9 (8)	Justification of Waste Generation	Section 2.3

1.4 N3B Organizational Structure and Staff Responsibilities

N3B's work scope involves the following elements:

- ongoing disposition of legacy MTRU/MLLW waste stored aboveground
- remediation for waste acceptance criteria compliance of MTRU aboveground waste
- retrieval and processing (size reduction) for disposal of MTRU waste stored belowground

- monitoring and protection of ground and surface water
- investigation and evaluation of groundwater contaminant plumes, including documented plumes of hexavalent chromium and high explosives
- campaign investigations and remediation of soils
- decommissioning, demolition, and disposal of facilities
- implementation of a Site Sustainability Plan in accordance with DOE Order 436.1A

N3B's organizational structure allows for the efficient implementation of this work scope.

The N3B Environmental Remediation (ER) Program has responsibility for the investigation and cleanup of legacy-contaminated sites in compliance with the 2016 Compliance Order on Consent (Consent Order).

N3B Environmental Programs/Services are responsible for management and tracking of the EMS, including N3B's Waste Minimization Program. The EMS establishes (1) institutional waste minimization and pollution prevention objectives and (2) environmental action plans that contain waste minimization, pollution prevention, and other environmental improvement actions.

N3B's CH-TRU (Contact-Handled Transuranic [Waste]) Program provides all N3B waste packaging, transporting, and disposal services. In addition, CH-TRU is responsible for the retrieval, size reduction, and disposal of 158 corrugated metal pipes, located in belowground storage at Technical Area 54 (TA-54), above Pit 29.

N3B's Environmental Programs/Services are responsible for overseeing the implementation of DOE Order 436.1A and the Site Sustainability Plan reporting requirements, including tracking of municipal solid waste sent to landfills, materials diverted from landfills (municipal solid waste, construction and demolition waste), and disposition of electronic items company wide.

All of N3B's programs share responsibility for waste minimization and implementation of the Pollution Prevention Program.

2.0 WASTE MINIMIZATION PROGRAM ELEMENTS

2.1 Governing Policy on Environment

All waste generation and management of waste by N3B is governed by N3B Waste Management Procedure (N3B-P409-0, Revision 4) and all work scope and supporting activities are implemented in accordance with N3B's Environmental Policy (N3B-POL-ENV-0001) which calls for the implementation of the Los Alamos Legacy Cleanup Contract mission in a safe and compliant manner that protects human health and the environment.

N3B EMS procedure N3B-SD400 addresses the Pollution Prevention and Site Sustainability Programs. As required by DOE Order 436.1A, "Departmental Sustainability," the EMS provides the framework for integration of sustainability and pollution prevention goals into N3B's work scope. In support of this effort, N3B's EMS Integrated Project Team (IPT) develops an implementation plan each year for management approval that identifies site-sustainability objectives and targets that support those goals. The EMS IPT is composed of professionals from across N3B functional areas who work to ensure that the environmental objectives, goals, and initiatives identified in the annual plan are integrated throughout N3B's work scope. This group meets periodically to track the objectives and targets of the site sustainability plan. The

implementation plan for FY 2024 consists of 4 overreaching objectives and 15 supporting targets (Attachment 1). The 4 objectives identified in the FY 2024 plan are as follows:

1. Manage and remove waste in support of lab operations and legacy waste remediation.
2. Reduce volume and toxicity of waste from field, office, and remote work support activities.
3. Reduce energy consumption, greenhouse gas emissions, and natural resource consumption.
4. Establish a culture of sustainability among N3B employees and subcontractors.

Of the 15 supporting targets included in the FY 2024 plan, the following are identified as directly associated with N3B's overall waste minimization strategy:

- Objective 1, Target 2: Disposition remaining above ground inventory of MLLW
- Objective 1, Target 3: Ship 62 m^3 of CH-TRU waste to the Waste Isolation Pilot Plant (WIPP).
- Objective 1, Target 4: Size-reduce and package for shipment 158 corrugated metal pipes by March 30, 2024.
- Objective 2, Target 2: (paraphrased) Require that projects subject to the N3B internal project review process include information to detail how waste volume and toxicity associated with the project will be minimized.
- Objective 3, Target 1: Develop a fugitive emissions management program.
- Objective 3, Target 3: Develop a tracking system for purchases of electronics and their energy efficiency ratings.
- Objective 4, Target 1: Develop an Intranet webpage with resources for employees to commute more sustainably (mass transit, carpooling, etc.).
- Objective 4, Target 3: Establish a contract with an occupational medicine provider for N3B located in Los Alamos County.

2.2 Employee Training and Incentive Programs

N3B employee training is used to promote waste recycling and source reduction. Available training courses include the EMS biennial awareness training (N3B-TS-RS-0003) and training associated with N3B-P409-0, "Waste Generation Overview" (Course # 23263); "Waste Generation Overview Refresher" (Course # 21464), and "Ensuring Safe and Compliant Waste Deposition" (CW-2019-16208). Through the promotion of pollution prevention and waste minimization and ongoing calls for increased efficiency from N3B management, employees and subcontractors are continually encouraged to seek project modifications that minimize environmental impact and waste generation.

2.3 Hazardous Materials Use and Justification

In conjunction with the implementation of N3B's work scope, the primary source of hazardous waste generation is repackaging and shipping of Federal Facility Compliance Order (FFCO) site treatment plan (STP) wastes for final off-site disposition. Other sources of hazardous waste generation include various investigation, remediation, and monitoring efforts, as well as limited, ongoing facility operations. The use of hazardous materials and generation of new hazardous wastes in conjunction with the implementation of N3B's work scope is actively minimized through the N3B project planning and review process defined in N3B-P351, "Project Planning and Regulatory Review, Revision 5." This procedure requires

consideration of waste generation and regulatory implications in the early planning phase of each new project. Additionally, N3B routinely considers waste reduction and sustainability as part of its procurement process. Through these and other programs, use of hazardous materials and minimization of waste generation are a prime consideration for every project implemented by N3B.

2.4 Investigation of Additional Hazardous Waste Minimization and Pollution Prevention Efforts

In FY 2024, N3B utilized its EMS to define hazardous waste minimization and pollution prevention goals. While N3B made progress with waste reduction targets, the specific achievements during FY 2024 are still being vetted for an annual report. The EMS annual report will be finalized by the end of Calendar Year 2024 and submitted to N3B management. Additionally, DOE Order 436.1A requires annual reporting to DOE through the Sustainability Dashboard.

2.5 Capital Expenditures and Operating Costs

N3B reported no capital expenditures devoted to hazardous waste source reduction and recycling during FY 2024. Waste management and disposal costs are incorporated into overall project costs.

3.0 HAZARDOUS WASTE

3.1 Introduction

Non-legacy hazardous wastes most commonly generated by N3B include solvents; metals; soil, demolition debris, and other solid waste contaminated with hazardous waste constituents or expired/off-specification hazardous material; as well as contaminated wastewater.

3.2 Waste Stream Analysis

Wastes are generated from all of N3B's operations, including administrative activities; waste management programs; decommissioning, demolition, and disposal operations; ongoing facility operations and maintenance; and remedial and investigation efforts. After a material is declared a waste, it is evaluated and if determined to be hazardous waste, is characterized, labeled, and collected in appropriate storage areas. Hazardous wastes are ultimately shipped to appropriate off-site treatment, storage, and disposal facilities for final treatment and/or disposal. The majority of hazardous waste managed and disposed of by N3B is legacy and environmental remediation waste.

During FY 2024, N3B disposed of 0.64 m^3 of non-radioactive contaminated hazardous waste. The volume of hazardous waste generated during FY 2024 decreased from FY 2023, when N3B disposed of 11.18 m^3 of hazardous waste. As Table 1 below summarizes, the volume of hazardous waste generated from year to year is variable, depending on remediation and investigation efforts performed during the year.

Table 2
Summary of Hazardous Waste Disposal by Fiscal Year

Fiscal Year	Hazardous Waste Disposed (m^3)
2021	0.85
2022	0.776
2023	11.18
2024	0.64

3.3 Hazardous Waste Minimization

N3B projects are expected to undergo a regulatory review in accordance with N3B-P351, “Project Planning and Regulatory Review, Revision 5,” before approval for implementation. This review includes the development of waste characterization strategy forms which anticipate all types of waste expected to be generated by the project. This information is reviewed by waste management coordinators with two primary goals: minimizing waste generation and identifying methods or products with lower environmental impact. Additionally, during the planning process, subject matter experts identify opportunities for waste minimization, substitution, and implementation of hazardous waste best management practices. N3B also routinely implements ongoing processes focused on waste minimization and environmental impacts consideration. For example, N3B’s procurement process requires sustainability and waste generation to be considered in the contractual process. As N3B has matured as an organization, hazardous waste minimization has been further incorporated into policies and procedures.

Universal wastes, including lead acid batteries and fluorescent lamps, are recycled on a company-wide basis. Scrap metal produced from N3B operations is recycled after radiological sampling/screening is performed to determine the presence/absence of radiological contamination. Wherever possible, N3B uses recyclable lubricating fluids for equipment, such as highly refined mineral oil in place of more hazardous hydraulic fluids. Used oil generated by N3B operations is routinely recycled.

Although specific weights or volumes of plastic and cardboard materials were not tracked by N3B, these materials were recycled during FY 2024. N3B recycled 259.95 m^3 of scrap metal and 2.56 m^3 of batteries and fluorescent lamps wastes during FY 2024.

3.4 Barriers to Hazardous Waste Minimization

Barriers to hazardous waste minimization at N3B include the limited availability of appropriate nonhazardous products, a limited pool of vendors or service providers, and a lack of options for on-site treatment of radioactively contaminated materials.

4.0 MIXED TRANSURANIC WASTE

4.1 Introduction

MTRU waste is RCRA hazardous waste that contains more than 100 nCi of alpha-emitting transuranic (TRU) isotopes per gram of waste. TRU isotopes have an atomic number higher than 92 and half-lives that exceed 20 yr. TRU waste does not include (1) high-level waste; (2) waste which DOE has determined, with the concurrence of the U.S. Environmental Protection Agency, does not need the degree of isolation required by 40 Code of Federal Regulations (CFR) 191; or (3) waste which the U.S. Nuclear Regulatory Commission has approved for disposal on a case-by-case basis in accordance with 10 CFR 61.

MTRU waste is generated from the management and disposal of legacy waste that was produced from research, development, nuclear weapons production, and spent nuclear fuel reprocessing. During FY 2024, N3B was responsible for the disposal of legacy MTRU waste managed at TA-54 but did not generate new MTRU waste. MTRU waste is disposed of at WIPP, a geologic repository near Carlsbad, New Mexico.

MTRU waste can include solidified liquids, cemented residues, combustible materials, noncombustible materials, and non-actinide metals. MTRU solid waste is packaged for disposal in metal 55-gal. drums, standard waste box containers, or oversized containers and is then stored on-site before being certified for transport and disposal at WIPP.

Standards for packaging waste for acceptance at WIPP change periodically. When this occurs, stored containers of MTRU waste often need to be repackaged to conform to the new standards. The shipment of repackaged MTRU waste accounts for the majority of MTRU waste shipped from N3B to WIPP.

4.2 Waste Stream Analysis

MTRU wastes located at TA-54 include legacy wastes listed in the FFCO STP for ultimate disposal. No new MTRU wastes are deliberately generated, except through routine management of existing MTRU wastes (such as repackaging to meet new requirements) or environmental remediation wastes, as explained in section 6.0 of this report.

4.3 MTRU Waste Minimization

The N3B CH-TRU Program, which manages and ships mostly legacy MLLW and MTRU wastes, has implemented several activities to reduce the amount of hazardous waste generated from ongoing operational activities. N3B minimizes MTRU waste by carefully segregating non-MTRU waste from the MTRU waste stream. The primary functions of the CH-TRU Program are management and shipping of legacy MLLW and MTRU waste.

During FY 2024, N3B disposed of 69.05 m^3 of MTRU waste.

4.4 Barriers to MTRU Waste Minimization

In order to protect human health and the environment, the MTRU waste packaging requirements defined by WIPP are very stringent, which makes minimization of these wastes difficult. There are radiological wattage and dose limits that cannot be exceeded, and a very small volume of MTRU waste may have a high wattage. Containers sent to WIPP are 55 gal. or larger in capacity.

5.0 MIXED LOW-LEVEL WASTE

5.1 Introduction

For waste to be considered MLLW, it must contain both hazardous and radioactive waste but not be classified as high-level waste, TRU waste, spent nuclear fuel, or byproduct materials, such as uranium or thorium mill tailings. Test specimens of fissionable material irradiated only for research and development (i.e., not for the production of power or plutonium) may be classified as LLW, provided the activity of TRU waste elements is less than 100 nCi/g.

Most of the routine MLLW comes from stockpile stewardship; remediation activities; reclassification of MTRU waste; and decommissioning, demolition, and disposal activities. Most of the non-routine waste is generated by abnormal events, such as spills in legacy-contaminated areas. Typical MLLW includes contaminated debris, waste gloveboxes, legacy chemicals, mercury-cleanup waste, electronics, copper solder joints, and used oil.

5.2 Waste Stream Analysis

Materials and equipment are introduced into a radiologically controlled area as needed. In the course of operations, materials may become externally contaminated or activated, thus becoming MLLW when no longer needed.

If MLLW is generated, it is transferred to a satellite accumulation area or central accumulation area (CAA) after generation. Whenever possible, MLLW materials are surveyed to confirm the radiological contamination levels. If decontamination eliminates the radiological or the hazardous component, materials are decontaminated to prevent them from becoming MLLW.

MLLW is managed in accordance with all appropriate waste management and U.S. Department of Transportation requirements. It may be shipped to and stored at an on-site CAA or permitted storage facility before transport to off-site commercial or DOE-operated permitted treatment, storage, or disposal facilities.

Reclassification. Waste formerly classified as MTRU waste may be reclassified and disposed of as MLLW based on new nondestructive assay measurements. Since this reclassified waste is already generated, there are no opportunities to minimize this component of the MLLW stream.

Lead Debris. This waste stream can include copper pipes with lead solder, lead-contaminated equipment, brass contaminated with lead, sheets, rags, circuit boards, cathode ray tubes, or personal protective equipment (PPE) contaminated with lead from maintenance activities. This waste stream is generated primarily from remediation campaigns, and volumes of this waste stream are expected to decrease as remediation efforts progress.

Trash and Maintenance. This waste stream consists of PPE, dry painting debris, paper towels, and rags and can also include unwanted equipment removed during remediation campaigns.

During FY 2024, N3B disposed of 33.28 m^3 of MLLW.

5.3 MLLW Minimization

MLLW is generated by cleanup activities and repackaging efforts. The volume of MLLW from these efforts varies significantly from year to year and often cannot be substantially minimized. It is therefore useful to examine the routine fraction of the MLLW waste stream separately to identify good waste minimization opportunities.

5.4 Barriers to MLLW Minimization

Packaging requirements at final disposition locations are often barriers to MLLW minimization. Containers sent for final disposition have a 55-gal. or greater capacity, often with very small volumes of waste inside the overpacks, and the majority of internal volume is empty space.

6.0 REMEDIATION WASTE

6.1 Introduction

The mission of N3B's corrective action activities is to investigate and remediate potential releases of contaminants as necessary to protect human health and the environment. These activities are implemented to comply with Consent Order requirements.

Through the implementation of this mission, large volumes of waste are typically generated. Because these activities involve investigating and, as necessary, conducting corrective actions at historically contaminated sites, source reduction and material substitution are difficult to control. These wastes often entail special handling, treatment, storage, and disposal requirements. Because of the investigative nature of this work, the volume of waste is often difficult to anticipate. The corrective action process, therefore, involves the responsibility and challenge of minimizing the risk posed by contaminated sites while also minimizing the amount of waste, thus reducing subsequent management or disposal efforts. Three factors make minimization desirable: the high cost of waste management; the limited capacity for on-site or off-site waste treatment, storage, and/or disposal; and reduction of the associated liability.

6.2 Waste Stream Analysis

The following sections summarize the waste that may be generated by corrective actions associated with the investigation and remediation of legacy contaminant releases. Wastes generated include “primary” and “secondary” waste streams.

Primary waste consists of generated legacy-contaminated material or environmental media that was present as a result of past DOE activities before any containment or restoration activities. Primary waste includes contaminated building debris and soil from investigations and remedial activities.

Secondary waste streams consist of materials used in the investigative or remedial process and may include investigation-derived waste (IDW), such as PPE, sampling waste, drill cuttings, or treatment residues, such as spent resins or activated carbon from groundwater treatment; wastes resulting from storage or handling operations; or additives used to stabilize waste. Primary and secondary waste streams generated as a result of investigative and remedial actions may be hazardous waste, nonhazardous waste, or MLLW.

6.3 Remediation Waste Minimization

Waste minimization and pollution prevention are incorporated into N3B standard operating procedures that govern the planning and implementation of field activities. Techniques used to reduce investigation-related waste streams include the following:

Land Application of Groundwater. Well drilling, development, sampling, and rehabilitation/reconfiguration activities all generate a significant volume of potential wastewater. However, the procedure for implementing the NMED-approved “Decision Tree for the Land Application of Groundwater” (November 2016), in cases where land application is determined to be protective of human health and the environment, allows for the minimization of purge water that must be managed as wastewater. During FY 2024, N3B land-applied 129,075 gal. of groundwater using this procedure.

Land Application of Drill Cuttings. Drill cuttings constitute a major potential source of solid waste generation. This procedure, which incorporates the NMED-approved “Decision Tree for the Land Application of Drill Cuttings” (April 2016), allows drill cuttings to be land-applied if this is protective of human health and the environment. These drill cuttings do not have to be managed or disposed of as waste. In addition, land-applied drill cuttings can be beneficially reused as part of drill site restoration. N3B land-applied 8912 m^3 drill cuttings using this procedure during FY 2024.

EMS Integration into N3B and Subcontractor Remediation Activities. N3B considers sustainability and waste generation as part of the contractual process. Full implementation of this process will enhance N3B and subcontractor awareness of waste minimization requirements and opportunities.

Sorting, Decontamination, and Segregation. Segregation of contaminated and uncontaminated soils is actively conducted so that uncontaminated soils can be reused as fill, thereby minimizing unnecessary disposal costs. This practice is easily implemented at sites where contaminated subsurface soils and structures are overlain by uncontaminated soils. During excavation to remove the contaminated soils and structures, the uncontaminated overburden is typically segregated and staged on plastic apart from contaminated materials. Any man-made debris present in the excavated material is removed and dispositioned at an appropriate disposal facility.

Following removal of contaminated soils and structures, segregated materials are tested to verify residential soil screening levels are met. Material that meets this standard is typically used as backfill for the excavation. This practice minimizes the amount of contaminated soil that must be disposed of as waste and the amount of backfill that must be imported from off-site.

Material that does not meet applicable soil screening levels or screening action levels, or which is determined to be LLW or hazardous waste, is managed as waste.

Risk Assessment. Risk assessments are routinely conducted for corrective action projects to evaluate the human health and ecological risk associated with a site. The results of the risk assessment may be used by NMED to determine whether corrective measures are needed at a site to protect human health and the environment. The risk assessment may demonstrate that it is adequately protective to leave waste or contaminated media in place, thus avoiding the generation of waste. Properly designed land-use agreements and risk-based cleanup strategies can provide flexibility to select remedial actions or other technical activities that may avoid or reduce the need to excavate or conduct other actions that typically generate high volumes of remediation waste.

Equipment and Material Reuse. The reuse of equipment and materials, such as plastic gloves, sampling scoops, plastic sheeting, and PPE, after proper decontamination to prevent cross-contamination can provide waste reduction and cost savings.

6.4 Pollution Prevention Planning

The potential to incorporate additional pollution prevention practices into future activities will be evaluated annually as part of the EMS planning efforts. This report will be used during the EMS annual management assessment to continue integration efforts across the organization and align environmental protection and sustainability goals. Further actions related to pollution prevention will be incorporated into the EMS as they are identified. Waste generation, management, and disposition processes are being developed to minimize waste generation and maximize pollution prevention. Specific actions and approaches that will be incorporated into planned corrective action projects include

- segregation and recycle or reuse of uncontaminated materials,
- continued use of land application of drill cuttings and fluids,
- waste avoidance,
- reuse and recycling of equipment and materials,
- increase in the use of sustainable acquisition strategies, and
- risk-based cleanup strategies.

In addition, pursuant to the January 2012 Framework Agreement, DOE and NMED have agreed to increase the efficiency of cleanup activities while maintaining protection of human health and the environment. These increased efficiencies should result in a reduction in sampling activities for future investigations and a commensurate reduction in IDW generation.

To help improve the implementation of waste minimization activities, N3B ensures communication of environmental and waste minimization concerns to project participants through N3B-P351, “Project Planning and Regulatory Review, Revision 5.” Waste minimization opportunities are and will continue to be integrated into routine project communications to increase awareness of waste minimization and promote the sharing of lessons learned.

6.5 Barriers to Remediation Waste Minimization

Corrective actions involving buried waste or contaminated soil undertaken by N3B typically require removal of these materials. For any given project, this approach has the potential to generate thousands of cubic meters of waste. In evaluating corrective measure alternatives project leaders generally give preference to alternatives that minimize waste generation, provided they are protective of human health and the environment. The consideration of other factors by external stakeholders, however, may result in the selection of an alternative that generates more waste than the recommended alternative.

Attachment 1

Fiscal Year 2024
Environmental Management System Objectives and Targets

N3B Fiscal Year 2024 Environmental Management System Objectives and Targets

October 1, 2023–September 30, 2024

Objective 1: Manage and remove waste in support of lab operations and legacy waste remediation	**Objective 2:** Reduce volume and toxicity of waste from field, office, and remote work support activities	**Objective 3:** Reduce energy consumption, greenhouse gas emissions, and natural resource consumption	**Objective 4:** Establish a culture of sustainability among Newport News Nuclear BWXT-Los Alamos, LLC (N3B) employees and subcontractors
Target 1 – Design, procure, and initiation of fabrication of a high- Material at Risk (MAR) glovebox. *Responsible Group: CH-TRU*	Target 1 – Execute EMS IPT-developed implementation plan to ensure compliance with non-radioactive waste reporting requirements in DOE Order 436.1A, "Departmental Sustainability." *Responsible Group: CH-TRU*	Target 1 – Develop a fugitive emissions management program. *Responsible Group: Regulatory Compliance*	Target 1 – Develop an intranet webpage with resources for employees to commute more sustainably (e.g., mass transit, carpooling, etc.). *Responsible Group: Communications*
Target 2 – Disposition remaining above-ground inventory of mixed/low-level waste (M/LLW). *Responsible Group: CH-TRU*	Target 2 – Add an inquiry to the Project Planning and Regulatory Review (PPRR) asking the project to detail how they will reduce the volume and toxicity of waste generated by the project. *Responsible Group: Environmental Programs/Services*	Target 2 – Develop a tracking system for non-fleet fuel usage. *Responsible Group: Business Services*	Target 2 – Revise N3B-SPC-32-9219 "Environmental Remediation: Specification for Seeding," to conform with Los Alamos National Laboratory "Pollinator Protection Plan." *Responsible Group: Environmental Programs/Services*
Target 3 – Ship 62 m^3 of contact-handled transuranic (CH-TRU) waste to the Waste Isolation Pilot Plant (WIPP). *Responsible Group: CH-TRU*		Target 3 – Develop a tracking system for purchases of electronics and their energy efficiency ratings. *Responsible Group: Business Services*	Target 3 – Establish a contract with an occupational medicine provider for N3B located in Los Alamos County. *Responsible Group: Safety & Health*
Target 4 – Size-reduce and package for shipment 158 corrugate metal pipes (CMPs) by March 30, 2024. *Responsible Group: CH-TRU*		Target 4 – Develop a tracking system for N3B-sponsored ground travel (e.g., rental cars, personal vehicles, taxis, etc.). *Responsible Group: Business Services*	Target 4 – Increase N3B staff capacity to ensure 100% on-site cultural monitors at culturally significant sites. *Responsible Group: Environmental Programs/Services*
Target 5 – Completion of 2016 Compliance Order on Consent Appendix B fiscal year (FY) 2024 Milestones. *Responsible Group: Environmental Remediation*			

Robert Edwards III	Robert E. Edwards III	Program Manager	Environment, Safety, Health, & Quality	6/17/2024
Printed Name	Signature	Title	Organization	Date