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Enduring Mission Waste Management Plan for Los Alamos National Laboratory

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EXECUTIVE SUMMARY

Implementation of the Enduring Mission Waste Management Plan for Los Alamos National Laboratory (LANL, or the Laboratory) was initiated in 2016 to define key strategies to manage the wide range of wastes produced in the execution of Laboratory missions. This 2020 update incorporates implementation goals of the Office of Enterprise Stewardship (NA-53), *Radioactive Waste Management Program Plan*, issued in March 2020 and is primarily focused on the execution plan for transuranic waste during fiscal year 2021. One of the goals of the NA-53 Plan is for each site to perform a prioritized risk assessment and develop a risk register. Although LANL has performed a risk assessment and this plan addresses risk, mitigation strategies and process improvements, a formal risk register for waste has not been developed. LANL plans to complete development of the waste risk register in FY21.

Many of the strategies described in earlier plans have been successfully implemented. Waste minimization efforts have eliminated many sources of radioactive and hazardous waste. The contractual development of off-site shipping to government and commercial treatment, storage, and disposal facilities has opened the path for eliminating on-site waste disposal. A Transuranic Waste Facility is in operation to allow the storage of transuranic waste for off-site shipments. Upgrades to the Radioactive Liquid Waste Treatment Facility were approved, and construction of the Low-Level Liquid Waste Facility is complete.

The 2020 update to this plan identifies four key waste management objectives to support future National Nuclear Security Administration (NNSA) mission work at the Laboratory. The key objectives are to

1. integrate the various waste management functions across the Laboratory into one coordinated function,
2. provide efficient and compliant waste management support to remove waste from the Laboratory and reduce the associated risk with stored waste,
3. maintain flexible capabilities and qualified staffing to support the expanding and changing NNSA mission scope at LANL, and
4. integrate with programmatic milestones on key waste requirements in order to support mission expansion and planning.

Attachment 1 lists the primary near-term waste management milestones and will be updated as needed.

1.0 INTRODUCTION

The objective of the Enduring Mission Waste Management Plan (EMWMP) is to articulate an institutional strategy and implementation path to manage wastes of all types from enduring U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) missions (Enduring Mission) and Strategic Partnerships Projects (formerly work-for-others) operations at Los Alamos National Laboratory (LANL, or the Laboratory). Enduring mission wastes are differentiated from transuranic (TRU) legacy wastes that became the responsibility of the DOE Office of Environmental Management (EM) on October 1, 2015. In 2018, DOE-EM issued the Los Alamos Legacy Cleanup Contract to Newport News Nuclear BWXT Los Alamos (N3B) to manage legacy waste and environmental remediation at the Laboratory.

This 2020 update incorporates requirements for implementation goals of the Office of Enterprise Stewardship (NA-53), *Radioactive Waste Management Program Plan*, issued in March 2020. Section 2.0 of this document describes the programmatic functions, organizational structure, and supporting elements that allow the Laboratory to compliantly and efficiently manage waste. Sections 3.0 through 8.0 provide discussion of specific waste types generated by the Laboratory, challenges associated with disposition, and the planned path forward for each waste type. Risks, gaps and open issues associated with the management of each waste type are discussed along with mitigation strategies and process improvement initiatives. However, LANL recognizes the need to provide a concise summary of all risks and will complete a formal risk register in FY21.

Attachment 1 lists the key near-term waste management milestones and will be updated as needed.

1.1 WASTE MANAGEMENT PROGRAM OBJECTIVES

While the overarching strategy for enduring waste management at LANL is source reduction and waste minimization, the 2020 update to the EMWMP includes key objectives to improve program effectiveness and ensure the long-term viability of waste management operations at the Laboratory. These are the key objectives:

1. Integrate the various waste management functions across the Laboratory into one coordinated function,
2. Provide efficient and compliant waste management support to remove waste from the Laboratory and reduce the associated risk with stored waste,
3. Maintain flexible capabilities and qualified staffing to support the expanding and changing NNSA mission scope at LANL, and
4. Integrate with programmatic milestones on key waste requirements in order to support mission expansion and planning

2.0 LANL WASTE MANAGEMENT

Laboratory waste management programs are owned primarily by two organizations at the Laboratory: the Associate Lab Directorate for Environment, Safety, Health, Quality, Safeguards, and Security (ALDESHQSS) and the Associate Lab Directorate for Weapons Production (ALDWP). Specialized groups within these organizations manage the characterization, packaging, storage, certification, and disposition of all newly generated waste. Effective waste management requires close cooperation among the owning organizations. Therefore, Triad National Security, LLC, (Triad) restructured waste management at the Laboratory to ensure an integrated approach. The two organizations listed above are now linked through the Environmental and Waste Program (EWP) Office, with the EWP Senior Director serving as the single point of contact for waste management at LANL.

2.1 WASTE MANAGEMENT STRUCTURE

Figure 1 shows the organizational chart of the Triad senior management team. Figure 2 shows the organizational structure for the linked waste management functions at LANL.

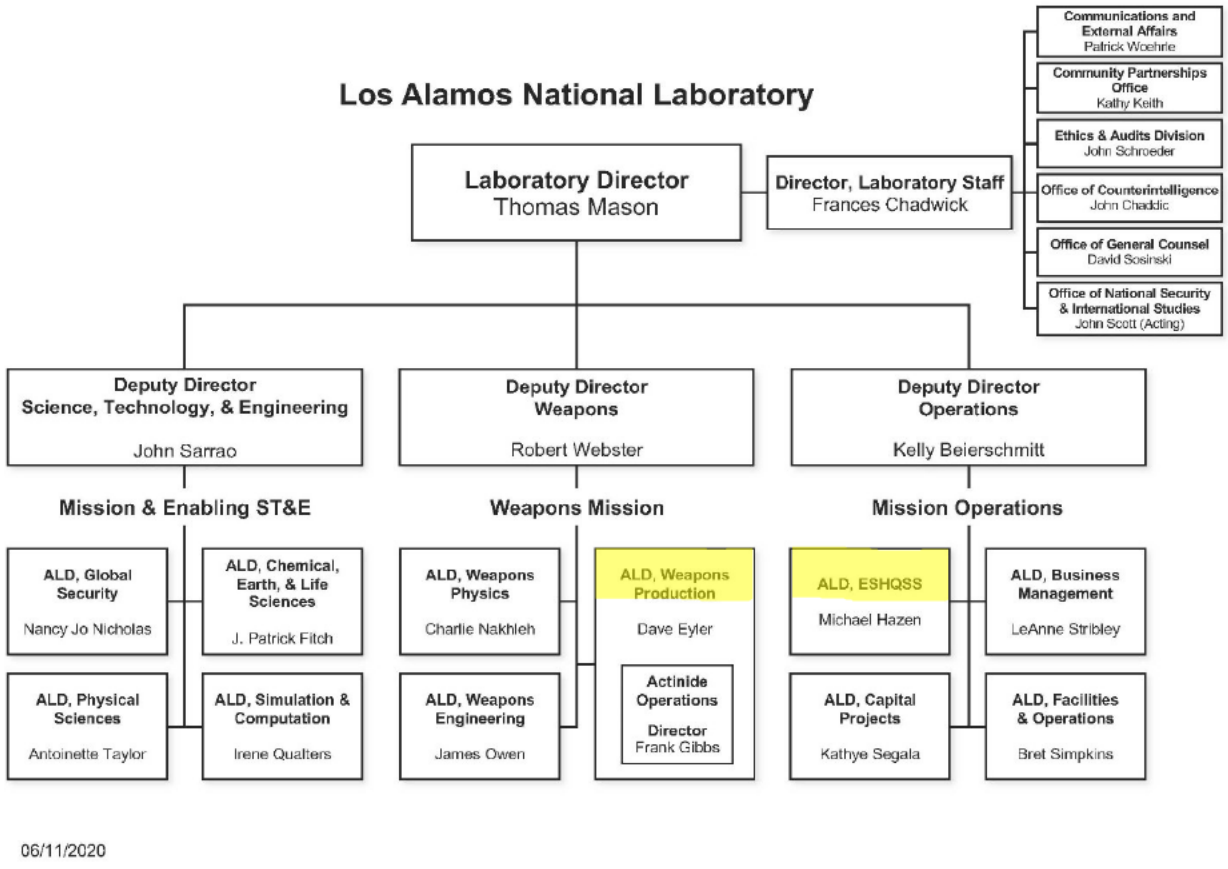

Figure 1. Triad National Security, LLC, Senior Management Team

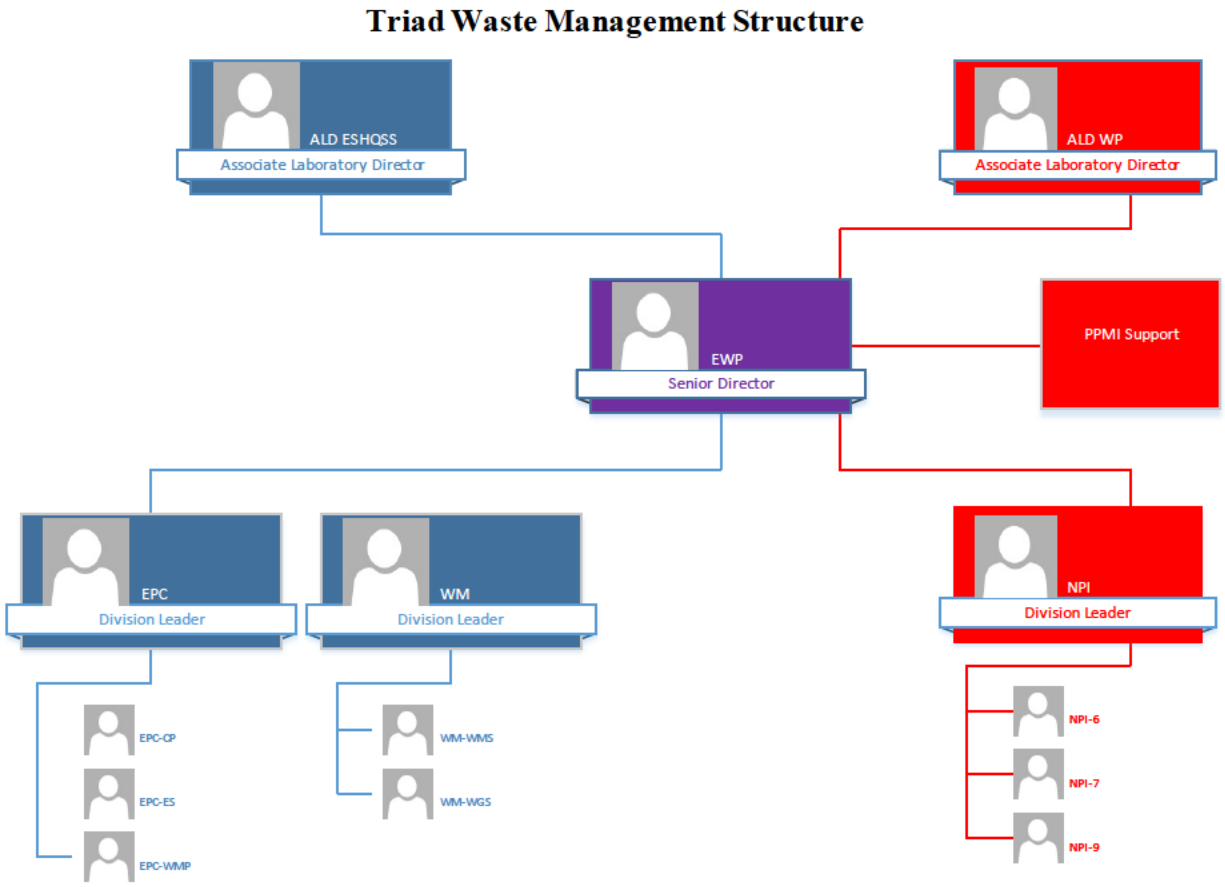

Figure 2. LANL linked waste management functions

To create efficiencies and consistent communication internally and externally to stakeholders, the responsibility and authority of TRU waste management under ALDWP is being integrated with EWP (the Laboratory's waste organization under ALDESHQSS) in the single position of Senior Director of Environment and Waste Programs. The Senior Director reports to ALDESHQSS with responsibility for the Environmental Protection and Compliance (EPC) Division and Waste Management (WM) Division and also reports to the ALDWP for TRU Waste Operations in Weapons Production. The Senior Director has authority and accountability for the Nuclear Process Infrastructure (NPI) Division within ALDWP. NPI consists of the current NPI-6, NPI-7, and NPI-9 groups with the Senior Director as the single point of contact for waste at the Laboratory.

2.1.1 Waste Management Division

The Waste Management (WM) Division within ALDESHQSS has direct responsibility for the management and disposition of all regulated waste types at LANL with the exception of TRU waste. There are two groups within the division, Waste Management Services (WMS) and Waste Generator Services (WGS). The WMS Group provides transportation and waste disposition services to the Laboratory; maintains the commercial contracts necessary for transportation, treatment, and disposal; and provides specialty services such as lab packing and difficult waste characterization. WGS provides deployed Waste Management Coordinators (WMCs), highly skilled waste professionals, to directly support all waste generating organizations at LANL.

Waste Management Technician (WMT) is a new entry level job category that is now being deployed to assist WMCs with field work and routine operations.

2.1.2 Nuclear Process Infrastructure Division

The NPI Division within ALDWP provides support for nuclear missions at the Technical Area (TA) 55 Plutonium Facility (PF); the Chemistry and Metallurgy Research (CMR) Facility; the Radioactive Liquid Waste (RLW) Facility; the Radiological Laboratory/Utility/Office Building (RLUOB); the Transuranic Waste Facility (TWF); the Waste Characterization, Reduction, and Repackaging Facility (WCRRF); and the Radioactive Assay Nondestructive Testing (RANT) Facility. The support provided includes operating the vault; performing assay measurements for nuclear materials control and accountability purposes; shipping and receiving special nuclear materials (SNM); packaging, characterizing, and staging low-level waste (LLW) and mixed low-level waste (MLLW); and packaging, staging, characterizing, and shipping TRU waste.

There are three groups within the division, NPI-6 (Hazardous Waste Management), NPI-7 (Hazardous Materials Shipping), and NPI-9 (Nuclear Materials Support Services). NPI-6 packages, characterizes, and stages all hazardous and radioactive waste for the TA-55 Facility Operations Director (FOD). NPI-6 performs these functions in PF-4, CMR, RLUOB, RLW, and TLW (once operational). NPI-6 develops and maintains acceptable knowledge (AK) information for all operations under the TA-55 FOD. NPI-7 stages, characterizes, and ships TRU waste. They perform line operations at TA-55, TWF, and RANT. NPI-7 also packs/unpacks and ships SNM to other sites in support of the weapons mission. NPI-9 supports nuclear missions in PF-4, RLUOB, and CMR by performing nondestructive assay (NDA) for Material Control and Accountability (MC&A) and manages the PF-4 vault.

2.1.3 Environmental Protection and Compliance Division

The EPC Division within ALDESHQSS provides programmatic and regulatory support for waste management activities across the Laboratory. The Waste Management Program (WMP) Group provides Resource Conservation and Recovery Act (RCRA) permitting and compliance, regulatory and DOE compliance oversight, Waste Compliance and Tracking System (WCATS) development and support, compliance assessments of waste generator and storage facilities, implementation of the waste certification program for disposal at the Nevada National Security Site (NNSS), and review of Waste Stream Profiles and Hazardous Waste Manifests. The Environmental Stewardship (ES) Group manages the pollution prevention (P2) program, provides waste sampling services, waste NDA services, and manages the Green is Clean (GIC) program.

2.2 LANL Waste Management Facilities

The Laboratory is divided into 47 technical areas, which include building sites, experimental areas, support facilities, roads, and utility rights-of-way. However, much of the LANL land provides buffer areas for security and safety or is held in reserve for future use. The Laboratory has 1,280 buildings, with approximately 9 million square feet under roof. The LANL waste management facilities comprise two separate groups: the LANL TRU waste system of facilities (including solid and liquid) supporting the plutonium infrastructure and other ancillary facilities supporting LLW and MLLW throughout the balance of the Laboratory.

2.2.1 LANL TRU Waste System of Facilities

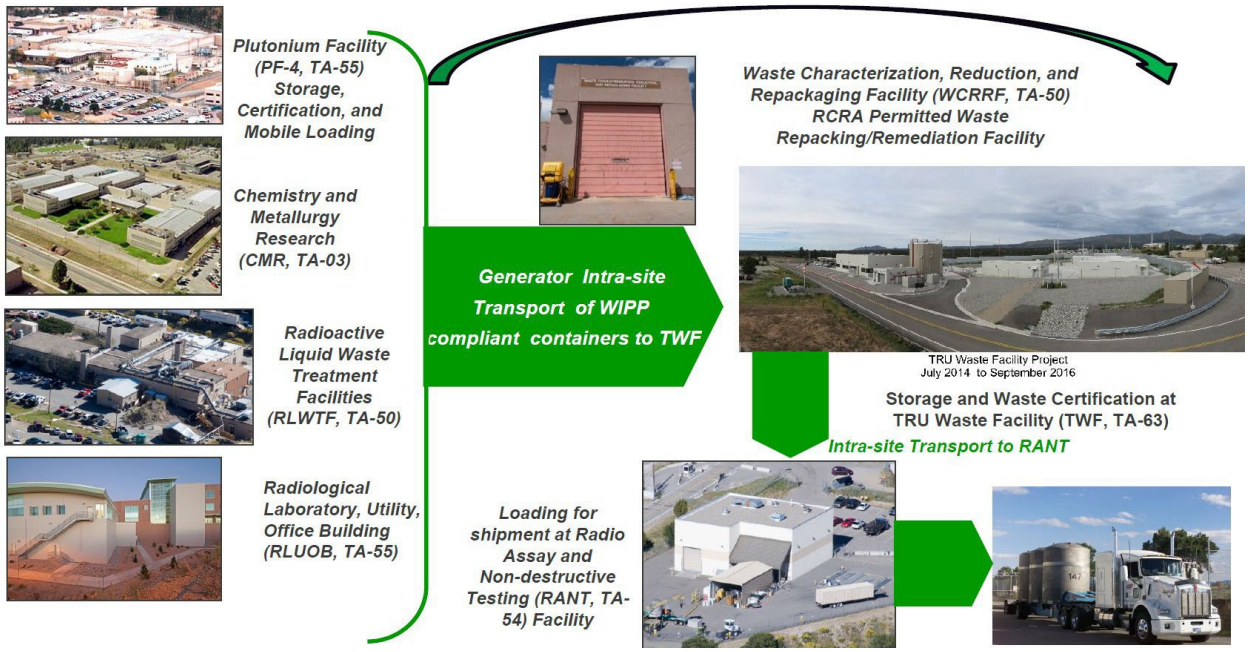

Figure 3. LANL TRU Waste Facilities

The TA-55 PF, RLUOB, the CMR building, and the RLWTF (b) (5) support production components with waste facilities to disposition liquid and solid radioactive waste. TA-55-PF, RLUOB, CMR, and RLWTF generate radioactive waste. The TRU waste generated at these facilities is transported to the TWF in Waste Isolation Pilot Plant (WIPP)-compliant containers. Once virtual payloads are planned and approved, the selected TRU waste containers are transported to the RANT facility to be loaded for shipment to WIPP. LLW and MLLW are also generated at these facilities.

LANL maintains a suite of nuclear facilities for plutonium operations, analytical chemistry, and waste management, including the following:

- CMR (TA-03-0029): actinide-based national security mission, materials research and development (R&D), SNM standards development
    - Supports analytical chemistry and materials characterization techniques for plutonium in support of the programs operating in PF-4 and across the Laboratory
    - (b) (5)
    - Includes RCRA-permitted storage areas for hazardous waste, MLLW, and mixed TRU (MTRU) waste
- RLWTF and low-level liquid waste (TA-50-0001 and -0230): RLW collection, storage, treatment, and discharge of influent received from multiple generators across the Laboratory

- Low-level radioactive liquid processing through the RLW collection system connected to 63 buildings, including CMR, PF-4, RLUOB, Sigma, and other facilities
- TRU liquid processing from metal production and Pu-238 oxide purification

- WCRRF (TA-50): RCRA-permitted waste repacking and remediation facility currently in cold standby
- RANT (TA-54-0038): enduring facility for payload assembly and loading into TRUPACT-II casks for transport to WIPP; equipped with two cranes and a hydraulic loading platform specific for TRUPACT-II loading
  - Completed readiness and was authorized for restart in February 2019, TRU waste shipments resumed in April 2019
  - Supports loading of TRU drums for shipment to WIPP
- TWF (TA-63): includes an operations building and, inside the RCRA-permitted area, six TRU waste storage buildings, a utility building, two seismic switch enclosures, an emergency backup diesel generator, and a 200,000-gal. fire water tank
  - Provides storage for newly generated wastes from TA-55, the CMR facility, and the RLWTF
  - Has the design capacity of staging and storing 825 drums (or drum equivalents) under normal operations and a surge capacity of up to 1,240 drums
  - Being equipped to certify that TRU waste containers meet WIPP acceptance criteria
- RLUOB (TA-55-0400): actinide-based national security mission, materials R&D, and SNM standards development
  - Supports analytical chemistry and materials characterization techniques for plutonium
- PF-4 and -5 (TA-55-0004 and -0005): manufacture and research of SNM components, process development, technology demonstration, and storage
  - Supports power supply production, process qualification to support 30 pits-per-year (PPY) production planning targets, pit surveillance, subcritical experiments, MR&R commitments to Defense Nuclear Facility Safety Board, Pu-238 oxide heat sources for NASA's Mars 2020 and other missions (NE-75, DOE Office of Space and Defense Power Systems), and Am-241 (DOE Office of Science)
  - Ancillary buildings include training area, warehousing, waste operations, nuclear support buildings, and other support to PF-4 and PF-5

2.2.2 Other LANL Waste Facilities

2.2.2.1 TA-60-0017

In 2018, the transition of waste management facilities located at TA-54 required LANL management to select a replacement facility for the previous Treatment Storage and Disposal Facility (TSDF) located at TA-54, Area L. This replacement facility (located at TA-60, Building 17) currently serves as the site-wide waste consolidation facility. A wide range of waste types are collected from across the Laboratory and shipped to Building 17. The area is used to efficiently group or stage shipments from generator sites to ensure that shipments of waste are

optimized to the extent practicable. Currently, the building is not RCRA permitted and is being managed as a Central Accumulation Area (<90-day storage). Site review of this location is underway to determine the feasibility of including it under the LANL Hazardous Waste Facility Permit (HWFP) as a one-year permitted container storage unit. The evaluation focus is changing traffic patterns within the area associated with waste management activities and determining compliance with seismic location standards. (b) (5)

2.2.2.2 RCRA Open Burning/Open Detonation Interim Status Units

LANL operates, on an interim status, several hazardous waste management units used for treating explosive wastes associated with weapons research and testing. These interim status units will be included in the draft 2020 RCRA permit application to be submitted to New Mexico Environment Department (NMED) this year. See Section 2.6.7 for further discussion of the LANL RCRA permit.

Solid and liquid hazardous explosive waste and explosive-contaminated waste may be treated by open detonation at the following units:

- TA-14-23 Open Detonation Unit
- TA-36-8 Open Detonation Unit
- TA-39-6 Open Detonation Unit
- TA-39-57 Open Detonation Unit

Solid and liquid hazardous explosive waste and explosive-contaminated waste may be treated by open burning at the following units:

- TA-14-23 Open Burning Unit
- TA-16-388 Flash Pad

2.3 WASTE MANAGEMENT FUNDING

Waste management funding for TRU solid and liquid waste, MLLW, LLW, hazardous solid waste, and low-level liquid waste is distributed based on the benefitting programs. For TRU waste, the DOE Office of Safety, Infrastructure, and Operations (NA-50) supports the waste facilities (CMR, RLUOB, TA-55, RANT, WCRRF, TWF, and RLW) in implementing, managing, and maintaining the safety, security, and compliance envelopes for all operations and facilities. The incremental requirements for collecting, processing, and disposing of programmatic generated waste are supported by the benefiting programs.

Based on the *Integrated Strategy for Plutonium Missions at Los Alamos National Laboratory* (the *Integrated Strategy*), LA-CP-20-20372, which has been integrated into the fiscal year (FY) 22–26 Future-Years Nuclear Security Programming plans for NA-50, the funding profile request for TRU waste and the dedicated waste facilities is provided below.

(b) (5)

Figure 4. TRU Waste Future-Years Funding Request

2.4 WASTE PROGRAM STAFFING

Per the *Staffing Plan for Plutonium Missions at Los Alamos National Laboratory* (the *Staffing Plan*), LA-CP-20-20312, the Laboratory is committed to developing and maintaining a robust workforce with the expertise and skills necessary to enable production of 30 PPY in 2026. The workforce is needed for both pit production and the support functions across LANL. One of the

(b) (5)

(b) (5) The budget planning was the result of the detailed staffing plan for waste activities within the plutonium enterprise, supported by NA-50.

Solid and liquid waste management is critical in the execution of the Integrated Strategy. The aqueous chemical operations generate radioactive liquid and solid waste, with aqueous recovery operations generating mostly liquid waste. Liquid waste is transferred to the RLWTF at

TA-50. Solid wastes are generated throughout the metal supply and manufacturing processes. Solid waste consists primarily of TRU waste and LLW. Typical solid TRU waste includes glovebox gloves, process items, process residues, and old equipment. LLW includes personal protective equipment, such as gloves, and other potentially contaminated items not in direct contact with SNM. The primary activities in solid waste management are staging, characterizing, certifying, and shipping radioactive solid waste (both low-level and TRU) to the appropriate disposal site. LANL has completed construction of the TWF and the low-level liquid waste facility; both are essential for solid and liquid waste management. The TRU liquid waste (TLW) facility is a new nuclear facility planned for completion as a Line Item Project.(b) (5)

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(b) (5)

Figure 5. NA-50 Staff Planning for Waste

Increased operations to support the plutonium mission will increase the volume of waste generated. Additional staff are needed to manage the increased waste streams and operate and maintain existing and new waste management facilities. The *Staffing Plan* to support the scope and schedule for managing the waste facilities and waste streams in support of pit production is being managed and implemented as part of the LANL *Integrated Strategy*. Figure 5 reflects the current staffing plan for direct NA-50 funded waste management FTEs.

General waste management support for activities at LANL are provided primarily by indirect funded waste management professionals assigned through the WM Division.

Over the last 10 years, attrition reduced the number of waste management professionals within WM by more than 50%. To reverse that trend the following actions were initiated:

- Increase staffing of WMCs who serve as the primary EWP interface with all LANL waste generators.
- Establish a new entry-level WMT position with an established career path.
- Develop a training pipeline for waste management personnel in coordination with a local college.
- Aggressively hire new personnel over the next two years to ensure qualified professionals are available to support future mission.

Figure 6 shows the staffing plan for waste management professionals within the WM organization that are predominantly indirect funded. (b) (5)

(b) (5)

Figure 6. Staffing Planning for Waste Management Professionals

2.5 SUPPORTING PROGRAM ELEMENTS

This section describes essential elements that support the overall Waste Management Program at the LANL.

2.5.1 Waste Compliance and Tracking System

The Waste Compliance and Tracking System (WCATS) is a software application that was designed to track Laboratory waste from cradle to grave. The system provides data needed to track generation, characterization, processing, and shipment of all waste generated at LANL. WCATS provides data management for stored and dispositioned waste. The application can readily accommodate new facilities, processes, and work-flow requirements through end-user-

established metadata. In addition, the application supports the characterization and management of the entire range of hazardous and radioactive wastes (including TRU, mixed TRU, LLW, MLLW, and other solid waste) that might be collocated or processed at a permitted facility.

In 2016, *A Business Assessment* was chartered by the WCATS Executive Governance Board to determine if WCATS met Laboratory requirements for a waste-tracking application and whether other options were available. The overall determination of the assessment was that WCATS effectively implements a portfolio of critical waste management functions. These functions reside within the technical envelope for the Software and Applications Engineering Division and the Network and Infrastructure Engineering Division and are implemented using industry standard technologies. The software quality management infrastructure that supports the system is rigorous and conforms to industry quality standards. The cyber security profile for WCATS meets the requirements of the LANL Cyber Security Program (*Program Description 210*).

The strongest and most impressive feature of WCATS is how quickly the system can adapt to new requirements. Major software upgrades are underway to address issues and weaknesses identified by the WCATS project team and in response to the assessment recommendations. Careful selection of upgrade or replacement technology eliminates technical risk and extend the life of the WCATS application. The reengineering effort should result in the following outcomes:

- Elimination of software license issues
- Elimination of the risk posed by end-of-life software
- Elimination of the risk posed by deprecated software
- Increased lifespan of the WCATS application
- Decreased human capital costs associated with Oracle
- Decreased license fees associated with Oracle
- Increased application capability to integrate with future technology
- Increased testability of the WCATS application with test automation tools

Future necessary upgrades to increase the functionality of WCATS will require additional funding and staff.

2.5.2 Nondestructive Analysis and Green is Clean

The Laboratory NDA Program, in conjunction with similar programs at TA-55 and the CMR, supports site-wide LLW and MLLW radiological characterization. In addition to supporting the disposition of radioactive waste, NDA results can also be used to reduce waste generation, as in the case of clearing metals for recycle or segregating demolition waste that has no DOE-added radioactivity. The Laboratory GIC Program began in 1988 to reduce LLW volumes through a Waste Segregation and Verification Program based on generator acceptable knowledge and verification screening. In the GIC Program, generators segregate clean waste in radiological control areas away from radioactively contaminated waste based on generator acceptable knowledge. The waste is placed into a GIC container and shipped to the GIC Facility for verification. GIC helps LANL meet DOE Order 435.1, *Radioactive Waste Management*, requirements for waste minimization and is an integral part of pollution prevention. The GIC

Program has processed and released approximately 1,705 m^3 of clean waste, diverting more than 9,005 drum-equivalents of LLW through the third quarter of FY20.

2.5.3 Waste Management Contracts

In FY19, the Laboratory EWP began to transition from a turnkey waste management contract vehicle, where enduring mission waste management support activities (i.e., container procurement; on-site movement of waste; off-site shipments; and treatment, storage, and disposal facilities [TSDF]) were managed by a subcontractor, to self-performing all enduring mission waste activities. The change in overall waste management operations implementation has led to an increase in operational compliance and has provided a significant cost benefit to LANL.

To effectively implement the change in operational management, the EWP, via the new WM Division, had to establish multiple contract mechanisms to replace those previously put in place by the subcontractor. These included contracts for the treatment and disposal of all waste types (excluding TRU) generated by Laboratory activities.

The EWP uses a wide range of contract types to efficiently and compliantly manage waste. These contracts are centralized fixed-price/fixed-unit-rate subcontracts for off-site waste transportation, treatment, and disposal of waste not managed through the TRU waste program or the Nevada National Security Site (NNSS) waste program. Currently, the contracts include some LLW streams, all MLLW, and all hazardous waste. The following are examples of contract vehicles used by EWP:

5. DOE-EM LLW/MLLW disposal services indefinite deliverable, indefinite quantity (IDIQ) contracts
6. DOE-EM LLW/MLLW treatment services basic ordering agreement (BOA)

2.5.4 Environmental Management System: System Description (SD) 400

The Laboratory Environmental Management System (EMS) resides in the EWP within ALDESHQSS. The Laboratory has maintained certification by the International Organization for Standardization (ISO) 14001, *Environmental Management Systems,* since 2006. Several requirements in the ISO provide reinforcement for institutional performance expectations regarding waste management, including the following:

- Maintaining and monitoring environmental compliance
- Evaluating environmental risks against work activities
- Action planning to manage and reduce environmental risks
- Communicating to all managers at all levels
- Integrating environmental controls with operational controls
- Demonstrating continuous improvement with consideration of lifecycle impacts

The Laboratory ISO 14001 EMS is recertified every three years and is audited biannually by an external auditor to maintain certification. The next recertification audit is scheduled in 2020, dependent on pandemic restrictions.

As part of the EMS, the Laboratory maintains an Environmental Aspects list pertaining to work performed on site. This list includes several aspects that relate to waste generation and

management. The Laboratory also issues an Institutional Environmental Objectives and Targets list that is reviewed annually by the Laboratory Senior Management Steering Committee. Implementing the strategies discussed in this EMWMP update was a FY19 institutional objective and target for the Laboratory; specifically, the objective is to achieve source reduction and manage waste from cradle to grave.

All Associate Lab Directorates at LANL use an Environmental Aspects list to assess the potential environmental impacts of work done at LANL. The list assists managers in identifying and finding opportunities to reduce negative environmental impacts effectively and proactively. Environmental compliance is fundamental to conformance with ISO 14001, but it also includes a process to evaluate work processes and associated wastes for opportunities to reduce quantities of both waste and hazards.

2.5.5 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires all federal agencies to assess the potential impacts of proposed actions before making decisions to implement the actions. Enduring mission waste management activities described in this EMWMP are conducted under the requirements of NEPA.

The 2008 *Site-Wide Environmental Impact Statement (SWEIS) for Los Alamos National Laboratory* and the 2018 *Supplement Analysis to the SWEIS* evaluated impacts associated with continued operation of LANL through 2022. The 2008 SWEIS analyzed Laboratory waste management operations, facility capabilities, and activity levels for all waste management. The 2018 Supplement Analysis examined changes to waste management facilities and activity levels from 2008 through 2022. Waste management related projects analyzed in the 2008 SWEIS include: waste management operations across LANL, waste management operations at TA-55, the new TWF, and upgrades to the RLWTF. Waste management operations at LANL remain bounded by the analysis in the 2008 SWEIS through at least 2022.

Over the next five to ten years, the Laboratory is projected to increase waste management activities associated with pit production and surplus plutonium disposition at TA-55. The Laboratory is being considered as a site to perform dilution of plutonium oxide and may require additional waste management facilities and capabilities. Future waste management needs would be evaluated by DOE/NNSA for NEPA compliance during project planning and would use the Laboratory Integrated Review Tool.

2.5.6 Nevada National Security Site Certification Program

NNSS disposal facilities are the preferred Laboratory disposition pathway for LLW. The Laboratory is required to certify that LLW destined for NNSS is compliant with the NNSS waste acceptance criteria (WAC). Managed by EWP, the Laboratory's program must be approved by the NNSS Radioactive Waste Acceptance Program. The EWP consists of the Waste Certification Official, an Alternate Waste Certification Official, and Waste Package Certifiers.

(b) (5)

(b) (5)

2.5.7 LANL RCRA Permit

LANL treats and stores hazardous and radioactive mixed waste as authorized by a Hazardous Waste Facility Permit with the EPA (EPA ID # NM0890010515, NM ID # 2390). NMED issued the permit to DOE, the owner and co-operator of LANL, and Triad National Security, LLC, and Newport News Nuclear BWXT Los Alamos, LLC, co-operators of LANL— collectively "the Permittees"—with an effective date of December 30, 2010.

The permit was due for renewal in July 2020. The permit application was submitted on schedule. The permit renews 27 existing units and requests that the three current interim status open burn/open detonation (OB/OD) units be fully permitted.

OB/OD activities historically have been used at LANL for the safe destruction of detonable quantities of explosives waste and explosives-contaminated waste. Because these wastes are considered hazardous for reactivity under the RCRA, OB/OD have been conducted in treatment units operated under RCRA interim-status requirements found in Title 40 of the Code of Federal Regulations (CFR), Part 265, Subpart P, *Thermal Treatment*. LANL is requesting, through the 2020 HWFP application, to permit the units and operate under the RCRA-permitted requirements found in 40 CFR 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*.

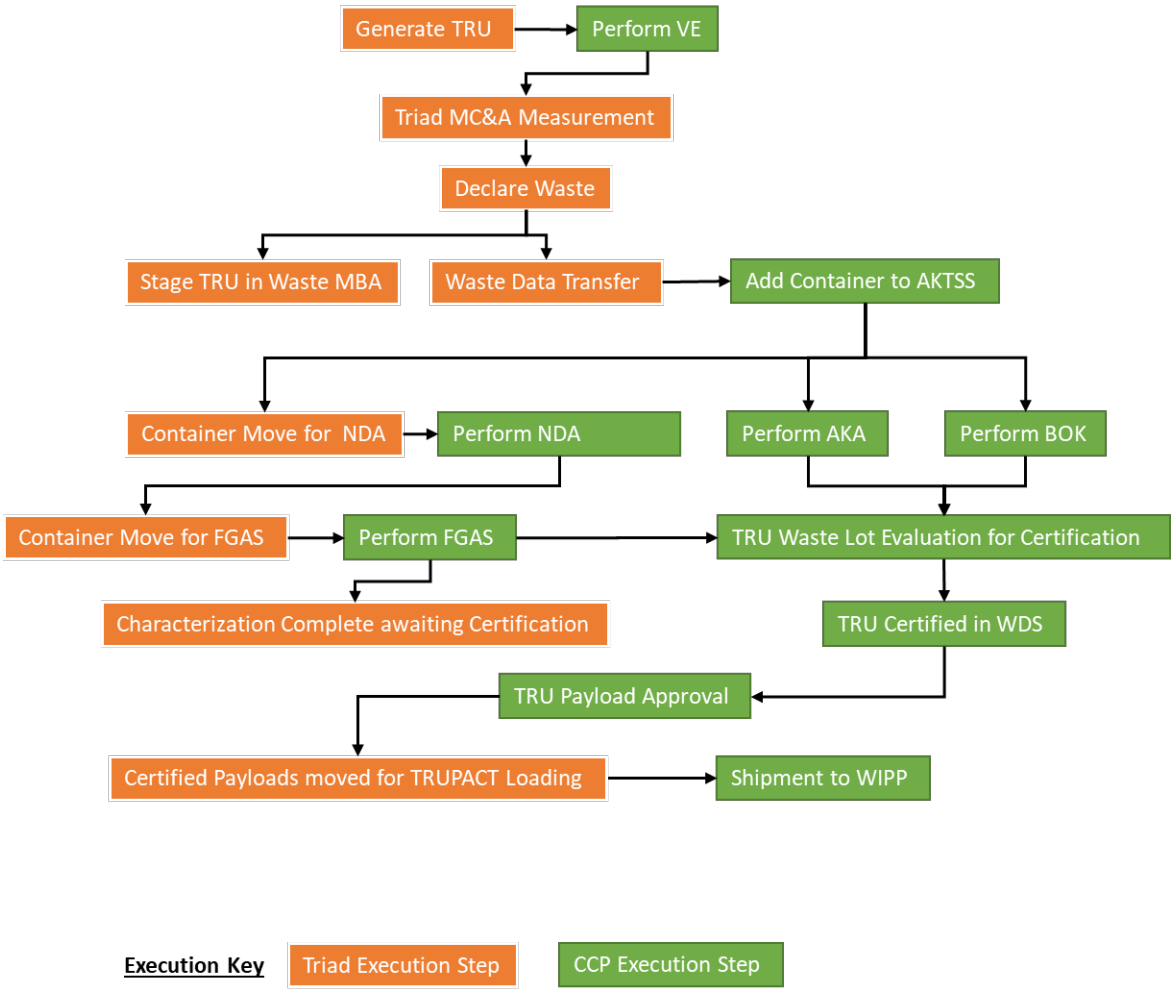
2.5.8 Technical Area 54 Areas L and G

Areas L and G of TA-54 are owned by DOE-EM and operationally managed by N3B, which has responsibility for legacy waste at the Laboratory. Both areas are RCRA permitted, with Area L used for hazardous waste and MLLW and Area G used primarily for MTRU. The NNSA TRU inventory at TA-54 Area G was generated from 1999 to the present and consists of drums, pipe overpack containers, standard waste boxes (SWBs), and oversized containers that require size reduction or decontamination before being sent to WIPP. (b) (4)

2.5.9 TRU Waste Certification

Triad generates nuclear waste from nuclear material processing operations. The waste is characterized to determine the nuclear material content and the chemical and physical form. If the waste contains sufficient transuranic nuclides to meet the WIPP criteria for TRU waste, further characterization, per the WIPP certified process is performed to provide support for eventual shipment to WIPP.

Transuranic waste generated at LANL is certified to meet the WIPP WAC by the Central Characterization Program (CCP), an entity under contract to the Carlsbad Field Office (CBFO) National TRU Program. A process flow diagram of the WIPP characterization and certification process is shown below.



Note: VE, visual examination; MBA, material balance area; AKTSS, acceptable knowledge tracking spreadsheet; AKA, acceptable knowledge assessment; BOK, basis of knowledge; FGAS, flammable gas analysis, WDS, Waste Data System

Figure 7. CCP/Triad TRU Waste Process

2.5.10 Difficult Waste Strategy

Small amounts of waste infrequently generated at the Laboratory are difficult to handle, transport, and treat for disposal. For example, difficult-to-treat waste streams include high-activity/high-dose waste from medical isotope production and LANSCE beam operations, waste with high levels of tritium contamination, and waste with classified characteristics or constituents. Managing difficult waste streams requires specialized on-site handling and packaging capabilities and proactive development and maintenance of off-site treatment and disposal paths. EWP recently developed a detailed strategy and process to identify difficult wastes before generation and to assign a team of subject matter experts to develop disposition options. For difficult TRU waste LANL waste generators work with the Difficult Waste Team of the Repository Science & Operations Program.

2.5.11 Waste Management Process Improvements

The EWP has several ongoing process-improvement initiatives as part of the *2020 Los Alamos National Laboratory Agenda* (3.4, "Implement systematic process improvement to drive

increased rigor and efficiency in work execution"). In addition to the use of scheduled internal waste management assessments, an independent company with waste management expertise was engaged to perform a thorough assessment of waste characterization practices across the Laboratory. The assessment is conducted in three separate phases, with two now complete and the final phase to be scheduled when LANL returns to routine operations after the COVID-19 pandemic. A separate company was contracted to evaluate waste management training in light of recent organizational changes. Based on the review, significant updates to both training materials and qualification standards were recommended. The major upgrade in waste management training, including implementation of a "40 Waste Fundamentals" course, is scheduled to be complete by the end of FY20. To address the need for qualified waste management personnel, LANL is partnering with a local university to develop a waste technician curriculum and a career pipeline.

3.0 POLLUTION PREVENTION, SOURCE REDUCTION, AND WASTE MINIMIZATION STRATEGY

3.1 PROGRAM DESCRIPTION

The Laboratory Pollution Prevention (P2) Program focuses on source reduction, as defined in the *Pollution Prevention Act of 1990*. Working with Laboratory colleagues, The EPC P2 Team identifies source reduction opportunities in need of technical and financial analysis. Since project ideas come from different sources with differing levels of pollution prevention expertise, the program's subject matter experts make support decisions after a comparative ranking (described below) using scoring criteria developed for the P2 Program. Current focus areas include (a) radioactive waste, (b) green chemistry, (c) cleaner-production process-improvement projects, (d) sustainable acquisition, (e) recycling, (d) mission resiliency, and (f) a Site-Wide Cleanup and Workplace Stewardship Program.

3.2 PROGRAM STRATEGY AND WASTE MANAGEMENT

Future progress for reducing waste generation requires a shift in practice that places more emphasis on prevention and structural change at earlier stages of project design. Once operations are in process, change is difficult, primarily focused on waste volume reduction, and results in operational improvements for potential cost savings mostly untapped. As a science and engineering organization, the Laboratory is uniquely suited to investigate and solve the challenges for integrating waste prevention.

The current P2 Program strategy has four elements. While continuing efforts to achieve source reduction and minimize waste volumes, the Laboratory's goal to achieve more prevention of waste generation focus areas are:

- engaging the workforce directly and comprehensively on project planning;
- implementing structural changes in planning, review, and procurement; and
- improving data quality and availability.

The P2 Program uses scoring criteria for the evaluation and selection of pollution prevention–funded projects. These selection criteria support the use of a stringent and more objective approach for achieving greater structural change. Listed below are the specific criteria categories used for scoring:

- Simple financial cost savings
- Environmental impact
- Waste reduction
- Waste type
- Social benefit
- Innovation
- Industry transferability
- Persistence

The scoring process continues to be refined for accuracy and efficiency as institutional priorities change. To date, this scoring process has proven to be very effective in achieving pollution prevention and waste reduction. Past pollution prevention accomplishments at LANL have demonstrated the potential for using the technical expertise at the Laboratory to modify processes, demonstrate source reduction, increase worker safety, and reduce waste generation.

3.3 FIVE-YEAR OUTLOOK

The Laboratory P2 Program will focus on source reduction and structural change for the next five years. TRU waste reduction continues to be a high priority, and the Program has added one staff member with the appropriate security clearance to focus on this effort through 2021. TRU waste associated with pit production and other mission-critical activities requires in-depth research that goes beyond waste reclassification to target process change. Additional changes are critical to cultivating long-term waste prevention efforts. These changes include the following:

- Adjusting training (e.g., Waste Generator Overview) to a program-specific "prevention first" orientation (including tracking return on investment data)
- Revising the LANL Engineering Standards to include pollution prevention alternatives
- Establishing procurement functions to block the purchase of problematic materials and products and to provide sustainable alternatives
- Developing accurate and consistent waste disposal cost data
- Deploying financial analysis tools to support life-cycle planning as part of an Analysis of Alternatives
- Tracking return on investment for pollution prevention projects in waste disposal, improved productivity, and worker health and safety
- Understanding the inputs and then implementing a source-reduction practice for wastewater treatment at LANL
- Identifying, analyzing, and funding opportunities for process changes that reduce or eliminate TRU waste or MTRU waste production
- Reducing the amount of unused/unspent chemicals by redesigning chemical procurement and distribution and enhancing the LANL Chemical Management Program
- Implementing a battery management process for on-site sorting and data collection to identify source reduction areas
- Continuing to increase the effectiveness of pollution prevention strategies and goals in the Integrated Review Tool
- Supporting structural change in the procurement process to ensure that DOE sustainable acquisition goals can be met efficiently

4.0 ENDURING TRANSURANIC WASTE PLAN

4.1 STRATEGY

The strategy for managing DOE/NNSA TRU waste is to ensure there is sufficient storage so the nuclear missions at the Laboratory can operate without interruption. With the nearly five-year pause in shipping to WIPP, the inventory of TRU waste stored at TA-55 is significantly backlogged. The first priorities are inventory reduction of the TRU waste stored at TA-55 by relocation to the TWF and initiating shipments of TRU waste to WIPP for permanent disposition. Details of the Laboratory's enduring TRU waste strategy are in the *Integrated Strategy*.

The Laboratory TRU waste certification program received recertification in June 2018. Since that time the Laboratory has worked closely with CCP and CBFO to certify the waste streams associated with the current inventory. As of May 2020, the Laboratory has shipped over 1,000 TRU waste containers to WIPP as part of the backlog reduction.

The Laboratory has a commitment from CBFO to reduce the TA-55/TWF inventory to as low as possible by the end of 2020. (b) (5) Performance towards deinventory targets is measured and discussed routinely with all stakeholders.

The NNSA TRU waste at Area G is being managed by N3B. The inventory consists of approximately 400 containers that are in all phases of the WIPP certification process (from needing remediation to ready-to-ship). (b) (4) NNSA has the financial liability for the waste based on the dates of generation.

Triad has submitted a draft *TRU Waste Management Strategic Plan* to the NNSA Los Alamos Field Office (NA-LA) for review. The plan has received comments and is in the revision phase, with a resubmittal time frame consistent with this implementation plan. The strategic plan describes in detail the specific scope and processes to ensure TRU waste management capabilities are sufficient to support the LANL mission, inclusive of the 30 PPY scope.

4.1.1 Oversized TRU Waste

4.1.1.1 Problem Statement

(b) (7)(E), (b) (7)(F)

4.1.1.2 Strategies

Triad will pursue multiple parallel strategies to try to mitigate this problem, including the following:

(b) (5), (b) (7)(E), (b) (7)(F)

4.1.2 Storage Capacity

4.1.2.1 Problem Statement

(b) (5), (b) (7)(E), (b) (7)(F)

4.1.2.2 Strategies

Waste progressing through the WIPP-certified waste characterization and certification processes requires joint efforts between Triad and CCP. The strategies below require participation by both entities to be successful.

(b) (5)

4.1.3 WIPP Prolonged Shutdown

4.1.3.1 Problem Statement

(b) (5), (b) (7)(E), (b) (7)(F)

4.1.3.2 Strategies

(b) (5), (b) (7)(E), (b) (7)(F)

4.1.4 Expanded Pit Production

(b) (5), (b) (7)(E), (b) (7)(F)

(b) (5), (b) (7)(E), (b) (7)(F)

4.2 TRU WASTE VOLUME PROJECTIONS

The majority of TRU waste generated at LANL comes from four programs: Plutonium Sustainment, Material Recovery and Recycle, ARIES, and Pu-238 (both the weapons and space programs). Other smaller generators such as Rad Liquid Waste, Life Extension Programs and Forensic Programs are grouped as "Other Programs" because of the small contribution. A (b) (5)

Figure 8. TRU Waste generation forecast

Figure 9. TRU Waste Drum Projections

4.2.1 TRU Waste Metrics

Triad developed a set of TRU waste metrics to provide a comprehensive overview of the health of the TRU waste program. For FY21 these metrics will be updated and reported monthly. See Attachment 2 for example metric charts. The metrics developed include the following:

- TRU waste inventory status
    - PF-4 Basement
    - TA-55 HENC Pad
    - TA-55 CSU-480 Pad
    - TWF TRU containers
    - CMR TRU Containers
    - NewGen TRU Containers at Area G
- TRU Waste Shipments
    - WIPP Shipments
    - TRU Containers Shipped to WIPP
- TRU Container Certification

4.2.2 TRU Data Flow

One of the improvement initiatives that Triad has launched is a Lean Six Sigma project to optimize the flow of TRU waste data between LANL and CCP. The goal of the project is to define, measure, analyze, improve, and control the cycle time of TRU waste data from drum closure to WIPP certification. Below is a summary of the TRU Data Flow Project Charter for this team effort.

TABLE 1. TRU DATA FLOW PROJECT CHARTER

Project Definition	Alignment with Strategic Objectives
(b) (7)(E), (b) (7)(F)	
Project Scope	**Estimated Benefits**
• In scope: The scope of this project will focus on the data flow and analysis of TRU waste data. • Process Start: Visual examination at the time of waste packaging. • Process End: Container certification in WIPP Waste Data System. • Out of scope: Non-TRU wastes. TRU container physical movement processes, such as storage and characterization. Project scope is limited to the TRU waste data analysis and processing.	• Reduce cycle time of a container from closure to certification. • Significant reduction to the risk of inhibiting TA-55 production due to stalled or inefficient removal of TRU waste. • Predictability of waste removal and storage capacities to guide strategic planning.
Clear, Compelling Goal	**Time Frame**
Currently the cycle time from drum closure to certification is too long to support future plutonium mission goals given the storage constraints at LANL. Analyze the data flow and physical movement of TRU Waste packaging, transportation, storage, characterization, and certification at LANL. Put in place systems, processes, equipment, resources, and metrics to ensure safe, dependable, efficient, and predictable TRU waste removal from LANL.	July 2020: Project definition July – Sep: Data access & mining, initial analysis Oct – Dec: Analysis, modeling, solution development Jan – Mar 2021: Implement potential solutions Mar – May 2021: Control – monitor and adjust

4.2.3 Simulation Modeling at TWF

A second initiative that Triad has commenced is the simulation modeling of TRU waste operations at the TWF. Triad has reached back to its integrated subcontractor Huntington Ingalls Industries and the Modeling and Simulation Department of Newport News Shipbuilding in order to develop a discrete-event simulation model. Modeling and simulation is widely recognized as a discipline that allows designing, testing, and improving virtually to realizing savings in both cost and schedule. Discrete-event simulation is viewed as a proper method for modeling complex environments, which have a lot of interactions between the modeled objects, where stochasticity is included in the system and where system operations are unstable and time dependent. The

ModSim team will leverage previously built models (such as for Savannah River Site) utilizing a proven framework to more rapidly produce a solution.

The business value of this ModSim effort is to provide the opportunity to:

- Evaluate current and future processes
- Identify areas of improvement and chokepoints
- Plan adaptively and mitigate risk
- Analyze future concepts of operations and throughput capacity
- Analyze experimentation

4.3 RISKS

Per the *Integrated Strategy*, the risks identified for the pit production mission are communicated to and managed with the responsible NNSA program. The 2020 update to the *Integrated Strategy* addresses the significant risks and handling strategies for the identified areas of concern including the following that have potential impacts to waste management:

(b) (7)(E), (b) (7)(F)

4.4 TRU WASTE PROGRAM ENHANCEMENTS

The Transuranic Waste Program at LANL received certification in June of 2018 and since that time has shipped over a thousand drums to WIPP. While the backlog of TRU is decreasing,

sustained shipping has been a challenge for a variety of reasons, some within Triad control and some within WIPP and CCP control. The primary focus for Triad is to improve the efficiency of operations and to accomplish steady-state characterization, certification, and shipping. A key near-term accomplishment being pursued is to decrease the current inventory to as low as reasonably achievable and improve the cycle times of the waste process to decrease the resident time for a TRU waste container from the time of generation to the time of shipping to WIPP.

(b) (5)

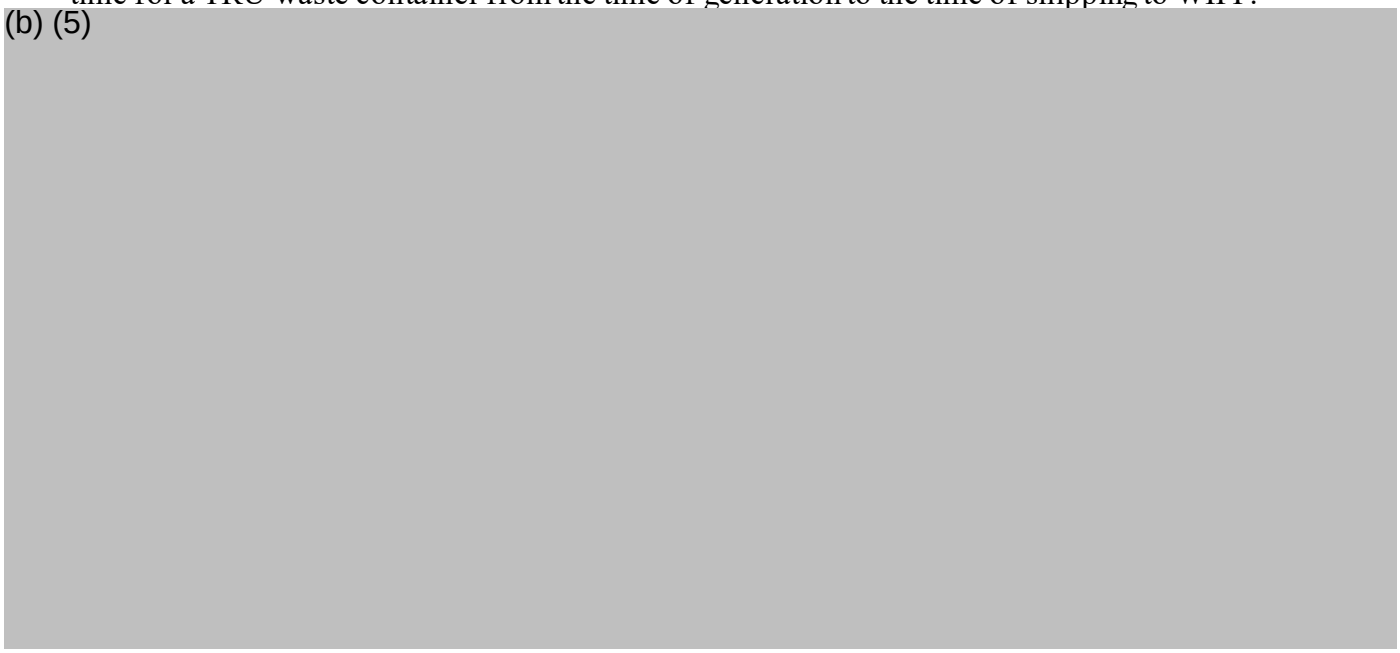


TABLE 2. FY20 TRU PROGRAM PROCESS IMPROVEMENTS

Facility	Date	Improvement	Impact
TWF	Nov. 2019	Facility modifications were completed, and TWF was declared a Temporary Limited Area, which allowed Material Balance Area (MBA) 601 to be upgraded to CAT III.	Upgrading to a CAT III MBA allowed more Attractiveness Level D (ATL-D) waste to be stored at TWF. This improved Triad ability to store TRU waste at TWF and allowed more options to store ATL-D waste.
TWF	Jun. 2020	The number of CAT III MBAs was increased from one to five.	This improved Triad ability to store TRU waste at TWF and allowed more options to store ATL-D waste.
TWF	May 2020	The Mobile ISOCS Large Container Counter (MILCC) 3 unit was moved from TA-55 to TWF.	Approximately 208 TRU waste containers that were approved through the Basis of Knowledge (BOK) process and were stored at TWF could begin WIPP characterization completion, making them eligible for certification and disposal.
PF-4	Aug. 2010	Triad implemented Evaluation of the Safety of the Situation 117, Revision 2, which allowed TRU waste with cheesecloth and nitric acid to be packaged into all types of TRU waste containers. Previously, this waste was required to be packaged in POCs.	This revision allowed for more efficient packaging of TRU waste composed of cheesecloth and nitric acid and containing low quantities of Pu-238. Waste that would fill up to 10 POCs can be packaged into a single 55-gallon drum.
PF-4	Aug. 2020	(b) (7)(E), (b) (7)(F)	

TABLE 3. FY21 TRU PROGRAM PLANNED PROCESS IMPROVEMENTS

(b) (5)

(b) (5)

4.5 TRU Waste Program Needs

(b) (5), (b) (7)(E), (b) (7)(F)

5.0 ENDURING LOW-LEVEL AND MIXED LOW-LEVEL WASTE PLAN

The Laboratory's LLW makes up a majority of the radioactive waste being generated, packaged, stored, and shipped. LLW includes items that have become contaminated with radioactive material or have become activated through exposure to neutron radiation, including isotope production wastes from the Los Alamos Neutron Science Center (LANSCE). Solid LLW typically consists of contaminated protective shoe covers and clothing, wiping rags, mops, filters, firing-site debris, radioactive wastewater treatment residues, equipment, and tools. In addition, significant quantities of RLWs are produced, primarily by processes at TA-55.

Current categories of LLW described in the Laboratory WAC include solid LLW, tritium-contaminated waste, MLLW, asbestos waste, infectious/medical/biological waste, polychlorinated biphenyl (PCB) waste, and GIC waste. MLLW is generated when LLW contains materials that exhibit one or more of the characteristics defined under 40 CFR 261, Subpart C (*Characteristics of Hazardous Waste*) or is a listed waste under Subpart D (*Lists of Hazardous Wastes*).

5.1 STRATEGY

(b) (5)

5.2 FIVE-YEAR OUTLOOK AND VOLUME PROJECTIONS

The Laboratory continues to generate LLW at a higher level than expected relative to the last available waste volume forecast (2014), as shown in Figure 10. The higher rate is partly because of the large-scale Associate Lab Directorate for Capital Projects demolition projects supporting

the Laboratory footprint-reduction goals. The Laboratory Enduring Mission Program LLW generation has averaged 6,000 m^3 each year since FY10, with a low of 2,825 m^3 and a high of 18,440 m^3.

(b) (5)

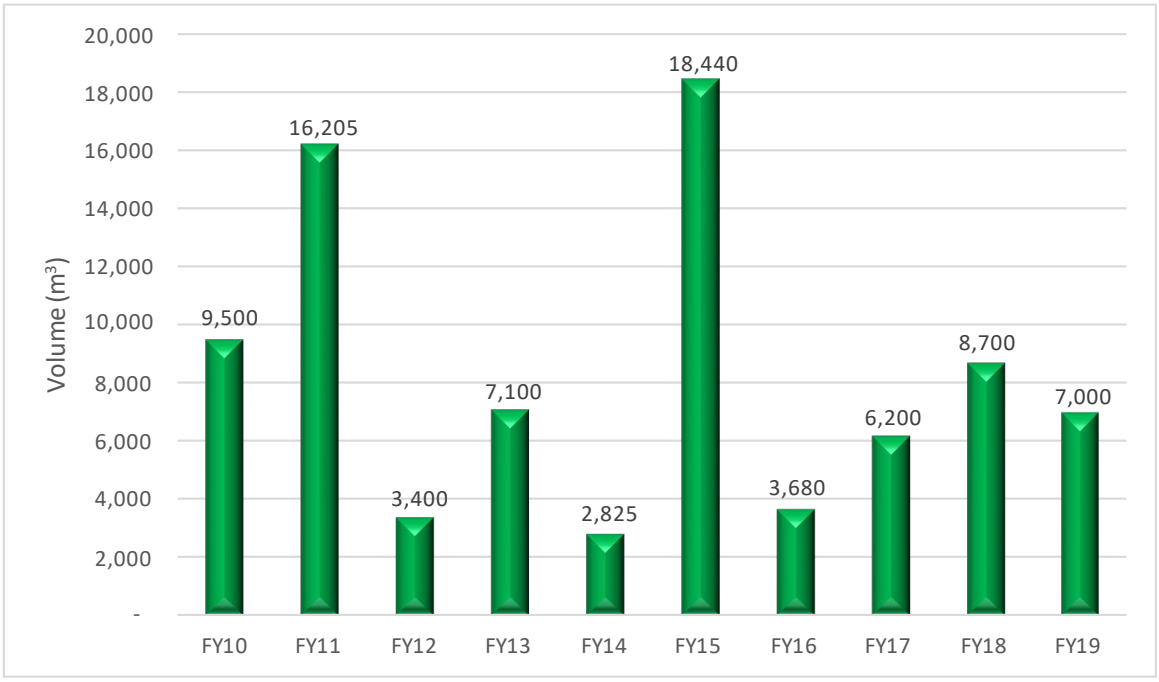


Figure 10. Historical Low-Level Radioactive Waste Volumes (in m^3)

(b) (5)

Figure 11. Projected Low-Level Radioactive Waste Volumes (in m^3)

5.3 GAPS AND OPEN ISSUES

(b) (5)

6.0 ENDURING RADIOACTIVE LIQUID WASTE PLAN

RLW is generated at various Laboratory facilities in support of a wide range of programs that involve nuclear materials R&D, nuclear nonproliferation, medical isotope production, and nuclear heat source technologies. The RLWTF receives and treats both low-level radioactive liquid waste and TRU radioactive liquid waste. The radioactive liquid waste plan section focuses on the RLWTF located at TA-50. The RLWTF is operated by the TA-55 Facility Operations Director (FOD).

6.1 STRATEGY

(b) (5)

(b) (5)

Table 5. TLW Project Activities and Milestones

(b) (5)

6.2 CURRENT WASTE VOLUMES

6.2.1 FY19 Low-Level Wastewater Operations

Low-level RLW is transported from various generator facilities to the RLWTF by an underground collection system, consisting of a pipe-in-pipe arrangement that provides secondary containment, or by tanker truck. The underground collection system collects 99% of low-level RLW. (b) (7)(E), (b) (7)(F)

6.2.2 FY19 TRU Wastewater Operations

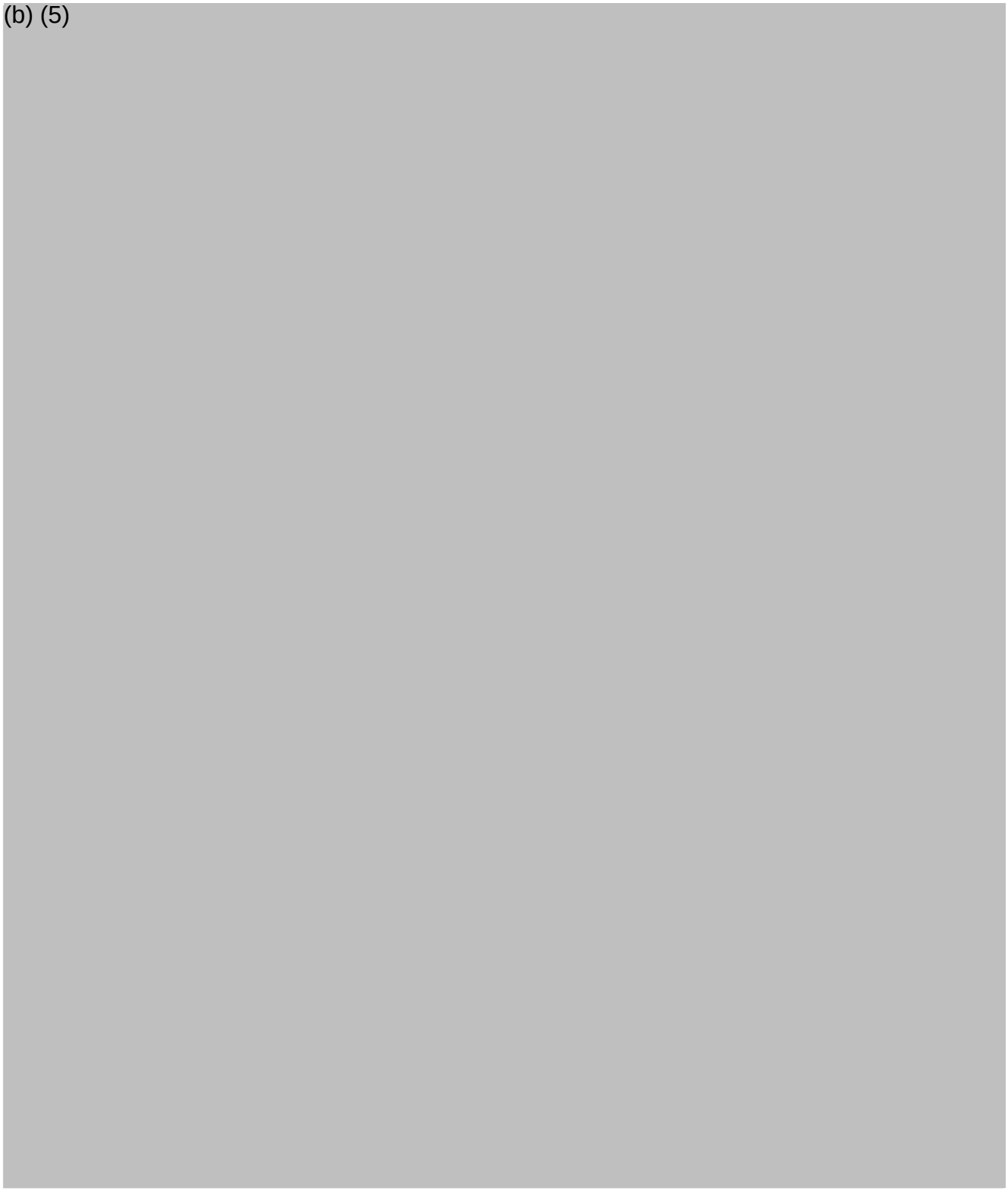
TRU radioactive liquid wastewater generated solely at the TA-55 PF-4 facility, is received at the RLWTF through an underground collection system separated from the previously described low-level wastewater collection system. This TRU wastewater collection system consists of two lines: the acid waste line and the caustic waste line. These lines also have a pipe-in-pipe arrangement that provides secondary containment.

(b) (7)(E), (b) (7)(F)

No TRU waste drums were produced at the RLW in FY19, but the system was exercised to support capability maintenance.

6.3 Five-Year Outlook

(b) (5)



(b) (5)

[redacted]

6.4 GAPS AND OPEN ISSUES

The RLWTF provides a mission-essential capability within the Weapons Infrastructure Program at LANL.(b) (5)

(b) (5)

[redacted]

(b) (5)

- Regulatory Issues
  - Reissuance of the NPDES permit for the TA-50 RLWTF Outfall 051 is expected in late calendar year 2020. LANL has submitted a reapplication for the TA-50 RLWTF NPDES Outfall 051 permit to the EPA for review.
  - NMED reissuance of the groundwater discharge permit for the treated water from the TA-50 RLWTF (DP-1132) was expected in April 2020. In June 2019, the NMED remanded the Groundwater Discharge Permit (DP-1132). Following a public hearing in November 2019, the hearing officer determined that NMED should grant LANL DP-1132.
  - There are ongoing regulatory challenges to RLW operations at LANL raised by citizens concerned about the environment.

6.5 RECOMMENDATIONS

(b) (5)

7.0 ENDURING REGULATED WASTE PLAN

Regulated waste at the Laboratory includes RCRA hazardous wastes, universal waste, Toxic Substance Control Act (TSCA) waste, and New Mexico Special Waste. Each of these types of regulated waste have different management, storage, and disposition requirements.

Hazardous waste is nonradioactive waste that exhibits a hazardous characteristic or is listed as hazardous waste under EPA hazardous waste regulations 40 CFR 260–268, adopted under RCRA. The Laboratory is also subject to State of New Mexico *Hazardous Waste Management* regulations (NMAC 20.4.1). Hazardous waste is generated by Laboratory R&D, applied science, production, and maintenance activities as part of the enduring mission. Other hazardous waste generators, such as construction and decontamination and decommissioning activities, may generate much larger quantities of hazardous waste, but the quantities vary greatly depending on the projects funded in a given year and the contamination found during work activities. Universal waste is a subset of hazardous waste that consists of common household items, such as batteries, light bulbs, and paint. Figure 12 shows historic volumes and trend data for regulated waste generation at LANL.

(b) (5) Estimated waste volumes for FY20–25 can be found in Figure 13.

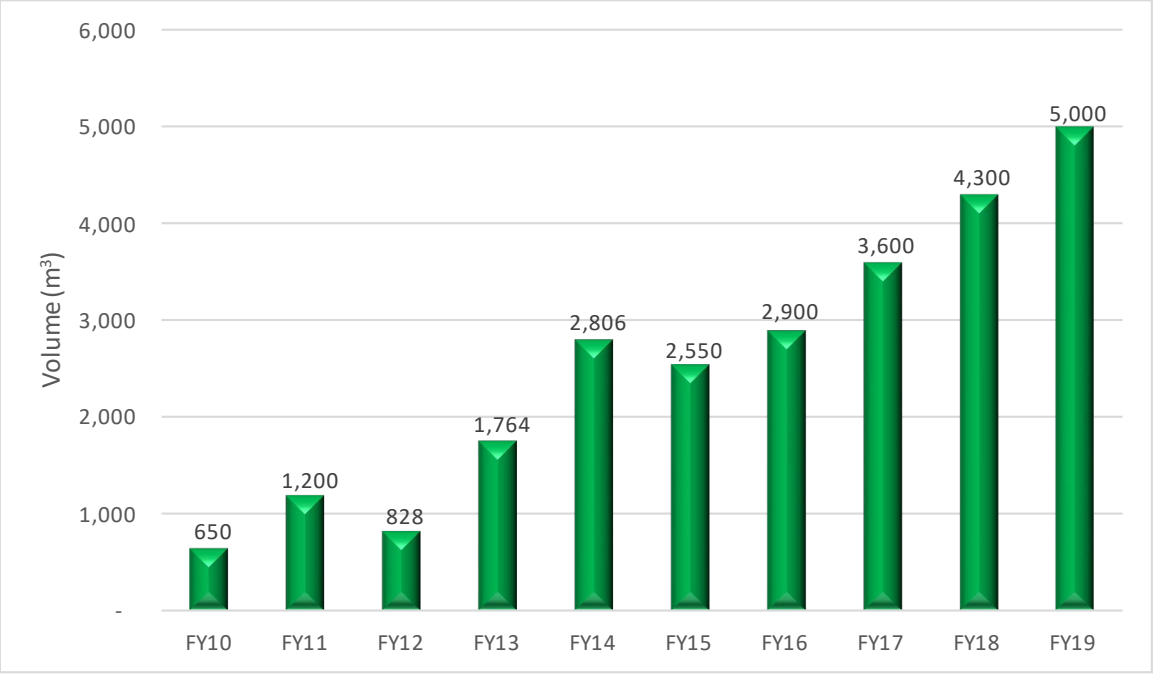


Figure 12. Regulated Waste Volumes and Trends

7.1 STRATEGY

The strategy for regulated waste is first to minimize the volume and toxicity of generated waste. Waste generated is managed in controlled storage areas and shipped to off-site TSDFs. In the short-term, regulated waste is currently shipped off-site directly from generation sites or managed at TA-60-0017, as necessary. (b) (5)

(b) (5)

7.2 Implementation Steps

Implementation of the Laboratory strategy for hazardous waste is focused on waste-generator training, planning, and waste avoidance. Waste avoidance is accomplished by minimizing the volume and toxicity of waste generated to achieve source reduction and to reduce the overall volume and cost of hazardous waste disposal.

7.3 Gaps and Open Issues

(b) (5)

7.4 Five-Year Outlook and Volume Projections

Most hazardous waste generated at the Laboratory is initially accumulated at registered waste areas. Triad operates permitted container storage units at CMR, TA-50-69, TA-55, and RANT as identified in the Laboratory Hazardous Waste Facility Permit. Interim use of TA-60-17 as a central accumulation area continues (b) (5)

(b) (5)

Figure 13. Regulated Waste Volume Projections

7.5 RECOMMENDATIONS

(b) (5)

8.0 ENDURING PLAN FOR RISK REDUCTION, SITE CLEANUP, AND METALS

(b) (5)

8.1 STRATEGY

Unneeded material and equipment can result from decommissioning facilities, organizing indoor and outdoor storage areas, construction and maintenance projects, and upgrading equipment.

Disposition of government property is overseen by Property Management/Excess Operations, with assistance from the Site Cleanup and Workplace Stewardship Program when there is no identified owner of the material or equipment. Metals recycling is overseen by the Logistics Division, with small clean/free released metal being processed through the Material Recycling Facility. Release and recycle of metal with potential for activation is coordinated by the Site Cleanup Program. Anyone with metal for recycle can coordinate with their WMC, contact the Site Cleanup Program, or work directly with the metals contract technical representative.

Many LANL workers require additional resources to support the disposition of excess items. Over the next couple of years, the Site Cleanup Program will be working with stakeholder organizations to develop clear and easily obtainable guidance. Communication about cleanup efforts and how-tos will become a more regular activity to encourage workers and organizations to engage property specialists and WMCs upon identification of items for disposition. The goal is to make real-time disposition the norm to minimize legacy issues. If LANL reduces excess on-site items quickly, risk is reduced.

8.2 VOLUMES AND TRENDS FOR RELEASE AND RECYCLE OF POTENTIALLY ACTIVATED METAL

Over the last six years, more than 3 million pounds of metal have been sampled and evaluated for release to recycling through efforts coordinated by the Site Cleanup Program. (b) (7)(E), (b) (7)(F) (b) (7)(E), (b) (7)(F) The Site Cleanup Program does n track metal dispositioned through the Material Recycling Facility. (b) (7)(E), (b) (7)(F) the metal is relocated to a staging area and added to the queue to go through the release process. The metal has acceptable knowledge and is in a radiation-controlled area to support the rigorous release process. This process requires radiological control technician evaluation and approval. Once the backlog of metal is dispositioned, the Laboratory expects to disposition metal as identified—using established release and recycle mechanisms to minimize the accumulation of large stockpiles of metal.

Items that cannot be released through the rigorous process are staged until they decay to a releasable level, (b) (5) Smaller metal items that are not released are properly dispositioned through the owning organization and the organization's FOD. Because this metal is considered legacy, there is typically no funding source to address costly waste disposal, requiring some metal to remain on-site.

(b) (5)

(b) (5)

8.3 ACCOMPLISHMENTS IN METALS RECYCLING

Overall, the quantity of unneeded metal has been significantly reduced.

- The release process continues with controlled staging areas and checks to ensure metal that has not been approved for release is not removed from the site.
- In FY20, 1.5 million pounds of metal was released and recycled, a significant accomplishment in on-site metal reduction.
- By the end of FY21, one of the metal-staging areas for the release process will be emptied and returned to parking.

Figure 14. A 28-ton piece of metal is loaded for transport to a metal recycler for processing

8.4 SITE CLEANUP AND WORKPLACE STEWARDSHIP PROGRAM

The goal of the Site Cleanup and Workplace Stewardship at LANL continues to be (a) remove legacy and abandoned material and equipment from around the site, (b) work with organizations to clean up their unwanted material and equipment before it becomes an issue, and (c) make sustainable changes so the Laboratory is not cleaning up the same areas multiple times. To support these goals, the Site Cleanup Program oversees approximately 25 projects per year. Funding is provided through the Operations and Infrastructure Program Office. Additional funding is received from the NNSA Office of Nuclear Material Integration (OMNI) for focused metal release efforts. If an owner is identified, projects require in-kind support such as ESH coverage, waste disposal costs, and a project coordinator. It is important that organizations learn how to efficiently address their material and equipment so they can promote and implement sustainable practices in their organization.

Key activities include coordinating the initiative to better manage storage structures, collaborating with key organizations to improve awareness, educating on the importance of workplace stewardship, and executing cleanup projects across the site.

8.5 CLEANUP AND SUSTAINABILITY PROJECTS

In the past six years, more than 120 projects have been identified, scoped, planned, and executed with a consistent annual budget of (b) (4) from Site Support and (b) (4) from OMNI. Due to leveraging and the expectation of in-kind support, Site Cleanup completes $3 of work for every $1 budgeted.

Examples of projects completed in FY19–20

- Preparation and recycle of metal cable from the TA-60 rack tower and surrounding area
- Cleanout of the HRL/TA-43 in-vivo laboratory
- Disconnection, draining, and dismantlement of large refrigeration units at the TA-43 Bioscience Division
- Protection of the archiological site in the Waste Management laydown yard on Sigma Mesa
- Cleanout and removal of several storage structures around LANL
- Removal of an abandoned radar trailer at TA-58
- Cleanup #5 of Sigma Mesa
- Cleanup and relocation of the Logistics laydown yard
- Cleanup of TA-03-216 parking lot for additional parking
- Recycle of TA-03 free release metal
- (b) (7)(E), (b) (7)(F)
- Cleanup of Physics Division space (inside and outside) at TA-35
- Cleanout of TA-54 for environmental protection and compliance

Figure 15. Abandoned radar trailer at TA-58, now gone from the site

Figure 16. TA-60 rack tower cables for recycle

Figure 17. Legacy equipment from TA-35

8.6 GAPS AND OPEN ISSUES

- (b) (5) The P2 Program and the Site Cleanup Program coordinated on this effort in FY19. Deployed environmental professionals were contacted and identified the need for covers that were obtained. Each FOD and deployed environmental professional manages the covers on the bins in their respective areas.
- (b) (5)
- (b) (5)

8.7 FIVE-YEAR OUTLOOK

There are more cleanup projects than can be addressed with current staffing and budget. There are 2.5 staff members working in the program, including project identification and scoping, planning, and a project superintendent. The amount of legacy and abandoned items has decreased each year. Individuals and organizations are learning how to address items and are encouraged to disposition unwanted items quickly.

Projects are being scoped and executed as quickly as the team can accomplish. In parallel with work execution, the goal to implement controls and sustainable changes continues as a slow process, but progress is being made. Over the next few years, updated and improved guidance and processes will be developed and implemented. The focus will be on consistent and sustainable storage structure management, concrete preparation and recycling, and capacitor preparation for excess or metal recycle.

Work on the storage structure management initiative continues and is crucial to reducing legacy and abandoned items. With growing programs and space limitations, there has been a significant increase in requests for storage structures. Some institutional efforts are being implemented including establishing a reassignment process, adding point-of-contact signs to each container, and a Site Cleanup Program review of each siting request for input.

By the end of FY21, all legacy metal with potential activation is expected to be identified and in the queue for release and recycle. Once legacy metal is addressed the process can be followed for timely disposition.

The goal is that in five years, significant legacy and abandoned items will have been removed from the site and processes will have been improved or developed so that the Site Cleanup Program will no longer be needed.

8.8 RECOMMENDATIONS

(b) (4), (b) (5)

APPENDIX A
Acronyms

ALDESHQSS	Associate Lab Directorate for Environment, Safety, Health, Quality, Safeguards, and Security
ALDWP	Associate Lab Directorate for Weapons Production
ARIES	Advanced Recovery and Integrated Extraction System (Program)
ATL	Attractiveness level
BOK	Basis of knowledge
CAT	Category
CBFO	NNSA Carlsbad Field Office
CCP	Central Characterization Program
CD	Critical Decision
CFR	Code of Federal Regulations
CMR	Chemistry and Metallurgy Research (Building)
DO	Division Office
DOE	Department of Energy
DP	Discharge Permit
EM	DOE Office of Environmental Management
EM-LA	DOE Office of Environmental Management, Los Alamos Field Office
EMS	Environmental Management System
EMWMP	Enduring Mission Waste Management Plan
EMWMP	Enduring Mission Waste Management Plan
EPA	Environmental Protection Agency
ESH	Environment, safety, and health
EWP	Environmental and Waste Program
FOD	Facility operations director
FTE	Full-time employee
FY	Fiscal year
FYNSP	Future-Years Nuclear Security Programming
GIC	Green is Clean
HENC	High-efficiency neutron counter
HWFP	Hazardous waste facility permit
ISO	International Organization for Standardization

ISOCS	In situ object counting system
LA-CP	Los Alamos Controlled Publication
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LLC	Limited Liability Corporation
LLW	Low-level waste
MAR	Material at risk
MBA	Material balance area
MC&A	Material Control and Accountability
MLLW	Mixed low-level waste
MR&R	Material reuse and recycle
MSS	Maintenance and Site Services Division
MTRU	Mixed transuranic (waste)
N3B	Newport News Nuclear BWXT Los Alamos
NA-50	DOE Office of Safety, Infrastructure, and Operations
NA-522	NNSA Office of Safety, Infrastructure, and Operations
NA-53	NNSA Office of Enterprise Stewardship
NDA	Nondestructive assay
NE-75	DOE Office of Space and Defense Power Systems
NEPA	National Environmental Policy Act
NMED	New Mexico Environment Department
NNSA	National Nuclear Security Administration
NNSS	Nevada Nuclear Security Site
NPDES	National Pollutant Discharge Elimination System
NPI	Nuclear Process Infrastructure Division
OB/OD	Open burn/open detonation
OMNI	Office of Nuclear Material Integration
P2	Pollution Prevention (Program)
PE-g	Plutonium-equivalent grams
PF	Plutonium Facility
PIDAS	Perimeter intrusion detection alarm system
PPY	Pits per year (30 Pits Per Year Plan)
R&D	Research and development
RANT	Radioassay and Nondestructive Testing (Facility)

RCRA	Resource Conservation and Recovery Act
RLUOB	Radiological Laboratory/Utility/Office Building
RLW	Radioactive liquid waste
RLWTF	Radioactive Liquid Waste Treatment Facility
SET	Solar evaporative tanks
SNM	Special nuclear material
SWEIS	Site-Wide Environmental Impact Statement
TA	Technical Area
TLW	Transuranic liquid waste
TRU	Transuranic
TRUPACT	Transuranic Package Transporter
TSDF	Transportation, storage, and disposal facility
TWF	Transuranic Waste Facility
WAC	Waste Acceptance Criteria
WCATS	Waste Compliance and Tracking System
WCRRF	Waste Characterization, Reduction, and Repacking Facility
WIPP	Waste Isolation Pilot Plant
WMC	Waste Management Coordinator
WMT	Waste management technician

APPENDIX B

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ATTACHMENT 1

Waste Management Milestones
Fiscal Year 2020 and 2021

	Milestone	Anticipated Completion
1	Complete Laboratory wide WCATS waste inventory	3QFY20
2	Submit 10 Year RCRA permit revision to NMED	3QFY20
3	Accomplish the effective and timely deinventory of stored NNSA TRU waste for off-site shipments to WIPP (1,250 container inventory target)	4QFY20
(b) (5)		
5	Implement 200 Day Strategy for Pu-239 cheesecloth	4QFY20
6	Complete FY2020 Waste Forecast	1QFY20
8	Standup Waste Management Division	4QFY20
(b) (5)		
11	Reduce the number of radioactive waste containers requiring radioactive waste management basis (RWMB) extensions	4QFY20
(b) (5)		
13	Standup WMC/WMT Pipeline and Team Leader	4QFY20
14	Implement WMC and WMT Updated Qualification Standards	2QFY21
15	Mature WMC/WMT Pipeline Curriculum	3QFY21
16	Review, update and implement additional WMC/WMT Staffing Goals	4QFY21
(b) (5)		

ATTACHMENT 2
TRU Waste Metrics (Example)