

Ten-Year Site Plan FY2016



March 2015
LA-UR-15-22269 (REV. 2)
Operated by: Los Alamos National Security, LLC

memorandum

National Nuclear Security Administration
Los Alamos Field Office
Los Alamos, New Mexico 87544

DATE: APR 06 2015
REPLY TO:
ATTN OF: Kimberly Davis Lebak
SUBJECT: Los Alamos National Security, LLC Fiscal Year 2016-2025 Ten Year Site Plan

TO: Jefferson Underwood, NA-00-521, HQ/FORS

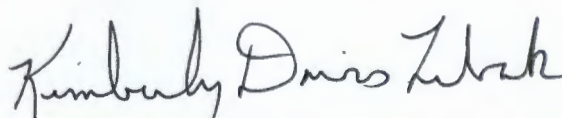
Reference:

- 1.) Contract Number DE-AC52-06NA25396, Los Alamos National Security, LLC and the Department of Energy, National Nuclear Security Administration
- 2.) LANS Report, LA-UR-15-22269, Subject: "Ten-Year Site Plan, FY 2016, dated March 2015
- 3.) LANS Letter, PADOPS-15-004, from Michael A. Lansing, LANS, to Kimberly A. Davis Lebak, NA-00-LA, Subject: "FY2016 Ten-Year Site Plan Submittal", dated March 25, 2015

The Los Alamos Field Office accepts the Los Alamos National Security, LLC (LANS) Fiscal Year 2016 Ten Year Site Plan (TYSP). The document meets the criteria defined in the Headquarters' Guidance dated January 2015.

The attached TYSP is presented with the intent to distribute as a public document. Our Los Alamos Field Office staff and the LANS authors worked together to ensure that the document meets NNSA needs. Due to budget and project uncertainties, this document is a work in progress. As options and strategies are selected, we will ensure that plans are updated accordingly.

Please direct any questions to Isaac Valdez at (505) 664-0285 or Jeff Casalina at (505) 664-0073 respectively.



Kimberly Davis Lebak
Manager

Attachments

LA-UR-15-22269 LANS Report
PADOPS-15-004 LANS Letter

cc w/attachment:

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4400 NSM:JC-619941



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March 25, 2015
PADOPS-15-004

Ms. Kim Davis Lebak
U. S. Department of Energy/NNSA
Los Alamos Site Office
Mail Stop: A316
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SUBJECT: FY2016 TEN-YEAR SITE PLAN SUBMITTAL

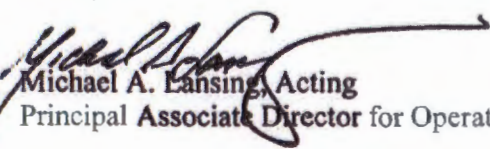
Dear Ms. Davis Lebak:

Los Alamos National Laboratory is pleased to submit the FY2016 Ten-Year Site Plan (TYSP) for your acceptance. This document was prepared in accordance with a memorandum dated January 16, 2015 from the Associate Administrator for Safety, Infrastructure and Operations. The Laboratory's approach to implementing the Program of Record for all NNSA and non-NNSA work is discussed from both a near-term tactical horizon (1 to 10-year) and a long-term strategic horizon (10 to 25-year).

The document defines infrastructure needs to sustain the Laboratory's Core Capabilities while meeting anticipated mission needs. It includes a discussion of the Laboratory's currently funded major initiatives and proposed initiatives submitted to NNSA during the FY 2016-20 Future Years Nuclear Security Program (FYNSP) budget request. The TYSP was produced as a public document and is fully compliant with NNSA's Ten-Year Site Plan guidance.

We appreciate the support of your staff during the document's development. Should you have any questions or concerns, please contact Ken Schlindwein at 606-2222, Program Director for Operations and Infrastructure.

Sincerely,


Michael A. Lansing, Acting
Principal Associate Director for Operations & Business

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1.0 EXECUTIVE SUMMARY

Los Alamos National Laboratory (the Laboratory) is the nation's premier national security science laboratory. Its mission is to solve national security challenges through scientific excellence. This includes developing and applying science and technology to ensure the safety, security, and reliability of the United States (U.S.) nuclear stockpile; reducing the threat of weapons of mass destruction, proliferation, and terrorism; and solving national problems in defense, energy, and the environment.

The fiscal year (FY) 2016 Ten-Year Site Plan (TYSP) is consistent with previous TYSPs and incorporates updated information in accordance with National Nuclear Security Administration (NNSA) guidance. The TYSP is a vital planning component to meet the NNSA commitment to ensure the U.S. has a safe, secure, and reliable nuclear deterrent¹. The Laboratory also uses the TYSP as an integrated planning tool to guide development of an efficient and responsive infrastructure that effectively supports the Laboratory's missions and workforce. Emphasizing the Laboratory's core capabilities, this TYSP reflects the Laboratory's role as a prominent contributor to NNSA missions through its programs and campaigns.

The Laboratory is aligned with Nuclear Security Enterprise (NSE) modernization activities outlined in the NNSA Strategic Plan (May 2011) which include: (1) ensuring plutonium laboratories effectively supports pit manufacturing and enterprise-wide special nuclear materials consolidation; (2) establishing shared user facilities to more cost effectively manage high-value, experimental, computational and production capabilities; and (3) modernizing enduring facilities while reducing excess facility footprint.

Long range facility and infrastructure development planning is critical to assure sustainment and modernization. Out-year reinvestment is essential for sustaining existing facilities, and will be re-evaluated on an annual basis. At the same time, major modernization projects will require new line-item funding. This document is, in essence, an overview of the plans for the Laboratory to modernize, streamline, consolidate, and sustain its infrastructure to meet its national security mission.

PRIOR YEAR ACCOMPLISHMENTS

Significant infrastructure milestones for the Laboratory include:

- **Transuranic (TRU) Waste Facility** [due to technical area (TA)-54 Area G closure]: Phase B completed final design and construction began in FY 2014.
- **TA-55 Reinvestment Project (TRP) II**: Phase C completed final design and construction began in FY 2014.
- **TA-3 Substation Replacement**: Attained critical decision (CD)-1 in FY 2012. First year Other Project Costs (OPCs) are funded in FY 2015 and the CD-2/3 package is being developed in anticipation of capital funding in FY 2016.
- **Environmental Testing Facilities**: Major capability upgrades at K-Site (TA-11) substantially completed in FY 2014.

1. This TYSP covers two time horizons: (1) a ten year tactical horizon extending to five years past the next Future Years Nuclear Security Program (FYNSP) Plan, and (2) a strategic horizon that extends fifteen years beyond the tactical horizon.

TAKE AWAY MESSAGE

The Los Alamos National Laboratory will continue to face a significant challenge over the next 25 years in balancing near-term needs while transforming the infrastructure to ensure long-term viability. The 2014 Los Alamos National Laboratory Strategic Plan emphasized that infrastructure must be modernized and maintained to fulfill diverse, complex, and evolving missions in a period of flat or decreasing budgets. The large number of existing facilities will continue to age while safety, security, sustainability and compliance requirements will likely increase. The Laboratory must also continue to act as an environmental steward, reduce environmental risk, and improve sustainability.

This plan identifies strategies that will enable the Laboratory to provide a flexible, responsive infrastructure within available resources. At the end of the 25 year period, the Laboratory will have achieved the following:

- New facilities construction and enduring facilities reinvestment to support critical capabilities
- Improved energy efficiency and long-term sustainability practices
- Modernized utility infrastructure to support future programmatic needs
- Legacy cleanup and long-term environmental stewardship goals
- Footprint reduction and nuclear infrastructure consolidation

Even in the face of new and significant pressures, the Laboratory will continue to take substantial steps to streamline operations, modernize the infrastructure, and fulfill its vision of being the premier national security science laboratory.

- **Plutonium Facility (PF)-4 Seismic Upgrades:** Seismic bracing for fire suppression in PF-4 attic and basement completed in September 2014.
- **Radioactive Liquid Waste Treatment Facility (RLWTF) Low-Level Waste (LLW) Project:** Achieved CD-3 in FY 2014 and construction has begun.
- **Chemistry and Metallurgy Research Replacement CMRR Project:** CD-1R attained in FY 2014. Design contracts have been released for both the Radiological Laboratory Utility and Office Building (RLUOB) Equipment Installation (REI)2 and PF-4 Equipment Installation (PEI).
- **Los Alamos Neutron Science Center (LANSCE) Risk Mitigation (RM):** Completed replacement of LANSCE linear accelerator (LINAC) critical components, including 201 megahertz system power amplifiers to enable 120 hertz (Hz) operations.
- **Advanced Simulation and Computing:** Completed cooling system upgrades at the Nicholas C. Metropolis Center for Modeling and Simulation to support the new Trinity supercomputing platform.
- **Nuclear Materials Safeguards and Security Upgrade (NMSUP) Project Phase II:** Construction was completed and security systems made operational.

The Laboratory is continuing efforts to improve the effectiveness and efficiency of its environmental stewardship activities. Accomplishments in 2014 included significant progress in remediation of chromium in groundwater, completion of a legacy contaminated soil cleanup project for polychlorinated biphenyls (PCBs), and rapid recovery from a 1000-year storm-water event that caused widespread flooding of canyons in September 2013. In the chromium remediation project, the Laboratory installed and used an extraction well as part of an accelerated schedule to contain and remediate chromium in the regional aquifer. Chromium was used as a corrosion inhibitor at the Laboratory's main power plant between 1956 and 1972. Core holes are also being installed to characterize the chromium distribution underground and develop strategies for plume control and remediation. The PCBs cleanup was conducted at TA-61 where a leaking electrical transformer had been located. Flood recovery actions at the Laboratory involved repairing watershed controls, including planting nearly 10,000 willows to stabilize stream banks and prevent further erosion in a canyon, repairing storm water controls at more than 130 sites, and sampling sediment throughout the Laboratory and areas downstream.

Sustainability accomplishments in 2014 included reducing site wide energy intensity by 16% compared to the FY 2003 baseline year. The Laboratory has also reduced energy use by over 6% compared to the FY 2003 baseline year while growing mission critical work, such as high performance computing (HPC). Additionally, the Laboratory reduced its water intensity by over 30% compared to FY 2012 and reduced water consumption by over 60 million (M) gallons in FY 2014 compared to FY 2013.

Strategic Goal: Enabling mission delivery through next generation facilities, infrastructure, and operational excellence

-Los Alamos National Laboratory Strategic Plan 2014

CURRENT STATE OF SITE

The Laboratory is currently mitigating a number of operational challenges from prior FYs. Laboratory TRU waste processes contributed to an incident at the Waste Isolation Pilot Plant (WIPP) that resulted in a failure to meet environmental commitments to the State of New Mexico, including the commitment to ship 3,706 cubic meters of TRU waste from the Laboratory to permanent storage. This event disrupted a key waste management capability within the NSE and could impact the Laboratory's ability to complete future programmatic milestones. Efforts are ongoing at the Laboratory to develop remediation plans for certain wastes, and future activities will include developing and implementing corrective actions for any findings from the accident investigation.

The Laboratory continues readiness activities to resume operations in two critical facilities, PF-4 and the Weapons Engineering Tritium Facility (WETF). In 2013, the Laboratory initiated a pause in programmatic operations at PF-4 to resolve issues with criticality safety and Conduct of Operations. A phased work resumption process began in 2014, with readiness assessments currently ongoing. WETF is also undergoing readiness assessments in FY 2015 to resume operations after a number of pressure safety issues were identified.

Currently, the Pajarito Corridor is experiencing considerable infrastructure development. Radiological operations at the RLUOB have begun; the TRU Waste Facility Phase A site infrastructure sub project construction is complete, and the Phase B facilities subproject is currently under construction; the replacement RLWTF–LLW capability is under construction; TRP II Phase C is under construction and Phases A and B are complete; the NMSSUP Phase II construction is complete and the security protection systems are operational. Remaining seismic improvements are underway at PF-4 and two tanks at RLWTF (50-0250) have been converted for daily influent storage in support of near term groundwater discharge reduction and future capability requirements.

The Nuclear Weapons Council has endorsed the NNSA Plutonium Strategy [See the Department of Energy (DOE) FY 2016 Congressional Budget Request] following the deferral of the CMRR Nuclear Facility (NF) project in FY 2012. The Laboratory is currently pursuing a three-step infrastructure approach to transfer plutonium capabilities from the Chemistry and Metallurgy Research (CMR) building and begin reducing operational risks in PF-4. The strategy to terminate operations in CMR includes maximizing the use of RLUOB by installing additional equipment and repurposing underused laboratory space in PF-4. A third future step may include constructing modular additions to the TA-55 facility network to avoid developing a PF-4 replacement project. Planning the first two steps as new sub-projects to the CMRR line item (LI) project has already begun, and the third step would be a separate LI to be submitted at a later date.

In addition to the Pajarito Corridor development, further revitalization of TA-3 includes a proposed Nuclear Counter Proliferation (NCP) building re-using a portion of the vacant parcel created by demolition of the original Administration Building. Pre-conceptual planning is also underway for a TA-53 flagship science facility, Matter-Radiation Interactions in Extremes (MaRIE), as well as facilities at TA-3 and TA-16 needed to support the increasing core capability workload.

All major facility construction and refurbishment projects will meet either Leadership in Energy and Environmental Design (LEED) Gold or Guiding Principles in coordination with the DOE 2014 Site Sustainability Performance Plan (SSPP) and DOE O 413.3B and 436.1 for sustainability and improved energy efficiency. A number of energy efficiency projects are underway, including heating ventilating and air conditioning (HVAC) and building automation system (BAS) upgrades. Planning is also underway to refurbish and expand some aging institutional infrastructure, particularly the Laboratory's aging Steam Plant, and 115 kV and 13.8 kV electrical power systems to meet the anticipated electrical power demand for exascale supercomputing.

The Secretary of Energy has asked NNSA and the DOE Office of Environmental Management (EM), which funds DOE legacy environmental cleanup work, to transition EM funded work at the Laboratory from NNSA to EM.

CHANGES FROM PREVIOUS YEAR

Since the FY 2014 TYSP, multiple changes have occurred in facility investment opportunities for Defense Programs (DP) facilities at the Laboratory. The Roof Asset Management Program (RAM) has replaced ~1.2 M square feet of building roofs through 2014 with better insulated, more energy efficient, 'cool roofs', saving ~\$3.2M in operating costs over the life of the roof. To recapitalize the Laboratory's infrastructure, a Recapitalization program and a Construction program under Infrastructure and Safety (I&S) programs has been initiated by NA-50 that provides targeted, strategic investments for life-extension and modernization of enduring facilities, which will include the RAM. These facility investments must address any risk associated with safety, facility deficiencies that will impact program deliverables, sustainability and return on investment (ROI). The Readiness in Technical Base and Facilities (RTBF) Capability Based Investment (CBI) program sustains, enhances or replaces DP capabilities through focused investments supporting the core programmatic requirements across the enterprise. These investments address needs beyond any single facility, campaign or weapon system and are essential to achieving program mission objectives. In addition, to continue management reform, the proposed Security Envelope Enhancement project will provide enhanced protection against vehicle threats for locations containing special nuclear material, classified matter, personnel, and property.

In FY 2014, a Laboratory Operations Board (LOB) was established by the Secretary of Energy to "provide greater viability of existing capabilities and identify needs for new infrastructure across the laboratory complex." Through the LOB, each site was tasked with completing three separate assessments of their facilities and infrastructure: Mission Unique Inventory, Condition Assessments, and Functionality and Utilization Assessments. The Laboratory identified 59 mission unique facilities that represent "one-of-a-kind, physically unique, large-scale technically complex...critical resources to the DOE and the nation." The direct funded mission unique facilities were considered to have strong program advocacy at the headquarters level, and were removed from further analysis. The remaining facilities underwent a qualitative condition assessment, where 25% were scored as adequate (asset is fully capable of performing its current mission) while

37% received substandard ranking (asset had deficiencies that limit performance of the mission including attracting and maintaining key staff). The primary driver of the substandard ranking was age of facilities with systems beyond useful life. Most of these assets have existing repurpose/recapitalization plans that are funding dependent. Additionally, results from the functionality and utilization assessments yielded a utilization rate between 87% to 97%, which indicates each space type at the Laboratory (high bay, ventilation intensive, power intensive, general wet laboratory, general dry laboratory, office, and storage) was either “Fully Utilized” or “Over Utilized.”

FUTURE PLANS

Mission need requirements within the next decade are an Energetic Materials Characterization Facility (EMCF), Weapons Manufacturing and Engineering Support Facility (WMESF), and the NCP facility. Reinvestment and renewal of radiochemistry, chemistry, bioscience, physical science, and astrophysics laboratories, TA-3 steam system, and an enhanced TA-3 chilled water system are being considered in the next decade. Implementation of the Plutonium Strategy enables the remaining wing closures and demolition of the CMR building to commence. The viability of any of these projects will depend on the Laboratory’s evolving missions, NNSA support, and out-year funding.

INFRASTRUCTURE RISK TO MISSION

Future Capabilities and Capacity Gaps: Over the next decade, specific program elements and DP workloads will be shaped by agreements and policies such as the New Strategic Arms Reduction Treaty (New START) and the Nuclear Posture Review (NPR). The trends toward a smaller operationally deployed stockpile will continue. As the stockpile becomes smaller, the premium on confidence in the weapons will grow, placing increasing demands on the science, technology, and engineering (ST&E) supporting the stockpile.

The Laboratory will continue to ensure the safety, security, and effectiveness of the U.S. nuclear deterrent and provide experience in nuclear weapons ST&E that supports international stability and national security, consistent with the Laboratory’s national security missions. However, the physical infrastructure supporting both direct-funded facilities and underlying ST&E capabilities requires recapitalization to provide continuing support for the nation’s defense and global security. Without a vital infrastructure, the Laboratory’s ability to perform experimentation, modeling, simulation, design, engineering, and production will be placed at risk, possibly creating gaps in the ability to certify the U.S. stockpile and support other important national security priorities.

Facility Operations and Maintenance: The Laboratory is currently implementing a number of new initiatives to improve operations and maintenance management and increase efficiencies. However, it is critical that the Laboratory receives adequate funding, on an annual basis, to support day-to-day facility operations and maintenance and continue construction activities to modernize and replace aging structures. Current and out-year budget targets in the RTBF program are not adequate to support the level of operations and maintenance needed to ensure that facilities will be available to meet programmatic requirements, including critical Life Extension Program (LEP) work. The Laboratory will continue to drive improved utilization efficiency within the existing facility portfolio, balance infrastructure risks within available budget, and minimize impacts to deferred maintenance (DM). However, ongoing budget reductions will require difficult decisions related to the continued availability of mission critical (MC) and mission dependent (MD) facilities.

Environmental Issues: The Laboratory is committed to a smooth transition of the EM-funded legacy environmental cleanup work to a new contractor and will maintain safe and secure environmental program operations until the transition is complete. The intent is to align the focus and accountability of cleanup work at the Los Alamos site with EM and enable the Laboratory to continue its focus on the core national security missions at the site.

Additionally, the Laboratory has developed a Long-Term Strategy for Environmental Stewardship & Sustainability (LTSESS) Plan that defines strategies and tactics for addressing past legacy issues, controlling present emissions, and creating a sustainable future. Long range infrastructure planning directly addresses environmental and sustainability issues in coordination with the Laboratory’s FY 2015 Site Sustainability Plan (SSP) and the LTSESS. Environmental and sustainability criteria are key components of the Laboratory infrastructure management strategy.

2.0 SITE OVERVIEW AND SNAPSHOT

Location: Los Alamos, New Mexico

Type: Multi-Program Laboratory

Web site: <http://www.lanl.gov>

Contract Operator: Los Alamos National Security, LLC

Responsible Field Office: Los Alamos Field Office

Site Manager: Kimberly Davis Lebak

The Laboratory was established in 1943 as a secret, centralized site to coordinate scientific research of the Manhattan Project, an Allied effort to develop the world's first atomic weapon. Located approximately 25 miles northwest of Santa Fe, New Mexico, the remote location was ideal because it provided controlled access, steep canyons for buffers in testing high explosives (HE), and some existing infrastructure (Figure 3). Following the end of World War II, the Laboratory expanded operations while continuing to provide significant contributions to the nation's science and DP missions. A unique array of facilities and infrastructure was built during the Cold War to accommodate weapons scientific research and development (R&D). Many of those unique facilities are now obsolete and need to be refurbished or replaced to sustain the Laboratory's current core capabilities. These include the following NNSA Capabilities: C1.1–Design and Certification; C1.2–Experiments; C1.3–Simulation; C1.4–Testing; C2–Plutonium; C4–Tritium; C5–High Explosives; C6–Non-nuclear; C7–Weapons Assembly/Disassembly; C9–Special Nuclear Materials (SNM) Accountability, Storage, Protection, and Handling; C11–Counterterrorism (CT) & Counter-proliferation (CP); C14–Non Proliferation; C16–Emergency Response; and C17–Strategic Partnership Projects. The Laboratory also supports additional DOE Capabilities including: EM04–Dispose of Transuranic/Low-Level Wastes; EM05–Decontaminate and Decommission (D&D) Facilities; EM06–Soil and Groundwater Remediation; SC05–Condensed Matter Physics and Material Science; SC08–Biological System Science; and SC13–Applied Nuclear Science and Technology. A real property snapshot of the facilities supporting these core capabilities is shown in Figure 1.

The Laboratory is one of the largest institutions in New Mexico with an annual budget of approximately \$2.4 billion in FY 2015. The majority of funding comes from NNSA DP (62.8%), supplemented by funds from other NNSA programs (11.7%), DOE (non-NNSA) programs (15.2%), and Work for Others (10.3%) FY 2014 funding details are captured in Figure 2. With a total workforce of approximately 10,000 people (as of 2/11/15), Laboratory affiliated personnel include professional (31.3%), technical (27%), flexible workforce (10.5%), post-docs & students (13.1%), managers (7.5%), craft employees (7.9%), support (2.2%), and executive staff (0.5%). M&O of the Laboratory is the responsibility of LANS, LLC which is comprised of four top United States (U.S.) organizations—University of California; Bechtel National; Babcock & Wilcox Company; and URS Corporation.

Figure 1: Real Property (End of FY 2014 FIMS Snapshot)

- 25,314 Acres (Leased / Owned)
- 981 Buildings/Trailers:
 - 7,856,601 gsf Active & Operational²
 - 338,088 gsf Non-Operational²
 - 435,114 gsf Leased
- Replacement Plant Value:³ \$14,025,742,157
- Deferred Maintenance:² \$935,831,686
- Facility Condition Index:² 6.8%
 - Mission Critical 4.1%
 - Mission Dependent 5.5%
 - Non-Mission Dependent 9.6%
- Asset Utilization Index (Overall):⁴ 89.3%

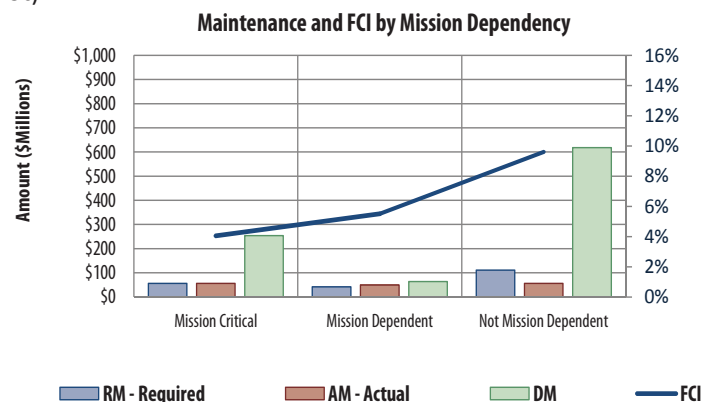
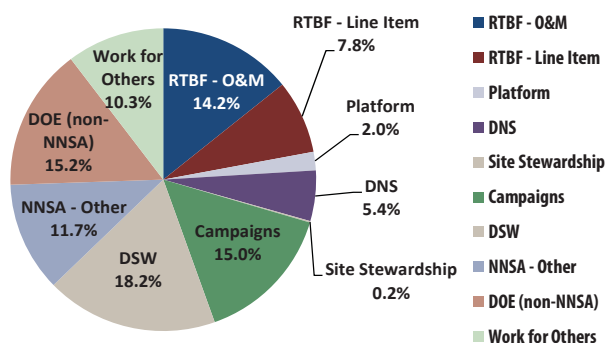


Figure 2: FY 2014 Funding by Source

- FY 2014 Total Site Operating Cost: \$2,117M
- FY 2014 Total NNSA Funding: \$1,767M
- FY 2014 Total DOE (non-NNSA)⁵ Funding: \$361M
- FY 2014 Total Other Funding: \$245M



2. DOE owned real property (buildings, trailers, other structures)
3. DOE owned real property and leased facilities
4. DOE owned and leased, operational gsf
5. Includes \$204M in EM funding for cleanup scope

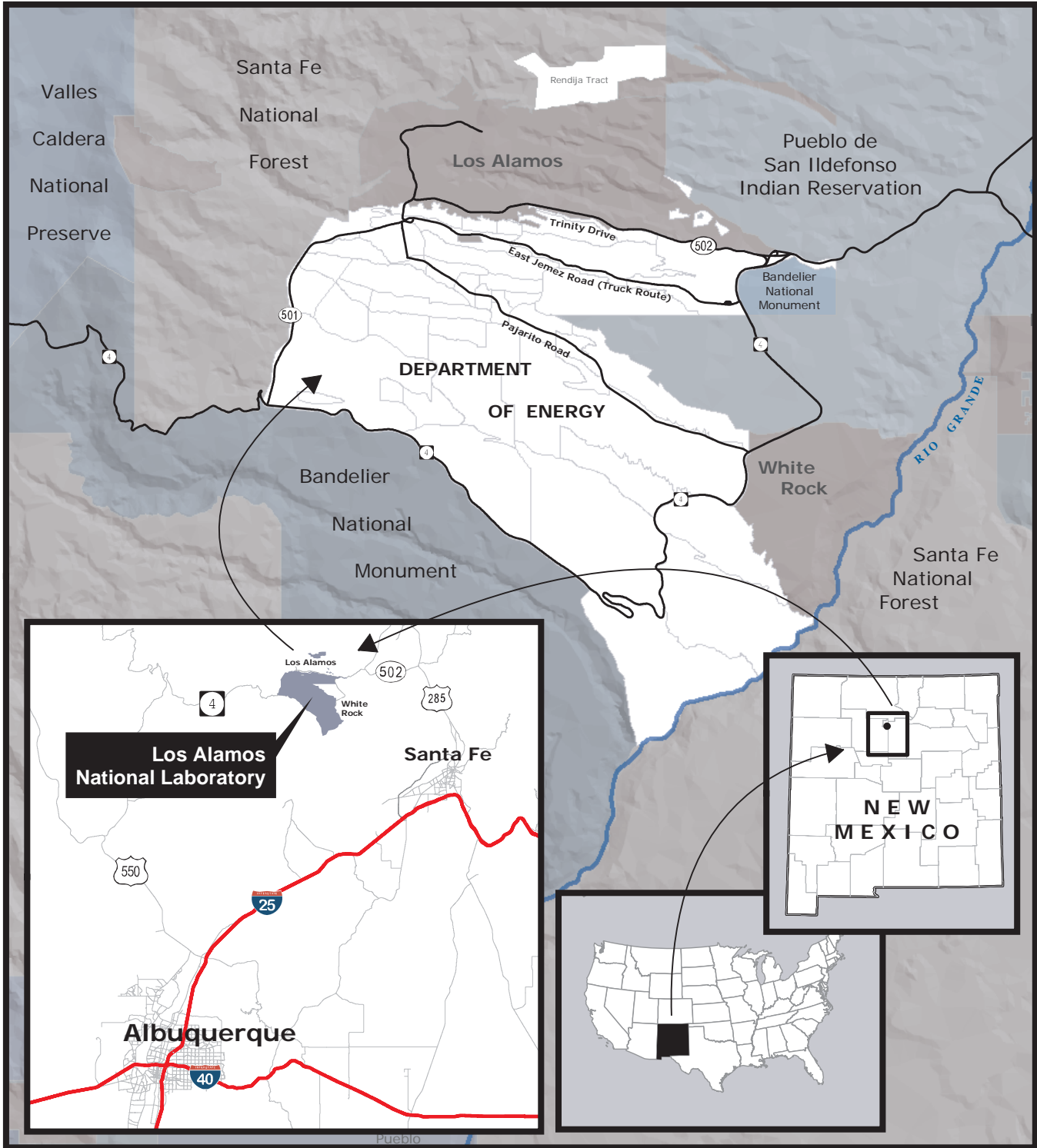


Figure 3: Location Map of Los Alamos National Laboratory

3.0 ASSUMPTIONS

PROGRAMMATIC

Primary drivers for the FY 2016 TYSP include the 2008 Complex Transformation Record of Decision (ROD), 2010 NPR, New START, FY 2016 Stockpile Stewardship and Management Plan (SSMP), FY 2015 Supplement Analysis—Chemistry and Metallurgy Research Building Replacement Project at Los Alamos National Laboratory, Resource Conservation and Recovery Act regulations, and the NNSA Construction Working Group's Integrated Project List for Capital Construction and Planned Recapitalization. Based upon key directives from these documents, it is assumed that the Laboratory will continue to support warhead surveillance and stockpile assessment science and technology to ensure certification and predictive capabilities in the absence of underground nuclear testing. The Laboratory will also continue to meet the immediate needs of the stockpile, including production for the Department of Defense (DoD) delivery and LEP commitments and milestones to prevent operational gaps while enhancing safety, security and use control. Meanwhile, the Laboratory will continue to strengthen its ST&E base by developing and sustaining high quality scientific staff and maintaining the ability to design nuclear warheads, including development and engineering expertise and capabilities. RTBF will provide strategic investments to operate and modernize programmatic infrastructure and manufacturing capabilities. In September 2014, DOE announced its intent to transition legacy environmental cleanup work from NNSA to DOE-EM. While there are many details to be worked out, it is assumed that some number of assets will be transferred from NNSA to DOE-EM.

In support of these programmatic missions and as part of the Department's strategy for creating a smaller, safer, more secure and effective physical infrastructure, the following assumptions are made about key Laboratory infrastructure projects:

- ✓ CMRR-NF portion of the CMRR project has been cancelled. The remaining enduring analytical chemistry and material characterization plutonium capabilities in the existing CMR Facility will be transferred to the existing RLUOB and PF-4. The transfer of capabilities will be completed by the end of the 4th quarter of 2024 consistent with the recently approved revised plan.
- ✓ Reinvestments are being made in the PF-4 infrastructure (TA-55 TRP II), and replacement facilities are underway for waste processing capabilities (RLWTF-LLW and the TRU).
- ✓ Cessation of program activities in CMR will occur no sooner than FY 2019.
- ✓ Upgrades to the minor environmental testing facilities are underway with completion anticipated for FY 2017.
- ✓ LANSCE will maintain the 120Hz operations achieved in 2014 after a decade of 60Hz operations.
- ✓ A Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility Sustainment Strategy has been developed that presents a five-year investment plan commencing in FY 2016.

BUDGET

Funding profiles in this TYSP are consistent with the FY 2016 FYNBP and the President's FY 2016 Congressional Budget Request. It assumes resolution and adoption of the FY 2016 Congressional Budget Request; the continuation of the CBI program; the initiation of the Recapitalization Program; continued funding for legacy environmental cleanup, including environmental restoration and legacy waste management, with work scope defined in an Integrated Priority List that has been accepted by DOE and the New Mexico Environment Department (NMED); and institutional funding for footprint reduction, reinvestment, new construction, and replacement of non-DP facilities. While NA-10 RTBF and NA-50 I&S will fund the minimal operations of most facilities, FYNBP targets are well below current operating budgets and are significantly below the required levels in FY 2015 through FY 2019.

PLANNING

Maintenance: An annual maintenance work plan is prepared for each facility or area to identify activities and resources needed to accomplish Laboratory maintenance. Each annual maintenance work plan supports the annual update to the TYSP. Disposition funding will continue to eliminate obsolete/non-sustainable facilities, allowing for the avoidance of associated DM while directing maintenance funding toward enduring facilities. In FY 2015, the Secretary of Energy initiated a requirement to hold steady or reduce DM across the complex. The targets provided to the Laboratory through NA-50 equal an \$18M reduction in DM by FY 2017. Condition assessments will continue to provide a better understanding of facility condition and consequently equip the Laboratory with better information to prioritize maintenance spending.

Disposition: Investment from several programs is anticipated to continue the footprint reduction progress made over the last decade. Several funding sources currently anticipated include Laboratory institutional funding to address small structures (especially trailers and transportables) and NNSA funding to address a significant number of buildings currently shutdown/excessed, as well as those anticipated to be shutdown over the coming years. Funding determination for TA-54 facilities disposition is yet to be negotiated between EM and NNSA. While the Facilities and Infrastructure Recapitalization Program (FIRP) ended in FY 2012, [which removed almost 501 thousand (k) gsf since 2002], inclusion of D&D in the NA-50 Recapitalization Program is proposed for FY 2016.

For an enduring site such as Los Alamos, timely removal of obsolete structures following completion of the shutdown/excessing processes is the optimal approach for reducing cost, minimizing risk, and maximizing program opportunities. Over time, all enduring sites will have structures that reach the end of their viable lifetimes and need to be removed. A national program to address the elimination of obsolete structures before an even more significant backlog is realized would provide a practical and efficient infrastructure strategy. At present, however, elimination of the current backlog remains a principal challenge. One upcoming challenge for both the Laboratory and NNSA will be the demolition of the CMR facility, a structure with over 550k gsf of nuclear operations space. Programmatic operations are planned to cease in 2019, and NNSA committed to demolishing the facility following transition of plutonium operations to other structures at TA-55. NNSA issued a CD-0 on the demolition project in 2005, and noted that it would evaluate D&D requirements in out-year program planning cycles.

The Atomic Energy Community Act of 1955, as amended (P. L. 105-119 Amendment Conveyance to Los Alamos, NM, MISC2) National Defense Authorization Act; and the Amended ROD for DOE/Environmental Impact Statement (EIS)-0293 (Conveyance and Transfer EIS) issued January 23, 2012, has identified lands no longer necessary to retain and will make them available for transfer. To date, approximately 2,980 acres have been transferred to the County of Los Alamos (LAC), the Los Alamos County School District (LACSD), and the Department of Interior (DOI) Bureau of Indian Affairs (BIA) in trust on behalf of the Pueblo of San Ildefonso since FY 2002. Approximately 1330 acres remain to be conveyed to LAC before FY 2023.

Sustainability: Infrastructure planning will continue to integrate DOE Order 436.1 site sustainability requirements into infrastructure planning, maintenance and project execution. The annual SSP describes planned actions to reduce greenhouse gas (GHG) emissions and upgrade aging facilities to conserve energy and water resources for future mission growth.

Capability Based Infrastructure: The Laboratory provided a prioritized project list consistent with the requirements of the CBI data call and will continue to evaluate potential projects and support the planning and execution of the CBI program as it matures.

Recapitalization Program: The Laboratory has also provided a prioritized project list for recapitalization projects in accordance with NA-50 guidance. The Laboratory will continue to evaluate potential projects and support the planning and execution of recapitalization projects as the program matures.

4.0 CHANGES FROM PRIOR YEAR TYSP

MANAGING THE STOCKPILE

- A new Plutonium Strategy has been developed by the Laboratory and adopted by the NNSA and endorsed by the Nuclear Weapons Council.
- NMSSUP II project was completed providing physical and access control infrastructure improvements at TA-55.
- TRU Waste Facility project and TRP II construction began in FY 2014.
- The Transuranic Liquid Waste (TLW) Treatment portion has been separated from the Radioactive Liquid Waste Treatment Facility Upgrade Project (RLWTF-UP), and is now a separate project. The Low-Level Liquid Waste (LLW) portion of RLWTF-UP is in construction and the TLW is in design.
- Major capability upgrades for environmental testing facilities at TA-11 were substantially completed.
- Seismic bracing for fire suppression in PF-4 attic and basement were completed, and roof girder upgrades are in progress.

PREVENTING PROLIFERATION

- A potential new Nuclear Counter Proliferation (NCP) Building is being evaluated to consolidate emergency response capabilities and address key gaps that were identified through a FY 2014 Red Team review of the NCP program.

CONTINUING MANAGEMENT REFORM

- Radio System Life Cycle Replacement project commenced the process of upgrading trunked radio systems.
- Legacy Field Panel Replacements began to replace panels with modern Argus field equipment.
- Public Law 105-119 (November, 1997) requires the conveyance or transfer of land not required for the Laboratory's national security missions to external parties for preservation or economic diversification. To date, approximately 2,980 acres have been transferred to LAC, LACSD, and DOI-BIA in trust on behalf of the Pueblo of San Ildefonso. Initially enacted for 10 years, the public law has been extended until 2023 to ensure transfer of all eligible parcels. In 2014, 523 acres were transferred to LAC.

RECAPITALIZING INFRASTRUCTURE

- A design/build contract for the TA-3 Substation Replacement Project [formerly LANL Electrical Infrastructure Upgrade Project (EIUP)] will start construction in FY 2016.
- Actions are being developed to meet targets of reduced DM by \$18M by the end of FY 2017.
- Revitalization and repurpose of 87k gsf of space for research, development, and training has been completed.
- 38k gsf of buildings, trailers, or transportable buildings were removed in FY 2014.
- On December 19, 2014, the Manhattan Project National Historical Park legislation was signed by President Obama. DOE and DOI will develop a Memorandum of Understanding (MOU) by December 2015 and complete a Park Management Plan in the next 3 years.

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5.0 FUTURE VISION AND CORE CAPABILITIES

NATIONAL NUCLEAR SECURITY ADMINISTRATION CAPABILITIES

C1.1: DESIGN AND CERTIFICATION

Facilities utilized to design and engineer nuclear physics packages and certify the stockpile are included in this core capability.

TACTICAL PLANNING HORIZON (FY 2016-25)

The significant weapons facilities supporting this capability include the DARHT, the main HE science facilities at TA-9, several HE firing sites, detonator production facilities at TA-22, and HE radiography at TA-8. DARHT is used to perform integrated, nonnuclear experiments designed to measure the many complex and dynamic aspects of implosion systems, shock physics, and high-velocity impacts. HE science facilities at TA-9 are used to synthesize, formulate, and machine small scale HE components. The HE firing sites are used for open air or contained tests primarily for experimental studies for stockpile data and R&D. The HE detonator facilities provide the capability to design, develop, manufacture, and test detonator systems. The facilities also currently provide the capability to produce detonators for all warheads in the stockpile. HE radiography at TA-8 supports characterization of HE components for detonator fabrication, hydrodynamic testing at DARHT, and subcritical testing at the Nevada National Security Site (NNSS).



Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility

Over the next ten years, several investments will be made in the design and certification facilities. Investments will be made at DARHT to ensure continued reliability and enhance the DARHT capabilities, including the construction of an enclosure to eliminate programmatic interruptions during inclement weather. While a new facility is currently planned to replace the TA-9 HE science facilities, a number of investments are needed to ensure operability until construction is completed, including roof replacements, heating and cooling systems improvements, and repairing the steam system. The HE radiography facilities will also need investments in heating and their other 1950s vintage building systems. TA-22 detonator facilities will need an upgraded chilled water system and general workplace improvements to office and laboratory space.

STRATEGIC PLANNING HORIZON (FY 2026-40)

The EMCF will replace the majority of the HE science facilities at TA-9 as currently planned. Funding will first be available in FY 2018, with construction complete in FY 2021. EMCF will replace 18 buildings and vacate approximately 48,500 gsf. Additional investments will be needed at TA-22 and TA-8 during this time period to replace end-of-life-cycle equipment and ensure an enduring capability.



Proposed Energetic Materials Characterization Facility (EMCF)

C1.2: EXPERIMENTS

Facilities falling under this core capability provide scientific experimentation to understand material properties under extreme conditions, contributions to formation and validation of models, validation of predictions about nuclear performance, and investigation of weapons-related phenomena.



Los Alamos Neutron Science Center (LANSCE)

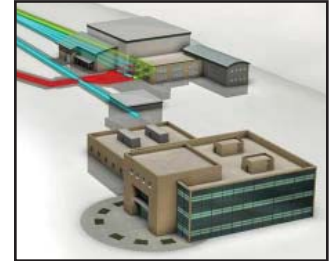
TACTICAL PLANNING HORIZON (FY 2016-25)

Los Alamos Neutron Science Center Facilities: LANSCE is a multi-purpose, accelerator-based national user facility. Scientists from around the nation and the world use LANSCE to execute a broad range of defense and civilian research. At the Laboratory, LANSCE supports national security, energy security, and fundamental science missions by maintaining a set of core technical competencies including advanced materials science, particle-beam technology, and nuclear science. Weapons research at LANSCE provides answers to fundamental questions that arise in the stewardship of an aging nuclear stockpile. The LANSCE facilities consist of a high intensity 800-million-electron-volt (MeV) LINAC (53-0003), a proton storage ring (53-0008), neutron target systems at the

Weapons Neutron Research (WNR) facility (53-0369), the Manuel Lujan Jr. Neutron Scattering Center (“Lujan Center”) (53-0622), and associated beam lines and detector systems.

LANSCE’s reliability has been under increasing stress over the past few years. Major components have become obsolete, demonstrated failure, and are operating years beyond expected service lives. The LINAC-RM projects are an independent compilation of beam line and infrastructure maintenance projects to renovate and modernize the existing linear accelerator and related systems. The projects will sustain reliable facility operations past 2020 for defense research and applications with a priority on dependable beam delivery. Work was initiated in FY 2011 for a portion of the LINAC-RM projects and will continue until the end of FY 2016. Additional reinvestments planned for the LANSCE area include correction of legacy fire protection and life safety issues, roof replacements on several facilities, replacement of failing HVAC systems, and installation of additional shielding for the Ultra-cold Neutron (UCN) Facility.

The Matter-Radiation Interactions in Extremes Facility: The proposed science magnet and flagship facility, MaRIE 1.0, will provide a vital increase in Laboratory capabilities for materials research at LANSCE. Located at TA-53 to take advantage of existing infrastructure, MaRIE 1.0 will integrate a state-of-the-art materials synthesis and characterization capability, a dynamic extremes environment, and a materials irradiation environment with diagnostic tools. The mission need fulfilled by MaRIE 1.0 is to close key gaps in our ability to understand the condition of the nuclear stockpile and to extend the life of nuclear materials by observing and ultimately controlling how mesoscale material properties affect weapon performance. In August 2014, the Laboratory received encouragement by senior DOE leadership to strive for CD-0. The Director has committed to submitting a CD-0 package by summer 2015.



Proposed Matter-Radiation Interactions in Extremes (MaRIE) Facility



Materials Science Laboratory (MSL)

Materials Science Laboratory: The MSL (03-1698) supports four types of experimentation: materials processing, mechanical behavior in extreme environments, advanced materials development, and materials characterization. Its research activities are important to the development of the Laboratory’s advanced manufacturing capabilities, especially in the areas of qualification and the science of scale-up (going from bench research to materials processing). MSL also is used for small-scale experiments that support NNSA Science Campaigns. The MSL is a relatively new building but its operational efficiency is impacted by failures in the HVAC system. An effort began in FY 2014 to analyze the HVAC deficiencies and plan a path to solution. Completion of this effort is important to the building’s continued viability in the next decade. The infill project to construct new laboratories in

an unfinished part of the second floor was completed in FY 2014; these new labs support chemical synthesis, characterization, and preparation of new materials.

TA-48 Refurbishment and Upgrades: Existing radiological facilities are operationally complex and multi-purpose, and present a myriad of challenges to conducting work safely, securely, and efficiently. Planned reinvestment activities include electrical panel upgrades and window maintenance to the Building 1 hot cells, remodeling and seismic upgrades to Building 107, and new construction to accommodate both increased demands for bio-assay activities at Building 45 and the eventual replacement of the portion of Building 1 that is not associated with the hot cells.



TA-48 Radiological Facilities



Physics Building

Physics Building: This facility (03-0040) supports a range of capabilities including: 1) quantum communications, 2) Quantum Sensing technologies, 3) Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI), and 4) neuromemetic research. Additionally, this facility supports activities in advanced materials development, electro-chemical based gas/vapor sensors, synthesis and characterization of nanomaterials, and acoustic sensor technologies for enhanced fossil energy utilization. It also houses laboratories and classified data in support of the nation’s space-based nuclear event detection system. The physics building is old and has problems with the HVAC system, roof leaks, fume hood capacity, and fire code compliance with its hydrogen gas supply system.

Reinvestment of the existing facility will be required until replacement facilities or improved existing space is available to accommodate both unclassified and classified laboratory and office requirements.



Target Fabrication Facility

Target Fabrication: This facility (35-213) provides 64,000 sq. ft. of laboratory and office space that primarily supports Science Campaigns and Directed Stockpile R&D programs. The facility supports extensive capabilities in micromachining, inertial confinement fusion (ICF) target fabrication, metrology, foams development, physical and chemical vapor deposition as well as extensive polymer characterization. The facility was built in 1984 and the HVAC and mechanical systems (compressors, chillers, boilers, controls, etc.) are at the end of their service life, with periodic failures and associated downtime affecting programmatic deliverables. Replacing this equipment and upgrading the pneumatic controls to electromechanical should extend the useful lifetime of the Target Fabrication Facility for another twenty years. In FY 2015 the Institution began investing in some of these necessary upgrades.

Trident Facility: The Trident Laser Facility (35-0189) is an extremely versatile Nd:glass laser system dedicated to high energy density (HED) physics research and fundamental laser-matter interactions. The facility conducts outstanding science in support of 1) the nuclear stockpile mission through experimental and data collection to enable assessment and provide predictive confidence; 2) Plasma and Fusion Energy Sciences understanding HED in support of the National Ignition Facility (NIF) programs; and 3) Global Security through advancing laser-driven particle acceleration and production for detection and interdiction of nuclear materials.



Trident Facility

Trident develops and tests diagnostics to be deployed ultimately at larger facilities, such as the NIF, and develops the advanced concepts to better utilize experimental data taken at the larger facilities by reducing the uncertainty in the material properties often used in HED experiments. The facility will provide scientific enabling R&D for MaRIE. Trident has achieved world record laser driven neutron production and is establishing the utility of a laser system for the detection and interdiction of special nuclear material. Trident will continue to enable world class HED plasmas through its User program.



Proposed Dynamic Equation of State (DEOS) Building

Dynamic Equation of State Facility: Gas guns provide fundamental, high precision material compressibility data, or equations of state (EOS), for a variety of engineering, performance, and safety models. Such models can determine the EOS and dynamic behavior of all inert, SNM and explosive materials; and EOS, dynamic and initiation behavior of explosives. The new Dynamic Equation of State Facility (DEOS) facility, to be built in FY 2016, will relocate three gas gun facilities from Ancho Canyon to TA-40 while closing the gas gun facilities and their supporting structures in Ancho Canyon. This new facility will replace six facilities and reduce the Laboratory foot print by approximately 4,950 gsf.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Planning is ongoing for the 25-year timeframe to determine what facility reinvestments or new construction will be required for this core capability. The planned retirement of the Trident Facility is predicated on the construction of the long-pulse laser for MaRIE, and the construction of a precursor MaRIE facility at TA-53 that transitions to a next-in-class, Peta Watt power, Trident-like facility taking advantage of newer technology built to assure enabling R&D necessary to support MaRIE design. Additional facility dispositions at TA-35 include moving HED fluids and plasmas staff and light labs at building 87 (ICF, HED) to new classified office and separate light lab facilities at TA-53; retirement of 35-207- light lab; consolidation of office, heavy lab needs supporting diagnostic development and fusion energy sciences into building 86, 128 and 125. Long term strategic reinvestment needs for the TA-48 area include a modern radiological isotope campus along the Pajarito Corridor.

C1.3: SIMULATION

This core capability includes facilities that provide computer modeling and prediction of weapon performance and material properties in regimes that are not accessible through experimentation.



Nicholas C. Metropolis Center for Modeling and Simulation Facility

TACTICAL PLANNING HORIZON (FY 2016-25)

Nicholas C. Metropolis Center for Modeling and Simulation: This facility (03-2327) houses Cielo, the next-generation petascale capability-class platform for the Advanced Simulation and Computing (ASC) Campaign with more than ten times the computing power of its predecessor. Cielo was approved for classified operations in March 2011, and enables scientists to increase their understanding of complex physics as well as improve confidence in the predictive capability for stockpile stewardship. It runs the largest and most demanding workloads involving modeling and simulation, primarily for milestone calculations. After Cielo, the next platform, Trinity, will introduce key elements of technologies deemed necessary as the stepping-stone towards exascale computing. Exascale computing, which is the ASC Roadmap, will be a thousand-fold increase in computing capabilities over the current petascale platforms. Installation of Trinity begins in 2015 and acceptance will occur in 2016. A number of upgrade projects are required at the Metropolis Center and in the electrical distribution utilities to provide adequate electrical capacity to support future computing missions.

The ASC program platform strategy sites new large scale supercomputers at the Laboratory’s Metropolis Center every five years for use by the Directed Stockpile Work (DSW) program. The 2020 Advanced Technology System 3 (ATS-3), and supporting systems, is expected to use more electricity than the existing infrastructure can provide. In FY 2017, a CBI project has been proposed that will fund a near-term power enhancement for the Metropolis Center.

STRATEGIC PLANNING HORIZON (FY 2026-40)

No major imminent changes are expected for mission areas for the simulation capability, although the program will progress to address evolving national security and other challenges. Planning is ongoing for the 25-year timeframe to determine what facility reinvestments or new construction will be required to meet ASC mission needs.

C2: PLUTONIUM

The plutonium core capability consists of plutonium production and process R&D, manufacturing and radioactive waste disposition.

TACTICAL PLANNING HORIZON (FY 2016-25)

Facilities supporting the plutonium capability at the Laboratory are located at TA-55, TA-50, TA-54, TA-46 and CMR at TA-3. At TA-55, investments will continue on seismic upgrades, facility control room modifications, criticality safety, and ventilation improvements. TRP II (Phase C) will continue as well. At the RLWTF, projects in preparation for the new RLW discharge permit are continuing. These projects include collection ground water vault upgrades and the installation of the primary and secondary reverse osmosis system. A new RLW LLW capability has begun construction and will meet the regulatory requirements for discharge. At TA-63, a new TRU Waste Facility is under construction and will provide a replacement facility needed to stage, characterize, and certify newly generated TRU waste. At TA-54, the Radioactive Assay Nondestructive Testing (RANT) Facility is



Radioactive Assay Nondestructive Testing (RANT) Facility



Radiological Laboratory Utility Office Building (RLUOB)

expected to continue as the shipping facility for both newly generated and legacy TRU waste at the site. Seismic concerns within the safety envelope of the facility may drive the Laboratory to an alternative shipping facility. If the seismic issue can be resolved within funding constraints, NA-50 will additionally invest in a larger shipping box loading capability within the facility.

The Laboratory has developed a Plutonium Strategy following the cancellation of the CMRR-NF project that has been adopted by the NNSA and endorsed by the Nuclear Weapons Council. The Laboratory is currently pursuing a three-step infrastructure approach to transfer capabilities from CMR and begin reducing operational risks in PF-4. The strategy to terminate

operations in CMR includes maximizing the use of the RLUOB by installing additional equipment and re-purposing underused laboratory space in PF-4. A third future step may include constructing modular additions to the TA-55 facility network to provide an effective response to assist the aging PF-4 facility. Based on recent direction from NNSA, the Laboratory has started designing the first two steps as new sub-projects to the CMRR LI project. The third step will be a separate LI project to be submitted for CD-0 at the end of FY 2015. Operations involving radioactive materials other than plutonium conducted in the CMR Wing 9 hot cells are not currently planned to be relocated within the Laboratory.

The CMR facility has been operating on a “run-to-2019” philosophy in anticipation of the above project. The CMR will be required to operate at a minimal level to sustain capabilities needed for ongoing missions. Until the Plutonium Strategy is complete, investments to maintain the CMR facility’s infrastructure are required to keep the CMR functioning.



Chemistry and Metallurgy Research (CMR) Facility

STRATEGIC PLANNING HORIZON (FY 2026-40)

No significant changes are expected in the future for plutonium mission, programs, and workload currently assigned to the Laboratory. TA-55 is expected to be the NSE’s only fully functioning plutonium complex used for R&D and pit manufacturing during the next 25 years. During this period, planning will be initiated on any additional still-to-be-identified PF-4 upgrades/life extension projects. Also during this time period, it is anticipated that the Plutonium Strategy will have been completed, and the CMR will have been decommissioned and excessed.



Weapons Engineering Tritium Facility (WETF)

C4: TRITIUM

This capability includes tritium related R&D, manufacturing, and storage.

TACTICAL PLANNING HORIZON (FY 2016-25)

At the Laboratory, WETF is the only facility under this core capability. Tritium R&D work is high-pressure gas operations in support of enduring nuclear weapons stockpile activities. Activities unique to WETF include R&D on tritium reservoirs, sample mining, reloading of aged R&D units, and testing. Tritium inventory reduction activities are continuing at WETF, and a number of small infrastructure projects are currently planned to support sustainable, predictable tritium operations.

STRATEGIC PLANNING HORIZON (FY 2026-40)

No significant changes are expected in the future for the tritium capability. Planning may be initiated on possible upgrades/life extension projects to support mission requirements.

C5: HIGH EXPLOSIVES

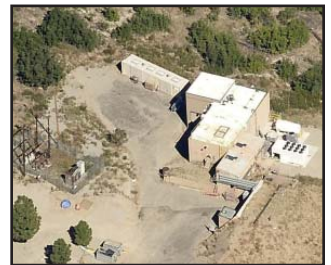
Laboratory facilities associated with this core NNSA capability provide high explosives production and process R&D, manufacturing, storage and disposition.

TACTICAL PLANNING HORIZON (FY 2016-25)

The majority of the HE facilities at the Laboratory support this capability, including some of the mission dependent firing sites, detonator production, environmental testing facilities, HE machining and pressing and some pulsed power facilities.

Major investments through CBI have occurred in the environmental testing facilities including a new electrical transformer at K-Site (TA-11). In FY 2015, work will begin on capability upgrades to another environmental testing facility at TA-16 and a new control room will be placed at K-Site.

FY 2016 will see a recapitalization project that will provide most of the HE facilities with multiple quality of life improvements including electrical power and fire protection system upgrades, renovated bathrooms, updated windows and doors, and new HVAC systems. New hoisting and rigging equipment, installation of fall protection, fire sprinkler replacements,



Environmental Testing Facilities at TA-11 (K-Site)

and new lighting will also be included. Erosion control corrections on HE storage facilities (earth covered bunkers), storm/rain water management, some environmental re-grade and exposure assessments will also be performed.

STRATEGIC PLANNING HORIZON (FY 2026-40)

No significant changes are expected in the future for the HE missions, programs, and workload currently assigned to the Laboratory. Planning is ongoing for the 25-year timeframe to determine what facility reinvestments or new construction will be required to meet mission needs. Other likely projects may include reinvestments to update aging building infrastructure, replace equipment, and upgrade facility systems to ensure the continued support of programmatic missions.

C6: NON-NUCLEAR

The Laboratory’s non-nuclear component production and testing capability is comprised of a variety of activities, including some that are one-of-a-kind within the NSE.



Beryllium Technology Facility (BTF)

TACTICAL PLANNING HORIZON (FY 2016-25)

Beryllium Technology Facility (BTF): The BTF (03-0141) provides the only technical and classified capability within DOE for non-nuclear beryllium component fabrication and beryllium R&D. Operations at the BTF include alloy development, foundry operations, inspections, nondestructive testing, joining, machining, metallography, mechanical testing, and powder operations. The BTF recently completed the replacement of its facility management system to ensure all building systems continue proper operations and installed two new air cooled chillers.

Machine Shops: The two machine shops in TA-3 (03-0039 and 03-0102) provide special or unique parts in support of DP missions, including parts used for testing or replacement within the stockpile. Capabilities include fabrication of specialty components, fabrication using unique materials, and dimensional inspection of fabricated components. The shops are almost 60 years old and a replacement facility, the WMESF, is currently planned to house consolidated high precision machining operations.

Sigma: This facility (03-0066) supports a large, multidisciplinary technology base in materials fabrication science. This facility is used mainly for materials synthesis and processing, characterization, fabrication, joining, and coating of metallic and ceramic items. Sigma is currently contributing to the Laboratory’s advanced manufacturing program development, with a significant focus on casting and thermomechanical processing of materials and components for experimental test programs. It also has been used to demonstrate additive manufacturing techniques involving a wide range of materials and addressing a variety of material repair challenges, including directed-energy systems and powder bed systems. In addition to supporting advanced manufacturing development, capabilities provided by the Sigma facility will be required to support increased manufacturing production.



Machine Shops

STRATEGIC PLANNING HORIZON (FY 2026-40)

In the long term, the Sigma facility is a candidate for replacement due to its age and condition. Issues associated with water use in the building, cooling water redundancy and copper build-up in its tanks will need to be addressed. For the near term, however, it provides an important capability for radiological activities that are consistent with the facility and ongoing DP activities. Options for future replacement or redevelopment to house Sigma’s DP work continue to be considered.



Assembly Facilities

C7: WEAPONS ASSEMBLY/DISASSEMBLY

This capability includes the ability to assemble or disassemble weapons and components.

TACTICAL PLANNING HORIZON (FY 2016-25)

Assembly Facilities: TA-16 Buildings 410 and 411 are used to assemble various test devices, including full-scale assemblies and smaller materials characterization test assemblies. Work performed in these structures supports hydrodynamic tests, joint test assemblies, environ-

mental and safety tests, and R&D activities. These facilities are critical in supporting the various LEPS, and workload has tripled in the past three years. A number of recent investments have been completed to improve building systems performance and protect programmatic work from environmental damage. Additional work is planned in the short term to address electrical safety requirements, upgrades cranes and hoists, and improve security.

STRATEGIC PLANNING HORIZON (FY 2026-40)

The assembly facilities are currently anticipated to remain as an enduring capability to support ongoing and emerging missions. Facility upgrades will be required during this time period to replace facility systems nearing end-of-life cycle, such as heating and cooling, electrical, and fire protection.

C9: SPECIAL NUCLEAR MATERIAL ACCOUNTABILITY, STORAGE, PROTECTION, AND HANDLING

The Laboratory has been identified by NNSA as the nation's consolidated Center of Excellence for plutonium research, development, and manufacturing activities. One key element to performing this mission is the ability to store category (CAT)-I quantities of SNM. This requirement had been met for the last 30 years primarily by the CMR facility and PF-4 at TA-55. In 2001, the CMR facility was de-inventoried and reduced to a CAT-III facility, leaving PF-4 as the only facility within the NSE authorized to store and process significant amounts of SNM.



Plutonium Facility (PF-4)

TACTICAL PLANNING HORIZON (FY 2016-25)

PF-4: As programmatic activities associated with pit manufacturing, surveillance, plutonium (Pu)-238 heat sources, and non-proliferation programs are being consolidated to the PF-4 facility (55-0004), the capacity to meet needs for storage and processing of SNM is being challenged. Focused efforts aimed at processing and discarding materials no longer required for programmatic work, in conjunction with vault and laboratory reconfigurations, will help mitigate the escalating space problem for the next decade. The Accelerated Vault Workoff Project is increasing efforts to process, package, and ship excess material out of the PF-4 vault. Some material currently held on the floor is being migrated to the vault for safety and security reasons, and this migration has the potential to occupy some of the liberated vault space. In conjunction with the containerization of materials on the processing floor and seismic modifications to the facility structure, vault storage supports reductions in the facility material at risk. As a result of recent workoff activities, the main storage vault is presently about 80% full.

STRATEGIC PLANNING HORIZON (FY 2026-40)

With the cancellation of the CMRR-NF project, the Laboratory will lose planned additional vault and laboratory space anticipated to help manage SNM storage. No other new facilities are currently planned that can provide permanent storage options, so it will be necessary to closely manage material quantities within the PF-4 vault during this time period.

C11: COUNTERTERRORISM & COUNTER-PROLIFERATION

This capability provides the expertise regarding improvised nuclear devices, proliferate foreign and non-US stockpile weapon design, and assessment activities related to nuclear terrorism, CP and national render safe activities.

Activities support the NNSA Office of CT & CP (NA-80) and the Intelligence Community through intelligence analysis, intelligence related R&D, and intelligence operations. This capability develops and integrates solutions relevant to end-users working in tactical operations and solves critical and challenging technical intelligence and cyber problems.

TACTICAL PLANNING HORIZON (FY 2016-25)

Consolidation of activities into upgraded space will create an opportunity to dispose of facilities over 50 years old. Ongoing upgrades of building systems and working environments will provide more effective space. With the increasing need for modern sensitive compartmented information facility (SCIF) space, communication improvements, and HPC capabilities, a potential new facility in the TA-3 area, referred to as the NCP Building, is also being evaluated. The proposed facility would consolidate global security capabilities and address key gaps that were



Proposed Nuclear Counter Proliferation (NCP) Building

identified through a FY 2014 Red Team review of the NCP program. Internal Laboratory discussions regarding the needs and associated scope for this potential new facility have commenced.

STRATEGIC PLANNING HORIZON (FY 2026-40)

This capability will need continued maintenance and upgrades of systems, including modern communications, in the Nonproliferation & Internal Security (NISC) building and in other facilities.



Nonproliferation & Internal Security Center (NISC)

C14: NON PROLIFERATION

This capability provides the detection, removal, and reduction of dangerous proliferant materials, technologies, and threats and R&D efforts to enhance safeguards and verification.

The Laboratory’s program mainly supports NNSA’s Defense Nuclear Nonproliferation (NA-20), often with international partners. Sponsors also include the State Department (DoS), Department of Homeland Security (DHS)’s Domestic Nuclear Detection Office (DNDO), and the National Aeronautics and Space Administration (NASA). Activities at the Laboratory include:

- Verify treaties
- Detect, secure, and dispose of dangerous nuclear and radiological material, as well as develop technology and expertise to reduce the nuclear threat
- Provide technology development and supporting policy and decision making in the areas of space science, space-based nuclear detonation detection, and national security space missions
- Meet national needs to dispose of excess weapons-grade plutonium and repurpose plutonium stockpiles for peaceful and non-weapons purposes



Nonproliferation and National Security Center

TACTICAL PLANNING HORIZON (FY 2016-25)

Nonproliferation Training: In FY 2014, the Laboratory completed efforts to repurpose approximately 10k gsf of existing office and laboratory space to meet the needs of the International Atomic Energy Agency (IAEA) training. This new facility, the Nonproliferation and National Security Center, provides office space, laboratory, training, and meeting spaces that fulfill specialized in-house training and hosting requirements. It also consolidates nonproliferation functions and replaces aging facilities that are now available for disposition.

Space Systems: This program provides science-based space solutions, engages the national debate on space issues with sound technical input, and diversifies the space-systems product line to enable a broader national security impact. The program currently occupies

space in the cold war era Physics building, which is targeted for replacement. Maintenance and upgrades of current facilities will continue until replacement space is available.

Nuclear Material Security and Minimization: This effort focuses on the utilization of the consolidated Center of Excellence for plutonium research, development, and manufacturing for non-weapons activities. Near term efforts are focused on two areas: (1) providing the process and manufacturing development expertise to prototype weapons-grade plutonium disposition needs, including the manufacture of mixed oxide fuel, and (2) continuing to produce heat sources for national missions including the space program. These efforts, in addition to supporting national non-proliferation activities, diversify activities performed at TA-55 and provide additional funding sources to maintain critical capabilities and infrastructure. Future facility adjustments and operation modifications may be necessary to meet potential expanded or accelerated manufacturing requirements.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Early in the next decade, a new non-proliferation radiological laboratory, training, and office building capable of handling CAT-III/IV SNM will be needed to replace obsolete Cold War Era radiological laboratory buildings at TA-35. During this time period, a Space Systems Instrumentation LI building will also be necessary to replace many of the activities currently conducted in the Physics building. This new facility will increase the capacity for R&D, design, fabrication, calibration, and testing of space instrumentation.



Proposed Space Systems Instrumentation Building

C16: EMERGENCY RESPONSE

This capability enables the response to nuclear and radiological emergencies through radiological search, render safe, and consequence management.

Activities support the DOE Emergency Operations (NA-40) program providing personnel, equipment, training, facilities, and communication to respond to worldwide nuclear and radiological events at all times. This program is one of the DoD's special operations community's preferred provider for rapid response CT applications in the areas of tagging, tracking, and locating; reconnaissance and surveillance; command, control, and communication; energetic materials; and a significant contributor to the NNSA-laboratory nuclear CP team.

TACTICAL PLANNING HORIZON (FY 2016-25)

This growing capability needs new modernized space for planning, training, practice, and response. Meeting rooms, SCIF space, and flexible training areas can be provided in a proposed NCP facility (see C11: Counterterrorism and Counterproliferation). Ongoing efforts during this planning horizon include minor facility modifications within existing facilities (i.e., 03-2322, and 03-0132) for space optimization. Firing site activities will also require additional facility space to support a mix of energetic materials activities.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Changing technologies in emergency response will continue throughout this horizon as new threats emerge. Facilities to accommodate these response capabilities will need continued maintenance and upgrades.

C17: STRATEGIC PARTNERSHIP PROJECTS

This core capability provides work for other federal agencies and non-federal entities.

Feynman Center for Innovation: The Laboratory's Feynman Center (00-1325) was formed to support work for others. Activities include market transition, strategic sponsored work, and innovation assets. This center ensures technology is available to benefit the public and private sectors and that intellectual property is protected. The Laboratory partners with industry, federal agencies, and universities to solve problems related to the national security science mission. Federal agencies sponsoring work include the following:

- Department of Defense
- Department of Homeland Security
- Department of Health and Human Services
- Department of State
- National Aeronautics and Space Administration
- National Science Foundation



Feynman Center for Innovation

TACTICAL PLANNING HORIZON (FY 2016-25)

This Center is currently located in the Los Alamos town-site in leased space; however the scientific capabilities are at various locations around the Laboratory site. Many of the scientific capabilities are in Cold War era buildings that have reached the end of their service life and need to be replaced.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Modern laboratories, including biology, chemistry, and physics, will be needed to replace aging obsolete structures in support of these capabilities for their national security science mission.

DOE OFFICE OF ENVIRONMENTAL MANAGEMENT CAPABILITIES

DOE EM funds the legacy environmental cleanup work scope at the Laboratory, and EM is establishing an office in Los Alamos to provide direction to EM-funded capabilities. These capabilities include disposition of legacy TRU and LLW, D&D of process-contaminated facilities at TA-21 and TA-54, and soil and water remediation to clean up legacy contamination. The EM work scope is expected to transition to an EM-funded contractor over the next 18-24 months, but capabilities to manage newly generated TRU waste will continue at the Laboratory under NNSA funding.

EM04: DISPOSE OF TRANSURANIC/LOW-LEVEL WASTES

The Laboratory maintains the capability to store, remediate, and load TRU waste for transport off the Laboratory site, as well as capability to characterize and dispose TRU wastes off-site that are reclassified to low-level and mixed low-level wastes during processing. The Laboratory provides support to the Central Characterization Program (CCP) for characterization and certification of the Laboratory's TRU wastes to WIPP waste acceptance criteria. Approximately 70% by volume of the total remaining legacy TRU waste inventory is stored below ground at TA-54 Area G, and a capability has been developed to retrieve the corrugated metal pipes category of TRU waste that makes up approximately 20% of the volume of the legacy TRU waste stored below ground. It is expected that much of the legacy TRU waste stored below ground will be reclassified to low-level or mixed low-level wastes during processing and these wastes will be dispositioned at sites other than WIPP.

TACTICAL PLANNING HORIZON (FY 2016-25)

The Laboratory facilities used to manage legacy TRU waste consist of TA-54 Area G, the Waste Characterization, Reduction, and Repackaging (WCRR) Facility (50-0069), and the RANT Facility (also see C2: Plutonium). The Laboratory maintains the nuclear safety basis to manage all three of these facilities as Hazard CAT-2 nuclear facilities, and all three of the facilities have container storage units that are permitted under the Laboratory's Hazardous Waste Facility Permit issued by NMED. These facilities are all managed, operated, and maintained by an assigned Facility Operations Director (FOD). This includes routine inspections and facility condition assessments to ensure compliance with life safety systems, nuclear safety Technical Safety Requirements (TSR), and environmental permits. Current plans for these facilities are as follows:



TA-54 Area G

TA-54 Area G: These structures include nine large fabric-covered tension-support domes, a pad that contains multiple characterization units operated by the CCP, and several units for repackaging or remediation of TRU waste containers. Near-term plans include replacement of the fabric covers on several of the domes, upgrades to fire detection systems in several domes, and development of capabilities to sample and remediate TRU waste containers that contain nitrate salt wastes. Plans have been developed for installation of a diamond-cutting tool that will be required for some items of oversize legacy waste and items of newly-generated TRU waste such as gloveboxes and containment spheres. This capability will be required before processing of the corrugated metal pipes

category of legacy TRU waste stored below ground. Area G will be closed after legacy TRU waste (both above and below ground) is dispositioned.

Waste Characterization, Reduction, and Repackaging Facility: The WCRR Facility (50-0069) contains a glovebox used to repack drums of TRU waste and has the capability to handle drums with high activity. Recent upgrades include replacement of the drum lift for the glovebox and the WCRR roof. Additional small upgrades may be identified as the remediation plan for previously remediated nitrate salt waste is developed. The current plan is to close the WCRR Facility after processing of legacy TRU waste is completed, but EM is evaluating moving the WCRR glovebox operations to one of the Area G remediation facilities and closing WCRR before completion of legacy TRU waste disposition.



Waste Characterization, Reduction, and Repackaging (WCRR) Facility

Removal of all legacy TRU waste from Area G is expected during the Tactical Planning Horizon but there is considerable uncertainty on the priority of legacy TRU waste processing and when shipments of TRU waste from the Laboratory to WIPP will resume.

STRATEGIC PLANNING HORIZON (FY 2026-40)

The TRU Waste Facility that is currently under construction at TA-63 will provide a capability to store, characterize, and certify newly generated TRU waste that will replace similar capabilities at Area G. The RANT Facility or a replacement facility will continue to provide the capability to assemble TRU waste payloads and load TRU waste into Transuranic Package Transporter (TRUPACT) casks for transport to WIPP.

The capability at Area G to size reduce or remediate oversize items of TRU waste that are too large to fit into WIPP-approved containers such as the standard waste box will not be replaced at the TRU Waste Facility. Implementation of a capability to load standard large box 2 (SLB2) containers at the RANT Facility would provide a capability for disposition of some of the oversize containers. A program for in-situ decontamination and surface-contaminated object characterization has been implemented at TA-55, and it is expected that many items that previously would have been classified as oversize TRU may be successfully classified and dispositioned as low-level waste. Experience with additional decontamination techniques used at Area G should also be evaluated for use at TA-55. If oversize TRU waste items that will not fit into an SLB2 cannot be decontaminated, then reinvestment to install a size reduction capability in a facility may be required after Area G is closed (also see C2: Plutonium).

EM05: DECONTAMINATE AND DECOMMISSION FACILITIES

The Laboratory maintains capability to decontaminate and decommission both contaminated and non-contaminated facilities. Almost all of the process-contaminated plutonium and tritium facilities at TA-21 were removed in 2010-2011 as part of the American Recovery and Reinvestment Act (ARRA) D&D project, and the two TA-21 water towers were demolished under a federal contract during 2014. Building 21-0257 and associated waste lines, slabs and basements/sumps from plutonium facilities, and some uncontaminated structures remain. At TA-54 over 100 structures and active facilities must be removed before implementation of corrective measures at historical waste disposal areas that underlie most of the active facilities at Area G. Many of the structures are subject to the Laboratory's Hazardous Waste Facility Permit and demolition must be closely coordinated with closure under the Permit. EM is responsible for D&D of facilities at TA-21 and TA-54.



Disposition of TA-21 Water Tower

TACTICAL PLANNING HORIZON (FY 2016-25)

The D&D of remaining structures at TA-21 will continue at a rate based on priorities negotiated with the NMED. The D&D of some structures at TA-54 Area L may also be conducted based on priorities. The D&D of structures at TA-54 Area G is expected to be conducted in phases, with D&D of the last structures at Area G completed after legacy TRU waste stored above and below ground at Area G has been processed and dispositioned. This could be completed before FY 2023, but the schedule is uncertain both because of the date for resumption of shipments to WIPP and priority for legacy TRU waste disposition.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Some D&D of structures at TA-54 Area G may extend into the early years of the Strategic Planning Horizon.

EM06: SOIL AND GROUNDWATER REMEDIATION

The Laboratory maintains capability to investigate and clean-up sites previously used for historical Laboratory operations. These capabilities include:

- Groundwater protection and monitoring
- Surface water protection and monitoring
- Soil investigation and remediation
- Material disposal area (MDA) investigation and remediation

TACTICAL PLANNING HORIZON (FY 2016-25)

Investigations of canyons, MDAs, and watershed aggregate areas are performed in accordance with all regulatory requirements. Following completion of each investigation, the need for remediation activities is determined based on risk to human health and the environment, and current and foreseeable land use. Final approval of the remedy for

cleanup is made by the NMED. Soil and water remediation scope will include the installation of additional groundwater monitoring wells, aquifer testing to assess remedies for chromium and high explosives contamination in groundwater, and interim measures (such as soil-vapor extraction at select MDAs).

STRATEGIC PLANNING HORIZON (FY 2026-40)

The end state for the EM funded work scope at the Laboratory includes:

- Removing all contaminated soils necessary to mitigate health and ecological risks and meet goals for current and future land use designations
- Completing and ensuring operational readiness of all final remedies, including vadose zone and groundwater monitoring of stabilized MDAs, installation of monitoring systems, and ensuring necessary institutional controls are in place
- Ensuring all necessary documentation is submitted to the regulator, and regulatory approval is obtained for all short- and long-term response actions
- Obtaining certificates of completions from the regulator and obtaining a modification of the Laboratory's Hazardous Waste Facility Permit indicating all sites subject to investigation and cleanup have achieved corrective action complete status

The responsibility for long-term stewardship of cleanup activities is expected to be transitioned from EM to NNSA after the EM scope of work has been completed and a formal agreement reached.

DOE OFFICE OF SCIENCE CAPABILITIES

Through the DOE Office of Science (SC), Los Alamos conducts long-term, national-security-inspired, fundamental science. These often high-risk and high-payoff efforts enable remarkable discoveries and tools that transform our understanding of energy and matter and advance the national, economic, and energy security of the U.S. R&D efforts at Los Alamos support multiple SC capabilities, including Condensed Matter Physics and Material Science, Biological System Science, and Applied Nuclear Science and Technology.

SC05: CONDENSED MATTER PHYSICS AND MATERIAL SCIENCE

Materials research efforts at the Laboratory are transitioning from observing and exploiting the properties of materials to a science-based capability that creates materials with properties optimized for specific functions. As such, the condensed matter community is uniquely positioned to elucidate the underlying design principles that can ultimately drive required materials properties. Current condensed matter efforts couple to energy security issues through high-temperature superconductor vortex physics R&D, correlated electron and multiferroic materials discovery, and nanowire research that focused on energy-harvesting applications. Weapons-related condensed matter R&D focuses on actinide and particularly TRU materials while metamaterials R&D shows promise for important applications that are relevant to the Laboratory's Global Security mission. Condensed matter research strongly benefits from three institutional user facilities: Center for Integrated Nanotechnologies (CINT), the National High Magnetic Field Laboratory (NHMFL), and the Lujan Center. Condensed matter physics also couples to MaRIE program interests through optical spectroscopies probes of mesoscale phenomena.

TACTICAL PLANNING HORIZON (FY 2016-25)

Center for Integrated Nanotechnologies: The CINT Gateway facility (03-1420) is a relatively new building that is beginning to show signs of aging including a leaking roof, HVAC problems, and other facility issues. A major problem for CINT is the physical separation of its spectroscopy capabilities at TA-35 and the Gateway Facility at TA-3. Another major concern for CINT and other materials science and device groups is the lack of nano to micro fabrication ('clean room') facilities at the Laboratory. Construction of a GPP light laboratory, office building, and flexible fabrication light laboratory building in the TA-3 area would support CINT users while enabling the disposition of older structures at TA-35.



Center for Integrated Nanotechnologies (CINT) Facility



National High Magnetic Field Laboratory (NHMFL) Facilities

National High Magnetic Field Laboratory: The NHMFL is a complex of seven buildings located at TA-35 that provides about 60,000 gsf of heavy, medium and light lab space as well as office space for staff. This includes a 1430 Megawatt (MW) generator system, recently refurbished cooling tower system, approximately 25,000 gsf of high-bay space, and four large capacitor banks. The generator system is at the heart of the facility's unique capabilities in magnet science and experimental condensed matter physics experiments in extremes of high magnetic fields. Capable of safely delivering about 600 megajoules (MJ) of energy in a single pulse to an electrical load, the generator is frequently used (between 300-500 times/year) to power state-of-the-art pulsed magnets for the NHMFL user program. Future direction of the NHMFL will include larger magnets which will dramatically increase energy demands. Water treatment systems should also be upgraded and tied into the Laboratory's main wastewater treatment line. Additionally, accessibility issues associated with the Laboratory's "nuclear corridor" should be addressed to mitigate negative impacts on the program. Any relocation of programmatic work would need to remain as close to the generator facility at TA-35 as possible to reduce power transmission line complexity and power conversion requirements.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Buildings 32 and 34: TA-3 buildings 32 and 34 house laboratories, offices, and a machine shop in support of a variety of condensed matter science capabilities. Ground floor labs house cryogenic, NMR, dilution refrigerator, angle-resolved photoemission, magnetic susceptibility, materials characterization, and sample growth capabilities. Building 32 and 34 operations make heavy use of liquid helium as part of low-temperature materials characterization measurements. While the lab space present in both buildings is heavily utilized, conducting experimental operations in either building does present challenges given that both structures were constructed in the mid-1950s. A new experimental complex for condensed matter science should be considered as a priority for next decade.

SC08: BIOLOGICAL SYSTEM SCIENCE

Basic and applied research capabilities in biological sciences at the Laboratory support national biosecurity, biothreat reduction, energy security and environmental biology. The programs and mission spaces are diverse and wide ranging from theoretical biology, genome sciences, detector development, neurosciences, algal biology for renewable energy applications, structural biology to host pathogen sciences. Biological Science currently maintains facilities with Biosafety Level (BSL) ranging from 1 to 2 select agent capabilities in aging infrastructure with immediate tactical replacement need.



Biological Sciences Laboratory (BSL)

TACTICAL PLANNING HORIZON (FY 2016-25)

Biological Sciences Laboratory: The Laboratory’s BSL facility (03-1076) will provide foundational capability for biosecurity R&D, extending the scope of laboratory work to pathogens of significant national security concern. As of February 2015, the BSL-3 has been awaiting final approval at NNSA. The authorization to commence release of the EIS is imminent and will allow for the issuing of a ROD for the facility. The ROD will determine if the facility will be operated up to BSL-3 level or lower levels, and startup would begin in accordance with the ROD.

Health Research Laboratory: The HRL (43-0001) is being considered for closure during the tactical planning horizon. Various options are currently being explored to relocate capabilities (that allow for “open access” collaborative research) to existing buildings at the Los Alamos Research Park (LARP) and at the New Mexico Consortium. National Security programs with BSL-2 needs are awaiting infrastructure reinvestment construction projects or a prefabricated engineered facility within TA-3.



Health Research Laboratory (HRL)

STRATEGIC PLANNING HORIZON (FY 2026-40)

Long term plans for the biological sciences capability at the Laboratory include a shared campus model with collocation of theoretical sciences, chemistry, and material physics within the TA-3 area to leverage proximity to the existing BSL-3 and NMR spectroscopy building.

SC13: APPLIED NUCLEAR SCIENCE AND TECHNOLOGY

The applied nuclear science programs and technology at the Laboratory aim to address the Laboratory’s DP missions and perform applied civilian and basic nuclear science research.



Isotope Production Facility (IPF)

TACTICAL PLANNING HORIZON (FY 2016-25)

Isotope Production Facility (IPF): This facility (53-0984) is part of the DOE Isotope Program within SC, Nuclear Physics, and serves the nation by providing radionuclides, know-how, and data that meet the most important existing, emerging, and future needs for accelerator-produced radioisotopes used for medical therapy and diagnostics, national security, and nuclear physics applications. With completion of the LINAC-RM, this facility will have increased reliability to fulfill its role as the major domestic supplier of critical medical isotopes for the nation well into the future. The IPF will continue to be a site for the collection of nuclear data, and to develop isotopes for R&D and future applications,

including investigations into the development of isotopes for cancer therapy. Proposed upgrades to the beam transport system in the next several years will enhance beam diagnostics, improve beam energy monitoring, and allow active beam collimation leading to increased reliability and enhanced isotope yields.

STRATEGIC PLANNING HORIZON (FY 2026-40)

The long-term future in this area will be tied to the development and operation of the MaRIE facility (also see C1.2: Experiments).

ENABLING INFRASTRUCTURE

In FY 2010, the Laboratory Director initiated an institutional program to reinvest in the Laboratory's aging facilities and infrastructure (F&I). The strategy of this program remains to identify F&I most essential to Laboratory missions, determine capability gaps (existing and future), and structure a consolidated plan of targeted investment and recapitalization to address the existing gaps and mitigate predicted future gaps in capability. This multi-year program includes prioritized investments in refurbishment and repurposing of existing facilities, consolidation of like work scope into common facilities' centralization of related scope functions, vacating and removal of poor facilities, replacement of end-of-life cycle facilities, new construction as appropriate, disposition of excess facilities, and modernization of facilities and utilities (Figure 4). Although funding for this institutional reinvestment plan is adjusted annually based on resource availability, significant progress has been made over this period to improve facility and utility availability / reliability while reducing DM. The prioritized list of F&I projects continue to ensure that investment of available dollars go to areas with the highest infrastructure need. For FY 2015, the Director has determined that approximately \$19.7M will be reinvested through this program.

The Laboratory's SSP establishes goals in alignment with the DOE's Strategic Sustainability Performance Plan to reduce energy intensity, GHG emissions, water consumption and waste. These goals are executed in collaboration with the Laboratory International Organization for Standardization (ISO) 14001 Environmental Management System (EMS). The SSP was funded by the Director and is investing in the operation of Sanitary Effluent Reclamation Facility (SERF) to achieve its water reductions. The Laboratory is investing in a number of projects, including BAS upgrades to implement night setback scheduling, lighting retrofits, HVAC re-commissioning, and the associated footprint reduction efforts to contribute toward the energy and water goals and to achieve GHG reduction. The Laboratory will purchase Renewable Energy Credits (REC) and continue to pursue and implement lower carbon electricity resources and energy reduction projects to reduce GHG emissions to meet DOE's FY 2020 GHG emissions reduction goal of 20 percent.

TACTICAL PLANNING HORIZON (FY 2016-25)

Highlights from this institutional program include: recapitalization of major plant and equipment and other targeted facility life extension projects in high capability facilities [such as the Sigma (03-0066) and Radiochemistry Laboratory (48-0001) buildings], removing excess temporary buildings, upgrades to aging utility systems and roads /parking lot improvements.



Laboratory Upgrades to 59-0001

Refurbishment: Completed projects include laboratory upgrades at 59-0001, MSL laboratory (03-1698) conversions, repurpose of 66-0001, and the TA-8 Water line Replacement. F&I refurbishments during the ten year time frame include limited life extension for fire stations 1 & 5 (03-0041 & 16-0180), recapitalization of major systems in 10 facilities per year (with a focus on fire protection, HVAC systems, and electrical equipment), interior improvements for office facilities, and roof replacements. Refurbishment of utility systems and equipment such as electrical transmission and distribution, water tanks, steam systems, gas distribution infrastructure, roads, parking lots and the Los Alamos Canyon (Omega) Bridge are also planned.

Replacement/New Construction: Planned replacement facilities within the next ten years should include radiochemistry, chemistry, bioscience, and physics labs; and proposed replacements for the Receiving & Distribution Center (03-0030), the Crafts/Shops facility (03-0038), and Fire Stations #1 (03-0041) and #5 (16-0180). Examples of new construction projects that are being considered or planned include light chemistry and biological laboratories as well as open and secure office buildings.

Disposition: The planned elimination of obsolete facilities is a key element in the accomplishment of several complementary infrastructure, sustainability and business goals, including DM reduction, energy intensity reduction, GHG reduction, workspace environment improvement, targeted maintenance investment in enduring facilities, and reduced risk associated with aged structures. The institutional footprint reduction program is currently targeting \$5M annually for excess and disposition of temporary facilities. Although this budget is insufficient for disposition of large permanent facilities, it allows for the excess of permanent structures in the near term. The Laboratory is continuing to seek other funding sources for disposition of currently excessed permanent facilities.



Disposition of Temporary Structure



V-Site is Included in Legislation for the Manhattan Project National Historic Park

Historical Properties: Associated with World War II and the Cold War, thirty-five historic buildings and structures at the Laboratory are candidates for long-term retention and will be managed in compliance with the National Historic Preservation Act. Seventeen properties supporting the wartime Manhattan Project are included in legislation authorizing the Manhattan Project National Historical Park, which was signed by President Obama on December 19, 2014. The park will be established by December 2015 and will include DOE-owned properties and properties owned by local governments and private individuals at Oak Ridge, Tennessee; Hanford, Washington; and Los Alamos, New Mexico. An MOU will be developed between the Secretary of the Interior and the Secretary of Energy (acting through the Oak Ridge, Los Alamos, and Richland Field Offices) regarding the administration of facilities under the jurisdiction of the DOE, including provisions for

enhanced public access, management, interpretation, and historic preservation. The Laboratory is preparing a plan for scheduled public access to key historical buildings located within limited access areas. Pre-scheduled escorted bus tours, perimeter security fence modifications that create private vehicle peninsulas, Americans with Disabilities Act compliant access, and comfort stations are a few of the infrastructures issues that will need to be addressed.

Modernization of Utilities: Within the next ten years, utility investments will primarily be balanced among assets needed to meet the Laboratory’s expanded supercomputing mission, refurbish aging infrastructure, improve energy efficiency, and increase the mix of renewable energy generation.

Major efforts by system are listed below:

Natural Gas — Upgrades and replacements in the system are planned in accordance with the Laboratory’s Distribution Integrity Management Plan (DIMP), beginning with TA-3, -16, and -55 to -46. A high pressure gas line extension to the existing combustion turbine is under consideration to enable “black start” capability for the generating unit and reduce the net cost of generation.

Water — Reduction of potable water consumption is planned to be from operation of the SERF Facility. Continuation of reliability is dependent upon completion of major water tank refurbishment projects and initiation of replacements of water mains based on condition assessments beginning at TA-3.

Electric — Upgrade of the Laboratory’s transmission import capability is planned within the next ten years to support increased electric consumption on site for the supercomputing and LANSCE missions. Re-conductoring the Norton transmission line will increase the Laboratory’s import capability to 135 Megavolt Ampere (MVA). Public Service Company of New Mexico (PNM) Resources, Inc. will need to re-conductor their section of the Norton transmission line. An alternative to re-conductoring the Norton line is to construct a replacement line from the Norton substation in Santa Fe to the Laboratory’s Southern Technical Area (STA) substation. PNM may also need to re-conductor the Reeves transmission line to Los Alamos to raise the import capability above 135 MVA if needed.

The TA-3 Substation Replacement Project is a LI that will replace the TA-3 substation and expand electrical distribution systems to provide capacity and for electrical load demands at TA-3 and adjacent TA’s such as TA-55. Key mission critical facilities, such as the Metropolis Center and PF-4, are located in these TA’s. Transmission and distribution upgrade projects are planned to bring reliable service to and around the site. Other electric utility projects include upgrading the controls for the Static VAR Compensator and the Combustion Gas Turbine Generator (CGTG) and replacement of 15 kilovolt (kV) switchgear at TA-55. Additional photovoltaic power generation at the former TA-61 landfill is being considered, but will likely be solicited by LAC through a power purchase agreement rather than NNSA direct investment. CD-1 was attained for the TA-3 substation replacement project and CD-2/3 is being developed in anticipation of capital funding in FY 2016.



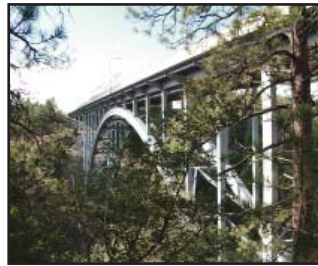
Photovoltaics at TA-61 (landfill)

Wastewater — The SERF plant expansion is expected to satisfy the increased cooling demand of increasing computing loads by using recycled sanitary plant effluent for the next 3-5 years, thereby reducing potable water consumption and ensure compliance with the National Pollutant Discharge Elimination System (NPDES) permit. To assure high levels of reliability, a site-wide refurbishment of deteriorating lift stations, manholes, and piping will be initiated, along with upgrades to the Sanitary Waste Water System (SWWS) plant at TA-46.

Steam, Cogeneration Plant, and Combustion Gas Turbine Generator — Long-term reliability of the TA-3 heating system and the ability to achieve sustainability targets is dependent upon the replacement of the TA-3 Steam Plant. This facility is over 60 years old and has increasing large scale maintenance projects, failing steam turbines and a failing electrical generation system. The Laboratory has completed preliminary engineering and economic feasibility studies that support an Energy Savings Performance Contract (ESPC) to replace the Steam Plant with either a high-efficiency, combined cycle heat and power system or installation of distributed heating boilers. A scope of work and execution approach has been developed, and Energy Service Company (ESCO) firms are being asked for their expression of interest in the project. The Laboratory is supporting the



Steam Plant at TA-3



Los Alamos Canyon Bridge

Roads — Primary and secondary road upgrades are planned in the next ten years using a condition assessment and project planning tool. A LI proposal for the Los Alamos Canyon Bridge Refurbishment project was submitted for a suite of corrective maintenance totaling over \$20M. The bridge is inspected annually by a certified Federal Highway Administration (FHWA) inspector. Maintenance activities are planned based on the annual inspection reports. For FY 2015 and beyond, the Laboratory's current inspection-based reinvestment plan identifies projects in the order of risk-based priority.

STRATEGIC PLANNING HORIZON (FY 2026-40)

Modernization of Utilities:

Natural Gas, Water, and Wastewater — Continuation of the lab-wide replacements for water, gas, and wastewater buried piping and other major equipment will occur in the 11-25 year time frame. Upgrades or replacements of systems for LI, such as MaRIE will be evaluated.

Electric — Electric utility planning will continue to define the projects to build distribution substation ties, upgrade substations including transformers, and provide infrastructure to support future growth, mainly in the HPC, LANSCE, and TA-55 mission areas

Wastewater — The SERF plant and delivery system will be evaluated to ensure that it has the capacity and reliability for cooling needs for the Metropolis Center as the HPC increases computing capacity into the 2020s.

Steam, Cogeneration Plant, and CGTG — Continuation of the Cogen and heating system replacements will extend into the Strategic window.

Roads — The Los Alamos Canyon Bridge will continue to receive life-extension refurbishments in the 11-25 year time frame. In the strategic time frame, widening of East Jemez Road (truck route) for safety purposes is planned. New roads, parking lots, and pedestrian safety routes will be completed in alignment with new facility projects. A by-pass road is anticipated and in the early stage of design to address access around the Laboratory should the security posture change.

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6.0 REAL PROPERTY ASSET MANAGEMENT

SITE FOOTPRINT

CURRENT

The Laboratory currently manages approximately 40 square miles of land for DOE in support of R&D activities. Under Public Law 105-119, approximately 2,980 acres have been conveyed or transferred since 2002 to LAC; LACSD; and DOI-BIA in trust on behalf of the Pueblo de San Ildefonso Indian Reservation. Additionally, DOE leases approximately 100 acres at the site to other parties, supporting scientific research and community needs.

The Laboratory's building footprint at the beginning of FY 2015 was approximately 8.6M gsf with a total of 981 buildings. The total includes 792 (7,957k gsf) permanent facilities, 146 (238k gsf) trailers and transportable buildings, and 43 (435k gsf) leased facilities. The Laboratory footprint has trended downward in recent years through ongoing disposition efforts funded by several programs. From FY 2013 to FY 2014 the total square footage was reduced by about 1% (60k gsf). Approximately 36% of the remaining permanent structures are more than 50 years old and 84% of the remaining trailers/transportable are over 20 years old. Consequently, continued balance between new construction, recapitalization, and disposition investment is necessary to achieve an appropriately sized, energy efficient, sustainable footprint consistent with mission requirements.

FY 2014 represented the thirteenth year of the congressional one-for-one footprint reduction mandate. During this time period, the Laboratory eliminated over 1.5M gsf while adding approximately 0.7M gsf. The delta was "banked" in accordance with DOE/NNSA requirements. This level of success provides the basis for continued removal of additional shutdown/excessed structures no longer required for mission work over the next ten years.

FUTURE

Approximately 1,330 acres of land remain to be conveyed to LAC before FY 2023. The DOE leases of approximately 100 acres are expected to continue for the next ten years.

Ongoing disposition work in FY 2015 is anticipated to remove over 45k gsf. During the FY 2016-26 timeframe, the Laboratory anticipates removal of over 900k gsf with three funding sources: EM, NNSA, and Institutional funding. The NA-50 Recapitalization Program is anticipated to be a key funding source for addressing disposition at the Laboratory for a significant number of currently shutdown/excessed facilities as well as other structures anticipated for shutdown in the coming years.

An implication equally important to square footage removal is the ongoing minimization of activities and removal of most structures at six TAs -18, -21, -41, -43, -46, and -54. Elimination of most existing trailers and transportable buildings across the institution is also a goal during this timeframe. Eliminating obsolete facilities over the next ten years will continue to be a basic business strategy that accomplishes even more than reducing operating costs and surveillance and maintenance (S&M) costs. It also:

- Minimizes risk associated with deteriorating facilities
- Contributes to all site and national goals associated with reductions in water and energy use, GHG and carbon footprint reduction, as well as the avoidance of DM
- Addresses waste disposal as soon as possible, thereby avoiding the continued escalation costs associated with removal
- Creates available land for future programmatic activities
- Improves the site as a whole benefiting retention/recruitment of scientific staff

For an enduring site such as Los Alamos, removal of obsolete structures as soon as possible following completion of the shutdown/excessing processes is the best approach for reducing cost, minimizing risk, and maximizing program opportunities. Over time, all enduring sites will have structures that reach the end of their viable lifetimes and need to be removed. A national program to quickly address the elimination of obsolete structures before a significant backlog is realized would provide a practical and efficient infrastructure means to address this issue.

The out-years will provide continued challenges for replacement and removal of major structures that will have been in service for over 70 years. The highest profile project will be the removal of the CMR facility. This nuclear facility was constructed in 1953 and consists of approximately 570k gsf within the most populated TA of the Laboratory. The formal shutdown of this facility is anticipated within the next decade. A number of other major non-nuclear research facilities will be in a similar situation, requiring investment for life extension, replacement, and eventual removal. These facilities, constructed in the early 1950s, include the Crafts/Shops facility (115k gsf, constructed in 1952) and the Tech Shop

(154k gsf, constructed in 1954). Institutional multi-program facilities, such as the Physics building (187k gsf, constructed in 1953) and the Receiving & Distribution Center (115k gsf, constructed in 1952) present numerous challenges that are driving replacement strategies as early as possible within the twenty-five year timeframe. In total, these five structures amount to more than 1.1M gsf.

LEASE ARRANGEMENTS

The current level of leased space is viewed as a practical, flexible, and cost effective approach for accommodating approximately 1,200 staff consistent with mission requirements at the Laboratory. Current leased property assets are primarily office-type facilities, and with Laboratory staffing trending downward, leased property holdings have tracked with this trend. A 20% reduction in staff housed in leased assets (from 2010 to 2015) has driven a reduced number of leased contracts and square footage necessary to support Laboratory missions. This trend is anticipated to continue for leased office facilities for the next several years. However, the Laboratory is currently considering lease space options for securing flexible swing space for researchers during refurbishment projects that affect their laboratory space. Recognizing that each lease has specific attributes, cost, and term, the associated effectiveness in meeting functional requirements is continually verified for contract conformance followed by the opportunity to conclude or renegotiate the lease when appropriate. All contractor leases are managed by the Laboratory and are included in the Facilities Information Management System (FIMS) database (Figure 4).

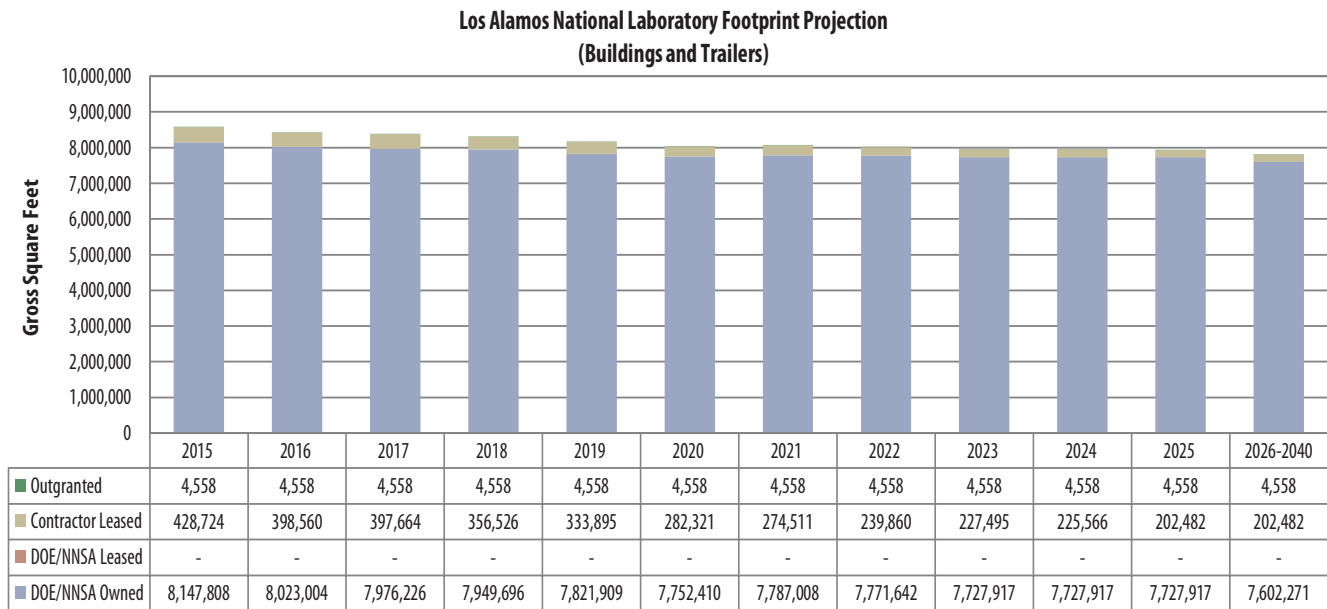


Figure 4: Los Alamos National Laboratory Footprint Projection (Buildings and Trailers)⁶ per November 2014 IDAC Submittal

FREEZE THE FOOTPRINT

Presidential Executive Order 13589, Promoting Efficient Spending, was issued in November 2011 and initiated the Office of Management and Budget’s Freeze the Footprint (FTF) initiative, restricting the growth in office and warehouse inventory. This FTF requirement is consistent with the infrastructure business strategies at the Laboratory. The Laboratory’s baseline was confirmed at 2,583,191 gsf for office and warehouse space. The Laboratory has reduced non-enduring warehouse and office space by 2% of the FY 2012 baseline office and plans to reduce it 12% by FY 2018. Much of this change is due to the Consent Order requirements, with enduring TA-54 solid waste management activities relocating to the new TRU Waste Facility, along with the continued reduction of non-enduring facilities. The anticipated removal of these types of structures over the next three years will contribute to this initiative, as well as the previously established Congressional One-for-One mandate (House Report 107-258), balancing new construction with elimination of excess space. The Laboratory’s Net Banked totals for FY 2014 include 692,990 gsf for NNSA, 18,077 gsf for EM, and 0 gsf for SC.

6. Includes all planned disposition, but not all replacements

FACILITY CONDITION

The current condition of MC facilities is “Good” with a facility condition index (FCI) of 4.1% (Figure 5). The condition of MC facilities has decreased slightly due to a small increase in the amount of DM (Figure 6). MC FCI is predicted to decrease gradually through the tactical planning horizon of this TYSP, with planned DM buy-down activities and recapitalization projects predicted to keep MC facilities rated “Good”.

The current FCI for MD facilities is 5.5%, which has improved due to continued targeted investments. The FCI for MD facilities is predicted to slightly improve in future years due consolidation of facilities and elimination of obsolete structures.

The condition of not mission dependent (NMD) facilities is “Adequate” with an FCI of 9.6%. This improvement is primarily due to reinvestment in targeted facilities and removal of excess deteriorating buildings thereby avoiding DM.

Planned consolidation of activities, targeted reinvestment, and footprint reduction efforts will continue to improve DM in operating facilities while redirecting funds to enduring real property assets. However, these efforts will need to be accelerated to out-pace aging and degradation of the facilities.

Replacement Plant Value (RPV) ⁵		\$14,026			Million	
Total Deferred Maintenance (DM) ⁶		\$936			Million	
Site Wide Facility Condition Index (FCI) ⁷		6.8%				
		Facility Condition Index (FCI) ⁷	Asset Condition Index (ACI) ⁷	Asset Utilization Index (AUI) ⁸	# of Assets ⁹	Gross Square Feet (GSF) Buildings & Trailers (000s) ⁵
Mission Dependency	Mission Critical	4.1%	95.9%	90.8%	32	2,266
	Mission Dependent	5.5%	94.5%	97.1%	298	1,429
	Not Mission Dependent	9.6%	90.4%	86.4%	651	4,934
Facility Use	Office	6.6%	93.4%	92.2%	221	2,224
	Laboratory	7.8%	92.2%	88.6%	187	2,761
	Warehouse	7.9%	92.1%	89.1%	237	650
	Medical	0.2%	99.8%	100.0%	1	21
	All other Categories	3.2%	96.8%	87.8%	335	2,974

Figure 5: Los Alamos National Laboratory Real Property Asset Management per End of FY 2014 FIMS Reporting

Planned Real Property Expenditure by Mission Dependency

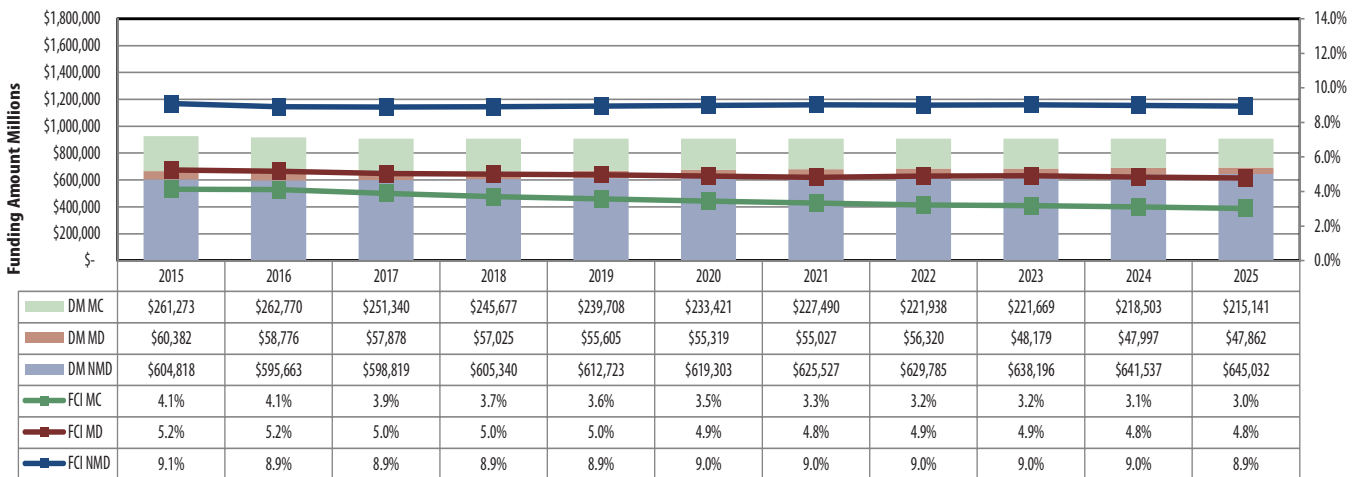


Figure 6: Los Alamos National Laboratory Planned Real Property Expenditure by Mission Dependency.⁸ DM Targets have been adjusted to align with December 12, 2014 memorandum from the Associate Administrator for Safety, Infrastructure and Operations.

- 7. DOE owned real property (Buildings, Trailers, Other Structures and Facilities)
- 8. DOE owned real property and leased facilities
- 9. AUI calculation redefined by LOB criteria implemented for space utilization in FY 2014

DEFERRED MAINTENANCE REDUCTION

In FY 2015, the Secretary of Energy initiated a requirement to hold steady or reduce DM across the complex. The targets provided to the Laboratory through NA-50 equal an \$18M reduction in DM by FY 2017. The DM reduction goals require that the Laboratory make increased investments in real property maintenance over the next several years. Funding will not likely be available for increases in maintenance. However, the Laboratory will put forward recapitalization projects with the goals of decreasing DM on MC facilities, achieving longer term cost savings and increased operational efficiencies, and consolidating operations or disposing of excess facilities.

Footprint reduction and increased productivity is an ongoing strategy to address maintenance needs and funding gaps. Maintenance funds are applied to high priority facilities while the required maintenance of shutdown facilities is reduced to a surveillance level, which helps prevent the growth of new DM. The Laboratory continues to improve maintenance efficiency and cost effectiveness by expediting execution of pre-approved, low-complexity, non-emergency maintenance and service activities.

The Laboratory ensures the safety, security, and compliance of its facilities as a first priority; however, funding reductions (e.g., new budget authority, delays in construction project activities, or shortfalls in cost recovery funding) may lead to decisions that put facility availability and completion of associated missions' activities at risk.

BUILDER SUSTAINMENT MANAGEMENT SYSTEM

As directed by NNSA, the Laboratory recently began implementation of the BUILDER Sustainment Management System, a facility assessment and investment forecasting software tool that will identify and prioritize facility maintenance and repair work. Use of BUILDER will enable the Laboratory and NNSA to support risk informed allocation of limited infrastructure funding. BUILDER will be used in conjunction with the Laboratory's existing Computerized Maintenance Management System (CMMS) capabilities to provide a complete infrastructure reinvestment analysis, from requirements identification and data management through project execution. Current BUILDER implementation activities include collecting, validating, and formatting existing facility component-specific data for a loading into the BUILDER system. Future implementation activities will include completing the data collection and migration and conducting field condition and functionality assessments. Full implementation of BUILDER is anticipated in 2018.

SPACE UTILIZATION AND CONSOLIDATION

Improving space utilization is consistent with the business goals of footprint reduction. Utilization improvement is integrated into consolidation approaches while also assuring staff are located in effective space. Continued application of the institutional space standards, coupled with consolidation and footprint reduction efforts, continues to enable the Laboratory to optimize utilization rates into the future.

The Laboratory's business strategy to eliminate non-enduring real property assets is consistent with the goals of the Congressional one-for-one footprint reduction mandate from 2002 and the most recent FTF directive. From the end of FY 2005 to the end of FY 2014, the Laboratory has reduced owned operational buildings by 5% (~365k gsf). Trailers/trans-portables have been reduced by 50% (currently 237k gsf), and leases have been reduced by 13% (currently 435k gsf). These efforts have had a direct positive impact on space utilization.

SUSTAINABILITY/ENERGY

The Laboratory prepared the FY 2015 SSP to describe progress towards the goals established in the DOE SSPP. Per the requirements of DOE Order 436.1 Departmental Sustainability, the Laboratory uses its ISO 14001:2004 certified EMS to establish objectives to improve compliance, reduce environmental impacts, increase operational capacity, and meet long term sustainability goals. The goals of the 2015 SSP are fully integrated into the Laboratory's institutional environmental objectives under the EMS and its LTSESS.

The challenges presented by the sustainability goals established in DOE Order 436.1 require innovative solutions that draw upon the many organizations, resources and talents at the Laboratory. The FY 2015 Plan reflects FY 2014 accomplishments and outlines FY 2015 actions that enable the Laboratory to continue progress toward DOE's sustainability reporting requirements and goals.

The Laboratory is working to institute cultural change to implement all DOE sustainability goals. Outreach efforts drive cultural change and this type of communication could reduce energy and water usage by as much as five percent. This change requires the use of a sustainability lens in all corporate management decisions; planning, executing, evaluating

and improving operations to maximize sustainability and support sound business practices. Realizing energy and water reductions through communications requires new focus and funding.

The Laboratory is pursuing a combination of additional investment in renewable energy, green construction practices, and operational improvements for energy efficiency to meet the sustainability goals. The Laboratory has developed a ROI funding strategy to work toward achieving the SSPP goals. This strategy includes investing in recommissioning, facility improvements, BAS, publicity and outreach, lighting retrofits, and implementing energy and water conservation measures. In FY 2015, \$3.35M is being dedicated to energy and water reduction efforts.

LABORATORY OPERATIONS BOARD DIRECTED INFRASTRUCTURE ASSESSMENTS

In FY 2014, the LOB was initiated by the Secretary of Energy to “provide greater viability of existing capabilities and identify needs for new infrastructure across the laboratory complex.” NNSA guidance was issued on March 12, 2014 with follow-on implementation guidance through FIMS. These efforts were intended to provide the Department with different but complimenting perspectives (condition and utilization) of infrastructure in support of missions. Each site was tasked with completing three separate assessments of their facilities and infrastructure: Mission Unique Inventory, Condition Assessments, and Functionality and Utilization Assessments.

Identify Mission Unique Inventory: This initial effort identified specific structures which are “one-of-a-kind, physically unique, large-scale technically complex...critical resources to the DOE and the nation.” In addition, these structures were believed to have had strong program advocacy at the headquarters level. The guidance further clarified “The focus of this overall effort is intended to be on general and supporting infrastructure and so these (mission unique) facilities will not be included in the rest of this assessment.” The Laboratory identified 52 directed funded facilities totaling 2.34M gsf as Mission Unique. Consistent with the guidance, these assets were not included in the rest of the assessments but will be evaluated in the near future. An additional 7 indirect assets were identified as Mission Unique, and those assets were included in the subsequent assessments.

Qualitative Condition Assessments: This effort applied to owned assets only and was based on three specific definitions:

- **Adequate** – “asset is fully capable of performing its current mission...”
- **Substandard** – “asset has deficiencies that limit performance of the mission including attracting and maintaining key staff...requires refurbishment to bring to adequate condition”
- **Inadequate** – “asset has major deficiencies that significantly impair or put performance of the mission at risk... requires major refurbishment or replacement....”

The summary of the results based on total owned square footage at the Laboratory is as follows:

CONDITION	PERCENT OF GSF	NOTE
Adequate	25%	This reflects progress across the site from new construction of the last 15 years and ongoing infrastructure investments.
Substandard	37%	The drivers are primarily age of the facilities with systems that are beyond useful life. Most of these assets have repurpose/recapitalization plans that are funding dependent.
Inadequate	5%	The drivers are primarily age of the facilities with systems that are beyond useful life. Most of these assets have repurpose/recapitalization plans that are funding dependent.
Shutdown Pending D&D	4%	This backlog of obsolete structures no longer serves missions and was not assessed.
Not Assessed	29%	Direct funded Mission Unique assets

Functionality and Utilization Assessments: The final assessments were directed towards both owned and leased buildings and trailers/transportables. The assessments were based on seven specific space types (1) high bay, (2) ventilation intensive, (3) power intensive, (4) wet laboratory, (5) dry laboratory, (6) office, and (7) storage. Assessed facilities did not include Mission Unique facilities or facilities without the 7 space types. Assessed facilities totaled approximately 5.6M gsf or 65% of the Laboratory's total facility footprint. The results were as follows:

- **Building Perspective** – 572 buildings with greater than 5.3M gsf were “Over Utilized” or “Fully Utilized” and only 65 buildings with less than 300K gsf were either “Under Utilized” or “Not Utilized.”
- **Space Type Perspective** – A roll up of each of the seven space types yielded a utilization rate in the 87% to 97% range, which indicates each space type was either “Fully Utilized” or “Over Utilized.”

As previously discussed, the Laboratory has aggressively pursued a business strategy in which inefficient/underutilized facilities have been identified, functions have been relocated, and facilities have been shut down with many removed. The net reduction of space has allowed for operations/maintenance resources to be redirected to more enduring structures. Without this business strategy, the results of the LOB assessments would have been very different.

SECURITY INFRASTRUCTURE

NEAR TERM (FY 2014-23)

In the near term, the Laboratory's Security and Safeguards Program will continue to consolidate security assets and replace and improve aging infrastructure to effectively support the Laboratory's missions. The primary focus will be consolidation of SNM at TA-55. The secondary focus will be the protection of classified matter, property, and personnel outside of the Pajarito Corridor.

The following major initiatives, either under way or in the planning phases, are necessary to achieve NNSA's strategic goals and objectives over the next decade. These initiatives are either funded or were submitted to NNSA in the FY 2014–19 FYNRP budget request. The most significant projects are listed below and the comprehensive items are listed on the NA-00/NA-70 Non-Recurring Projects and Procurements List. Prioritization within this TYSP submission is consistent with the prioritization within the current Non-Recurring Projects and Procurements List as was submitted to NA-70.

Protective Force Training Facilities: An erosion control project is underway at the protective force outdoor-firing-range to stabilize the ground surrounding several of the ranges/facilities to prevent flood damage similar to that which occurred in FY 2013. The outdoor range upgrade is the fourth and final planned protective force training facilities (simulation center, tactical training facility (TTF), indoor range, and outdoor range upgrades) and once completed will result in a complete suite of state-of-the-art training facilities sufficient for a robust protective force training environment.

Security Envelope Enhancement Project: This project addresses the creation of a hardened site envelope, which would provide enhanced protection against vehicle threats. The project would also allow for the rerouting of public vehicle traffic around the northern perimeter of the Laboratory. NA-70 approved funding of up to \$1.5M for activities leading to the development of CD-1. The documentation package for CD-0 is complete and awaiting NA-70 approval. Following CD-0 approval, the Laboratory anticipates proceeding with work on CD-1, aligning the project to its assigned anticipated budget year.



Protective Force Indoor Firing Range at TA-16

Radio System Life Cycle Replacement: The Laboratory (the protective force and Emergency Operations) and LAC (the fire department which provides fire services to the Laboratory and the Los Alamos Police Department which responds to the Laboratory) are in the process of upgrading their trunked radio systems based on a joint project management plan “Project Management Plan for Trunked Radio Upgrade Project”. During the transition the radio shop will run two somewhat seamless radio systems with the plan of eliminating the old existing system by the end of FY 2015.

Legacy Field Panel Replacements: The first of four separate projects has been funded with funding requested for the remaining three projects. These projects support the

replacement of legacy field panels with modern Argus field equipment, which will upgrade the site's field panels to a current Argus configuration.

Homeland Security Presidential Directive (HSPD)-12 Compliance (Argus): Replacement of 200 Argus stations based on a preliminary plan, including estimates of craft labor and materials. This plan and estimate are based on the mandated 3-year completion deadline. Estimate is based on NA-70 guidance that the Argus equipment [Remote Access Panels (RAPs), Argus Field Panels (AFPs), etc.] are to be provided by the Lawrence Livermore National Laboratory (LLNL) Argus depot at no cost to the Laboratory.

HSPD-12 Compliance (Apollo): Labor, equipment, and material costs to convert ~1,200 Apollo access points. Estimate based on a preliminary plan and analysis, including gross estimates of craft labor and materials. This plan is based on the mandated 3-year completion deadline. Argus stations are not included.

Permanent Vehicle Inspection Station (Post 10): Replace the current station with a facility to include vehicle cover. The current facility consists of a trailer and a portable post which were initially intended to be temporary structures but have been made permanent.

Post-116 Upgrades: This project will renovate Post 116 to provide more efficient operation, replace outdated systems, and install new Argus capability. Primary scope includes; (1) Renovation of Post 118 to accommodate PF-4 access while P116 is being renovated; (2) renovation of Post 116 to include replacement of most existing systems, installation of x-ray systems, SNM monitors, Positive Personnel Identification and Verification booths, Argus compatibility, and explosives detectors; (3) cosmetic repairs to the internal guard booth, life safety upgrades and other minor improvements; (4) development of security infrastructure to include the installation of AFPs, redundant signal wire, secondary Alarm Station at TA-55/PF-142 and the installation of Argus compatible readers at the TA-55 muster area; and (5) development of redundant power from TA-55/PF-142 to Post 116. This upgrade will make Post 116 equipment fully compatible with all of the upgrades currently occurring as a part of the NMSSUP II project.

Replacement Badge Office: Replace the current the Laboratory badge office with a facility outside of the East Jemez Road Vehicle Access Portal (VAP) containment area.

Pro-Force Consolidated Facility (TA-16): Construct a facility to centralize protective force activities and allows for more versatility and efficiency providing on-shift training. Replacement facility would improve facilitation of on-shift and off-shift training reducing time associated with officer rotation and transition. The indoor range and the TTF are currently located at TA-16.



Proposed Replacement Badge Office outside of the Vehicle Access Portal

Security Office Building: Construct a secure office building of approximately 13,000 gsf with accommodations for 50-60 staff at TA-3. The new building would replace seven outdated transportable buildings adjacent to building 03-0440 and house staff that currently occupy the existing transportable offices. The proposed site requires no major utility or site work and will utilize existing adjacent parking. The new facility will enhance work efficiencies, provide appropriate work areas, and be constructed to current DOE standards for energy use and sustainability.

PF-4 Compartmentalization: This project will provide Argus-based compartmented security to the PF-4 laboratory area. The initial plan creates twenty (20) security compartments based on material balance areas in PF-4. The work scope includes the following: (1) development of an AFP complex in PF-3. Thirteen AFP complexes will be installed with redundant power, additional cooling and communication to both the secondary alarm station (SAS) and central alarm station (CAS). A project assumption is that infrastructure to the SAS and CAS will be available through a separate project; (2) installation of all physical conduit and wiring infrastructure inside PF-4; (3) replacement of approximately 69 doors with fire rated doors, including egress/security hardware and various mechanical modifications to maintain proper air/pressure balance; (4) installation of RAPs on both sides of each impacted door; and (5) development of new software to support the PF-4 compartment concept.

Electromagnetic Pulse (EMP): Fabrication of protective filters to shield sensitive equipment from electromagnetic pulse attacks from malicious, industrial or natural causes. The EMP project will provide protection to vital security equipment from short and medium length electro-magnetic pulses. The scope of this effort will include design, development, testing, parts procurement, and fabrication of 130 passive filters. After successful testing, several units will be placed in service and monitored for several months. After the filters successfully pass this phase of acceptance, the filters will be installed in key electronic equipment at the Central and Secondary alarm stations. Optional work includes remote monitoring of the filters for attacks and installation of 94 filters in the Perimeter Intrusion Detection Alarm System (PIDAS) bed detection system. A class three estimate is being prepared. Currently estimated at \$5M as an expense funded project with a current study to cost the work as a capital equipment project.

LONG TERM (FY 2024-38)

Assuming that priority security and safeguards projects are funded in the near term, the Laboratory's security program will be positioned to more efficiently and effectively protect the security CAT-I assets on the Pajarito Corridor, critical facilities within the core TA-3 area, as well as the Laboratory population. Enhancements should allow for the protection of the CAT-I material with minimal protective force manpower and minimal recurring physical and system maintenance costs over the long term. Furthermore, proposed reductions to security area footprints and system upgrades necessary for compliance with Argus and HSPD-12 requirements should enable efficient and effective protection of classified matter with minimal physical and system maintenance costs in the long term.

ACRONYMS

AFP	Argus Field Panel	DP	Defense Programs
ARRA	American Recovery and Reinvestment Act	DSW	Directed Stockpile Work
ASC	Advanced Simulation & Computing [Campaign]	EIS	Environmental Impact Statement
ATS	Advanced Technology System	EIUP	Electrical Infrastructure Upgrade Project
BAS	Building Automation System	EM	DOE Office of Environmental Management
BIA	Bureau of Indian Affairs	EMCF	Energetic Materials Characterization Facility
BSL	Biosafety Level	EMP	Electromagnetic Pulse
BTF	Beryllium Technology Facility	EMS	Environmental Management System
CAS	Central Alarm Station	EOS	Equations of State
CAT	Category	ESCO	Energy Service Company
CBI	Capability Based Infrastructure	ESPC	Energy Savings Performance Contract
CCP	Central Characterization Program	F&I	Facilities and Infrastructure
CD	Critical Decision	FCI	Facility Condition Index
CGTG	Combustion Gas Turbine Generator	FHWA	Federal Highway Administration
CINT	Center for Integrated Nanotechnologies	FIMS	Facilities Information Management System
CMMS	Computerized Maintenance Management System	FIRP	Facilities and Infrastructure Recapitalization Program
CMR	Chemistry and Metallurgy Research [Building]	FOD	Facility Operations Director
CMRR	Chemistry and Metallurgy Research Replacement [Project]	FTF	Freeze the Footprint
CMRR-NF	Chemistry and Metallurgy Research Replacement Nuclear Facility	FY	Fiscal Year
CP	Counter-proliferation	FYNISP	Future Years Nuclear Security Program
CT	Counterterrorism	GHG	Greenhouse Gas
D&D	Decontaminate and Decommission	GPP	General Plant Project
DARHT	Dual Axis Radiographic Hydrodynamic Test [Facility]	GSF	Gross Square Feet
DEOS	Dynamic Equation of State [Facility]	HE	High Explosives
DHS	Department of Homeland Security	HED	High Energy Density
DIMP	Distribution Integrity Management Plan	HPC	High Performance Computing
DM	Deferred Maintenance	HRL	Health Research Laboratory
DNDO	Domestic Nuclear Detection Office	HSPD	Homeland Security Presidential Directive
DoD	Department of Defense	HVAC	Heating Ventilating and Air Conditioning
DOE	Department of Energy	Hz	Hertz
DOI	Department of Interior	I&S	Infrastructure and Safety
DoS	Department of State	IAEA	International Atomic Energy Agency
		ICF	Inertial Confinement Fusion
		IPF	Isotope Production Facility
		ISO	International Organization for Standardization

k	Thousand	NIF	National Ignition Facility
kV	Kilovolt	NISC	Nonproliferation & Internal Security [Facility]
LAC	Los Alamos County	NMD	Not Mission Dependent
LACSD	Los Alamos County School District	NMED	New Mexico Environment Department
LALCCP	Los Alamos Legacy Cleanup Completion Project	NMR	Nuclear Magnetic Resonance
LANS	Los Alamos National Security, LLC	NMSSUP	Nuclear Materials Safeguards and Security Upgrades Project
LANSCE	Los Alamos Neutron Science Center	NNSA	National Nuclear Security Administration
LARP	Los Alamos Research Park	NNSS	Nevada National Security Site
LEED	Leadership in Energy and Environmental Design	NPDES	National Pollutant Discharge Elimination System
LEP	Life Extension Program	NPR	Nuclear Posture Review
LI	Line Item	NSE	National Security Enterprise
LINAC	Linear Accelerator	OPC	Other Project Costs
LLNL	Lawrence Livermore National Laboratory	PCB	Polychlorinated Biphenyl
LLW	Low Level Waste	PEI	PF-4 Equipment Installation
LOB	Laboratory Operations Board	PF	Plutonium Facility
LTSESS	Long-Term Strategy for Environmental Stewardship & Sustainability	PIDAS	Perimeter Intrusion Detection Alarm System
M	Million	PNM	Public Service Company of New Mexico
M&O	Management and Operating	Pu	Plutonium
MaRIE	Matter-Radiation Interactions In Extremes [Project]	R&D	Research and Development
MC	Mission Critical	RAMP	Roof Asset Management Program
MD	Mission Dependent	RANT	Radioactive Assay and Nondestructive Testing [Facility]
MDA	Material Disposal Area	RAP	Remote Access Panels
MeV	Million Electron Volt	REC	Renewable Energy Credit
MJ	Megajoules	REI	RLUOB Equipment Installation
MOU	Memorandum of Understanding	RLUOB	Radiological Laboratory Utility and Office Building
MRI	Magnetic Resonance Imaging	RLW	Radiological Liquid Waste
MSL	Materials Science Laboratory	RLWTF	Radioactive Liquid Waste Treatment Facility
MVA	Megavolt Ampere	RLWTF-UP	Radioactive Liquid Waste Treatment Facility Upgrade Project
MW	Megawatt	RM	Risk Mitigation
NASA	National Aeronautics and Space Administration	ROD	Record of Decision
NCP	Nuclear Counter Proliferation [Facility]	ROI	Return on Investment
New START	New Strategic Arms Reduction Treaty		
NHMFL	National High Magnetic Field Laboratory		

RTBF	Readiness in Technical Base and Facilities	TLW	Transuranic Liquid Waste
S&M	Surveillance and Maintenance	TRP	TA-55 Reinvestment Project
SAS	Secondary Alarm Station	TRU	Transuranic
SC	Office of Science	TRUPACT	Transuranic Package Transporter
SCIF	Sensitive Compartmented Information Facility	TSR	Technical Safety Requirements
SERF	Sanitary Effluent Reclamation Facility	TTF	Tactical Training Facility
SLB2	Standard Large Box 2	TYSP	Ten-Year Site Plan
SNM	Special Nuclear Material	UCN	Ultra-cold Neutron [Facility]
SSMP	Stockpile Stewardship and Management Plan	U.S.	United States
SSP	Site Sustainability Plan	VAP	Vehicle Access Portal
SSPP	Strategic Sustainability Performance Plan	WCRR	Waste Characterization, Reduction and Repackaging [Facility]
ST&E	Science, Technology, and Engineering	WETF	Weapons Engineering Tritium Facility
STA	Southern Technical Area	WIPP	Waste Isolation Pilot Plant
SWWS	Sanitary Waste Water System [Facility]	WMESF	Weapons Manufacturing and Engineering Support Facility
TA	Technical Area	WNR	Weapons Neutron Research [Facility]

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