

# Los Alamos National Laboratory

## **TODAY'S COMPLEX**

*The U.S. nuclear weapons complex—the laboratories and facilities that research, design, produce, maintain, and dismantle such weapons—must ensure that the arsenal is reliable, safe from accidents, secure from unauthorized use, and no larger than needed to maintain national security. To fulfill those goals, the complex needs resources and facilities to extend the life of nuclear warheads, assess their reliability and safety, understand how aging and modifications affect weapons, and retain employees with essential expertise. It also requires the capacity to dismantle retired weapons in a timely fashion, and methods for verifying further reductions in nuclear weapons. Additionally, the complex must minimize security risks of storing, transporting, and disposing of weapons-usable materials.*

*The administration and Congress will make important decisions over the next few years on how the complex can use limited resources to best meet these challenges. Doing so requires smart choices based on strict attention to priorities.*

Los Alamos, NM, is the birthplace of the U.S. nuclear weapons program, where the primary research, design, and production of the first U.S. nuclear weapons took place. Today, Los Alamos National Laboratory (LANL) is one of three privately managed facilities that conduct research on and design U.S. nuclear weapons, along with Lawrence Livermore National Laboratory and Sandia National Laboratories.

Like the other sites in the nuclear weapons complex, LANL is overseen by the National Nuclear Security Administration (NNSA), a semi-autonomous agency within the Department of Energy (DOE).

## **Los Alamos Today**

With the end of the cold war and the declaration of a moratorium on full-scale nuclear testing in 1992, LANL's primary mission shifted from developing new warheads to maintaining the safety, security, and reliability of the existing U.S. nuclear stockpile without nuclear explosive testing. LANL conducts life extension programs (LEPs) on existing weapons, which involves replacing components affected by aging with newly manufactured and sometimes modernized components. Under current NNSA plans, future LEPs will entail replacing existing warheads with new ones.

In support of congressional requirements for an annual report certifying the safety, security, and reliability of the nuclear stockpile, LANL conducts regular



Los Alamos National Laboratory and town, 2006

evaluations of weapons it has developed: the W76 and W88 submarine-launched ballistic missile warheads, the W78 intercontinental ballistic missile warhead, and the B61 nuclear bomb. LANL's surveillance data, peer reviews, and the results of experimental and computational simulations inform the Annual Stockpile Assessment, an initiative administered jointly by the DOE and Department of Defense that certifies the stockpile is safe, reliable, and militarily effective, and meets performance requirements.

LANL performs the following nuclear-weapons-related tasks:

- **Conducts research, design, and development of nuclear weapons.** No new nuclear weapon has been produced since 1990. Today LANL's design work is focused on LEPs.
- **Designs and tests advanced technology concepts.** "Advanced technology concepts" refers to new ideas for the design or use of nuclear weapons; past examples include considering ways to improve the use control of nuclear weapons and examining the utility of nuclear weapons to destroy chemical and biological agents.
- **Maintains production capabilities for limited quantities of plutonium pits.** LANL can produce 10 to 20 pits per year and eventually seeks to produce 50 to 80 pits per year.
- **Manufactures nuclear weapon detonators for the stockpile.** LANL is the sole bulk producer of this key warhead component, which initiates detonation of the high explosive that, in turn, compresses the plutonium pit.
- **Conducts tritium research and development (R&D), hydrotesting, high explosives R&D, and environmental testing.** Tritium is used to boost the yield of the primary; hydrotests experimentally simulate the conditions in an exploding nuclear weapon; and environmental tests assess the effects of a nuclear detonation on various materials.
- **Currently maintains Category I/II quantities of special nuclear materials (quantities of plutonium and highly enriched uranium that require the highest level of security).** For ease of protection, the plan is for this material to be consolidated to the extent possible. Since LANL will continue to produce pits, some of it will stay there.

In addition to work on the U.S. nuclear stockpile, LANL performs work to reduce the threat of weapons of mass destruction, nuclear proliferation, and terrorism, and conducts research on other defense, energy, and environmental issues such as electricity

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delivery and energy reliability; energy efficiency; nuclear, renewable, and fossil energy; and the cleanup of radioactive and otherwise contaminated portions of the site. It also maintains some of the most powerful supercomputing capabilities in the world, which help it to carry out the simulations used for the Stockpile Stewardship Program.

After decades of being managed by the University of California and run as a nonprofit, LANL is now managed by a for-profit limited liability company, Los Alamos National Security. This corporation was established in 2006 and is made up of Bechtel National, the University of California, BWX Technologies, and URS Energy and Construction, Inc. The lab employs a total of about 10,300 people.

## Budget

LANL's total FY 2013 budget was roughly \$1.8 billion. Of this, most—\$1.3 billion—comes from the NNSA for nuclear weapons activities, with additional NNSA funding for nuclear nonproliferation efforts. LANL also receives funding from the DOE for environmental management (cleanup related to defense nuclear programs), site security, and energy programs.

For FY 2014, LANL has requested a total of nearly \$2 billion in funding, with \$1.4 billion of this for weapons activities. The largest line item in LANL's FY 2014 weapons activities budget request (\$460 million) is for directed stockpile work, which supports current and future LEPs and includes surveillance and maintenance activities. The second-largest budget line (\$302 million) within the weapons program is for site stewardship (that is, the operation and maintenance of NNSA program facilities).

## Current Issues

### THE CHEMISTRY AND METALLURGY RESEARCH REPLACEMENT-NUCLEAR FACILITY (CMRR-NF)

Until recently, NNSA had proposed near-term construction of the CMRR-NF, a new building that would become the center of analytical chemistry and characterization of highly radioactive materials for the U.S. nuclear weapons complex. It would replace LANL's existing Chemistry and Metallurgy Research (CMR) building, built in the 1950s.

Safety concerns, in particular relating to seismic events, and general deteriorating conditions in the CMR building led the NNSA to argue that a new facility is required. However, estimated costs for the CMRR-NF have risen dramatically. Initially estimated at \$375 million, by the time the design was 45 percent complete in 2010 the NNSA estimated that it could cost between \$3.7 billion and \$5.8 billion.

For FY 2012, Congress cut \$100 million of the \$300 million requested for the CMRR-NF and specified that this funding could not be used for construction costs. Then the administration's FY 2013 budget request zeroed out funding for the facility and deferred construction for at least five years, stating that existing facilities could provide support for LANL's missions. The NNSA says studies are ongoing to determine long-term requirements, but the future of the project is unclear.

### PIT PRODUCTION

While the United States is no longer producing new nuclear weapons, the NNSA wants to maintain the capability to produce

new plutonium pits, the fissile core of the first stage of a modern, two-stage nuclear weapon. LANL has been producing pits since 2003, after years of effort to restore this capability, which was lost in 1989 when the Federal Bureau of Investigations shut down plutonium production at the Rocky Flats Nuclear Weapons Plant due to environmental and health hazards.

Between 2007 and 2011, LANL produced 29 W88 pits; it is now transitioning to producing W87 pits. The CMRR-NF, if completed, would allow LANL to increase significantly its capacity to produce plutonium pits by freeing up space in the building (PF-4) where the pits are produced. According to the NNSA, a completed CMRR-NF would allow LANL to increase its production to 50 to 80 pits per year. However, by making some changes in its use of space, PF-4 could have the capability to produce 20 to 30 pits per year in the short term. If adjustments at other LANL facilities are also made, some NNSA reports state that LANL could produce up to roughly 50 pits per year using existing facilities.

However, there is debate about whether this level of pit production capacity is necessary. According to NNSA research, the minimum lifetime of current pits is 85 to 100 years, and the oldest pits are roughly 30 years old. The most plausible need for new pits is to replace the pit of one warhead with a newly built pit from another warhead design as part of a life extension program, but this procedure has not yet been approved. Moreover, if a decision is made to reduce the U.S. nuclear arsenal below 3,500 weapons over the next several decades, a lower annual pit production capacity could be sufficient.

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