Union of Concerned Scientists

FACT SHEET

THE U.S. NUCLEAR WEAPONS COMPLEX

Nevada National Security Site

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.

The Nevada National Security Site (NNSS) is where the United States carried out most of its explosive tests of nuclear weapons (the vast majority of them underground). When the United States signed the Threshold Test Ban Treaty in 1974, it became the only U.S. nuclear weapons test site. Originally known as the Nevada Proving Grounds, and then as the Nevada Test Site, the facility was renamed in 2010 when its mission was expanded to encompass a broader range of activities related to nuclear weapons, energy, and homeland security needs.

The NNSS is located in the desert, about 75 miles northwest of Las Vegas. The site itself covers more than 1,300 square miles and is surrounded by the federally owned Nevada Test and Training Range that acts as a buffer, giving a total unpopulated area of more than 5,400 square miles—nearly the size of the state of Connecticut. Its remote location and large size were important factors in its selection as a testing site.

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

The NNSS Today

With the end of the cold war and the 1992 moratorium on nuclear explosive testing, the NNSS's primary mission shifted from the explosive testing of nuclear weapons to maintaining the safety, security, and reliability of the existing U.S. nuclear stockpile without such testing. (Under a 1993 presidential decision

NNSA Nevada Field Office

Subsidence craters at Yucca Flat at the Nevada National Security Site, where hundreds of full-scale underground nuclear tests were performed until the United States halted such testing in 1992.

directive, the site must maintain a state of readiness to resume nuclear explosive testing within two to three years if the president directs it to do so.)

The NNSS is still a major test site for the U.S. nuclear complex, but the tests that take place there no longer involve nuclear explosions. Instead, it is home to several unique facilities that contribute to its stockpile stewardship mission. These include:

- **The U1a Complex** (previously known as the Lyner Complex), an underground laboratory where subcritical testing takes place. Subcritical tests, which use small amounts of plutonium but not enough to generate a chain reaction, help improve understanding of the dynamic properties of weapons parts or materials in an explosion and evaluate the effects of new manufacturing techniques on weapon performance.
- **The Big Explosives Experimental Facility (BEEF)**, where hydrodynamic testing is performed using high explosives to simulate the intense shock pressures and temperatures of a nuclear weapon. The term hydrodynamic is used because the material is compressed and heated with such intensity that it begins to flow and mix like a fluid, and the equations used to describe the behavior of fluids—called hydrodynamic equations—can be used to describe the behavior of this material as well. BEEF tests use full-scale mockups of nuclear primaries without fissile material, which helps to assess the performance of nuclear weapons and ensure that they will not detonate accidentally.
- **The Joint Actinide Shock Physics Experimental Research (JASPER) Facility**, which simulates the intense shock pressures and temperatures of a nuclear weapon using a two-stage gas gun. Data from JASPER hydrodynamic experiments are used to develop hydrodynamic equations for the materials used in nuclear weapons and to validate weapons computer models.
- **The Device Assembly Facility (DAF)**, made up of more than 30 buildings, including special structures (bays and cells) for assembling and disassembling nuclear weapons, and staging bunkers for temporarily storing nuclear components and high explosives. In 2012, the DAF was upgraded to allow it to assemble the plutonium targets for the JASPER Facility, a task previously done at Lawrence Livermore National Laboratory. The NNSA is also developing a capability at the DAF to dismantle and dispose of damaged weapons or improvised nuclear devices (such as "dirty bombs") that might be made by terrorists.
- **The National Criticality Experiments Research Center (NCERC)**, housed at the DAF, is the only site in the United States where such experiments take place. By bringing a small amount of plutonium or highly enriched uranium into a chain reaction, these experiments help define the limits of safe handling and allow testing of radiation detection equipment. Criticality experiments were previously carried out at Technical Area 18 (TA-18) at Los Alamos National Laboratory. After the NNSA decided in 2002 to close TA-18 due to concerns that it would be difficult to defend against armed attackers seeking to acquire nuclear materials, the capability was transferred to the NNSS. The NCERC officially opened in August 2011.

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In addition to its tasks supporting the Stockpile Stewardship Program, the NNSS also provides a testing site to evaluate detection, monitoring, and verification technologies used in nuclear nonproliferation and arms control applications, and helps manage the nation's nuclear emergency response efforts. Other federal agency activities are supported by the NNSS as well, such as remote imaging and training first responders to deal with nuclear or radiological emergencies.

The NNSS is operated by National Security Technologies, LLC, which is a partnership of Northrup Grumman, AECOM, CH2M Hill, and Nuclear Fuel Services. The site employs roughly 1,900 scientific, technical, engineering, and administrative personnel.

Budget

The NNSS's total FY 2013 funding from the DOE is $383 million. Of this, the majority—$257 million—came from the NNSA for weapons activities, with an additional $67 million in NNSA funding for defense nuclear nonproliferation.

In FY 2014 the NNSS has requested a total of $396 million in funding, with $244 million of this for weapons activities. The NNSS also requested $110 million for defense nuclear nonproliferation in FY 2014. The jump in the funding request for nonproliferation and drop in that for weapons activities reflect a change in the NNSA's organization of the FY 2014 budget, not a significant change in funding.

Current Issues

PLUTONIUM STORAGE

In 2012, the Obama administration decided to defer for five years the construction of a proposed Chemistry and Metallurgy Research Replacement-Nuclear Facility (CMRR-NF) at Los Alamos National Laboratory, which was planned in part to provide additional storage space for plutonium at the lab. This raised concerns that an alternative storage site may be required. However, in its FY 2013 budget release, the administration noted that excess plutonium could be stored at the DAF, which has considerable unused space (one DOE study estimated that the DAF could hold up to 8,000 pits). Since the DAF was designed to house nuclear materials, it has the safety and security features required to store plutonium.

WEAPONS DISASSEMBLY

The DAF is one of only two locations in the U.S. nuclear weapons complex (along with Pantex Plant in Texas) with the necessary facilities for full assembly and disassembly of nuclear weapons—in particular, for mating or unmating the plutonium pits with the high explosives that surround them. The DAF was originally intended to assemble weapons to be used in underground tests, but that role disappeared with the end of the cold war and the testing moratorium. It is now used to assemble devices for subcritical experiments and other activities involving high explosives and special nuclear materials.

The NNSA has suggested that the DAF's unique capabilities could make it a suitable backup facility to Pantex Plant, which is the primary site in the U.S. nuclear weapons complex for the assembly and disassembly of nuclear weapons. The DAF could also be used along with Pantex to speed up the dismantlement of retired weapons. Pantex's dismantlement rate has slowed recently because it requires use of the same facilities as life extension programs (LEPs), which replace nuclear weapons components affected by aging with newly manufactured components. The NNSA's greater emphasis on LEPs over the past several years means less space is available for dismantlement, creating a backlog that some experts have suggested the DAF could help clear.

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