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Entire Stock Of W56 Nuclear Weapons Dismantled

The last W56 nuclear warhead was recently dismantled as part of NNSA's mission to significantly reduce the size of the nuclear weapons stockpile. The 1960s-era system has been safely and securely taken apart at NNSA's Pantex Plant. The Y-12 National Security Complex will continue to support this effort with additional dismantlements and the storage of materials.

"Dismantling the last W56 warhead shows our firm commitment to reducing the size of the nation's nuclear weapons stockpile to the lowest levels necessary for national security needs," said NNSA Administrator Linton F. Brooks.

In 2004, President Bush directed that the size of the nuclear weapons stockpile be reduced by nearly 50 percent by

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NEW LIFE FOR AN OLD BOMB: B61 bombs are the oldest weapons in the nuclear stockpile and an integral part of the nation's strategic defense.

NNSA Achieves Significant Milestone For B61 Bomb

A six-year effort to deliver the first refurbished B61 nuclear bomb was recently celebrated at NNSA's Pantex Plant. Every part of NNSA's nuclear weapons complex contributed to this major effort through design, production or review work and ensured that it was completed on schedule.

"Completing the B61 first production unit is an important step in keeping our nuclear weapons stockpile safe and reliable."

Deputy Adminstrator Tom D'Agostino

"Completing the B61 first production unit is an important step in keeping our nuclear weapons stockpile safe and reliable. Our nuclear weapons were never intended to last this long and they were not designed to be taken apart, so it is a credit to our scientists and engineers across the complex who have come together to deliver this unit on time," said NNSA Deputy Administrator for Defense Programs Tom D'Agostino.

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NNSA Achieves A Significant Milestone For B61 Bomb

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Under a Life Extension Program, NNSA will now begin to restore all of the B61 mod-7 and mod-11 strategic bombs in the U.S. nuclear weapons stockpile. This work, which will extend the bomb's life by 20 years, is expected to be completed in 2009.

The B61 bombs are an integral part of our nation's strategic defense and are the oldest weapons in the nuclear stockpile, many of which were originally produced in the late 1960s and early 1970s.

To maintain a credible nuclear deterrent without conducting underground tests, NNSA uses science-based research to extend the lifetime of nuclear weapons. Life extension work includes identifying and correcting potential technical issues within each weapon, and refurbishing and replacing certain components. Work on the B61 includes refurbishment of the canned subassembly, and the replacement of associated seals, foam supports, cables and connectors, washers and other components that have a limited life.

FUTURE LEADERS: The second class of NNSA's Future Leaders Program participants came on board beginning June 12. This group is comprised of 30 new employees recruited from 19 universities who are working in seven of the eight site offices, the Service Center and in six headquarters program offices. The program began in July 2005, with the arrival of 29 participants. The Class of 2005 will "graduate" from the program next year and the participants will be assigned to offices at which they have worked.

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2012, which will result in the smallest stockpile since the Eisenhower administration. NNSA's work to dismantle nuclear weapons will increase by nearly 50 percent from fiscal year 2006 to fiscal year 2007.

NNSA's Lawrence Livermore and Sandia National laboratories designed the W56 warhead, which supported the nation's intercontinental ballistic missile program. It was produced in the 1960s and saw service until the early 1990s.

NNSA's 4-Step Dismantlement Process

1. **Retirement:** Paperwork to remove warhead from active or inactive status within stockpile.
2. **Return and Storage:** Transportation to Pantex and temporary storage.
3. **Disassembly:** Physical separation of high explosive from special nuclear material.
4. **Disposition:** Evaluation, demilitarization, sanitization, recycle, and ultimate disposal.

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New Office To Oversee NNSA's Transformation

A new Office of Transformation to coordinate modernization efforts for the Cold War-era nuclear weapons complex has been created at NNSA headquarters in Washington.

"Since nuclear weapons will remain a part of the U.S. national defense for the foreseeable future, NNSA will need the scientific and manufacturing infrastructure to support them. Our goal is to have a nuclear weapons complex that is smaller, more efficient, more secure and capable of providing the tools a future president may need to respond to changing national security needs," said Administrator Linton F. Brooks.

The new office will guide and oversee the implementation of NNSA's transformational vision, titled *Complex 2030*. The comprehensive plan was unveiled in April to outline NNSA's goals through the year 2030 for the nuclear weapons complex.

Dr. George Allen has been appointed director of the new transformation office. Over the last year, Allen has been responsible for leading the responsive infrastructure planning and implementation actions within NNSA's Defense Programs. Previously, Allen was a senior manager at NNSA's Sandia National Laboratories in New Mexico for more than 27 years working on a broad diversity of nuclear-related projects. Allen has both a PhD and an MS in nuclear engineering, and a BS in civil engineering from MIT. He also holds an MBA from the University of New Mexico.

Five Questions For George Allen, NNSA's Director For The Office Of Transformation

Q. *Why is the establishment of this new office so important to NNSA's future?*
A. Changes must happen to achieve a responsive nuclear weapons complex infrastructure. This Office of Transformation will focus actions and champion changes needed to move forward rapidly and effectively with infrastructure transformation. The office leverages the tremendous resources NNSA has in the talent and commitment of its personnel across the nuclear weapons complex.

Q. *What are some of your goals or things you'd like to accomplish in the next couple of years for the new office?*
A. Of top importance is developing confidence in NNSA's capability to achieve a more responsive infrastructure. A continuous stream of changes facilitates moving us closer to our vision for Complex 2030. Tom D'Agostino's "Getting the Job Done" list is a positive example of accomplishments in the short-term that build confidence for the long-term. Over time, I would like to see a long list of NNSA accomplishments that reflect the capability of the nuclear weapons complex to make essential changes required for a more sustainable and responsive future.

Q. *What do you see as one of the biggest challenges to implementing the transformation plan?*
A. Transformation requires changes in our culture in addition to our physical infrastructure. Changing the way we think is the hardest. We must think of the complex rather than individual sites. Federal personnel must be demanding customers that focus on defining what our objectives are, while empowering our site contractors to determine how the objectives are best achieved. We must manage safety, security and programmatic risks more effectively in a culture that has traditionally been very risk-adverse.

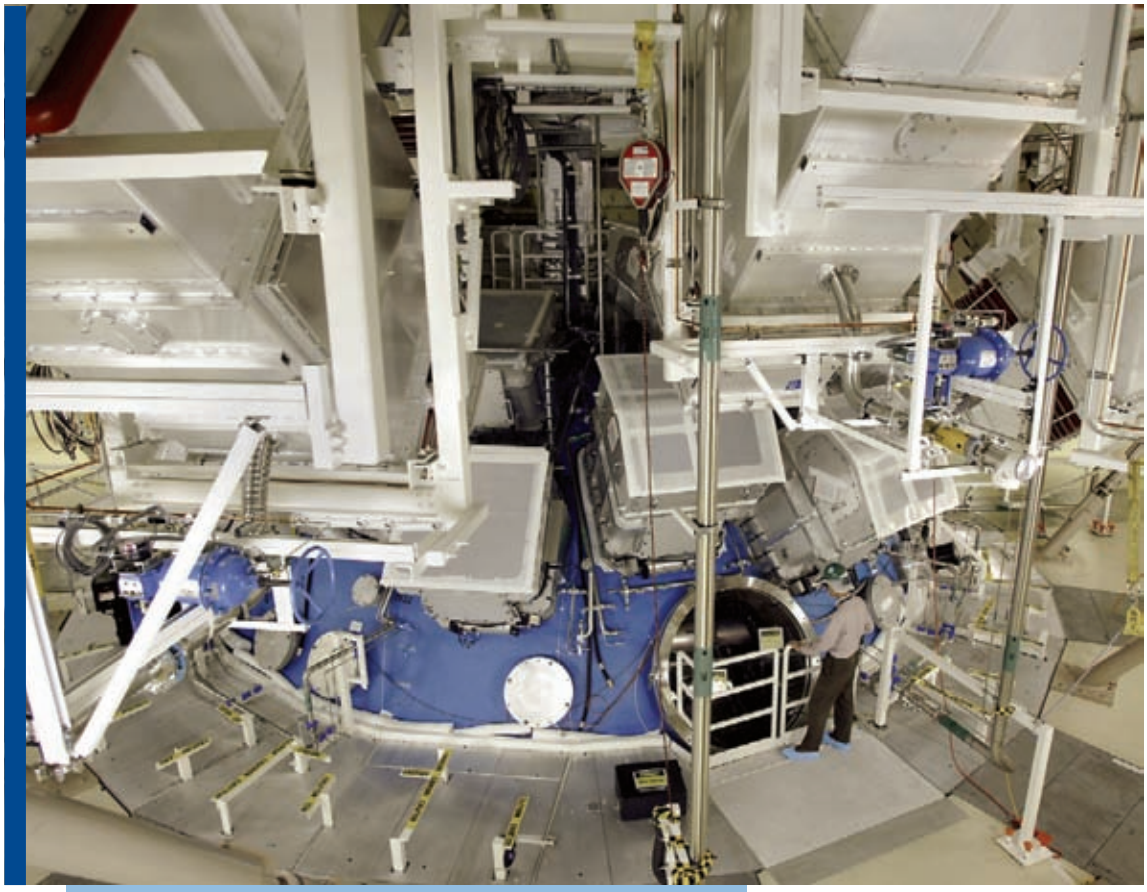
Q. *What advice would you give NNSA's leadership in 2030?*
A. Be agile, flexible and expect further change. Even if we fully implement Complex 2030, further changes should be expected. Stay in a rhythm of continuously evolving to keep up with changing requirements. Work closely with stakeholders, especially the Department of Defense. Value your people.

Q. *Why do like you working at the NNSA?*
A. NNSA has a very important mission; a stimulating environment that is chock-full of challenges; and a tremendous group of exceptionally bright people. What more could one want? The fun of doing meaningful work should be a large part of each individual's compensation. For me, this job is fun and I am convinced that it is important.

Counting Down To Fusion Ignition

Excitement is growing at Lawrence Livermore National Laboratory as the nation moves closer to completion and activation of the National Ignition Facility (NIF). Preparations are under way for initiation of the ignition campaign in anticipation of the 2009 completion of NIF.

NIF is a key element of NNSA's Stockpile Stewardship Program. NIF's ability to create fusion ignition and thermonuclear burn under controlled laboratory conditions will provide NNSA with the experimental tool it needs to produce weapons-relevant conditions. These conditions are essential to NNSA's efforts to assess and certify the nation's nuclear weapons stockpile without underground nuclear testing. NIF is the world's largest and most complex laser and optical system, and is designed to provide the capability necessary to achieve ignition in a laboratory for the first time in history. Its 192 square laser beams will converge inside a 30-foot target chamber, enveloping a BB-size target of hydrogen isotopes, and creating temperatures of 100 million degrees and pressures above 100 billion atmospheres. The conditions are similar to those found in the sun and produce phenomena never before experienced in a laboratory setting.



NIF TARGET CHAMBER: A worker peers through a hatch in NIF's 10-meter diameter target chamber. The laser beams enter the chamber from above (shown here) and below in groups of four. A final set of optics focuses each beam directly at the target, and compresses its size from about 40 square centimeters to just a pinpoint.

Construction of the stadium-sized building was completed, and the first scientific experiments using the first four beams were conducted, in 2002. Now, robotic transporters are installing optics, diagnostic and mechanical equipment in modules called line replaceable units (LRUs) for the rest of the beamlines. By mid-June, more than 2,100 of the total 6,204 LRUs had been lifted into place.

An early set of collaborative experiments between Lawrence Livermore and Los Alamos National laboratories in May 2004 demonstrated NIF's value and provided high-quality experimental experiments will investigate the physics regimes associated with weapons effects, radiation transport, secondary implosion and ignition in support of the continued success of the Stockpile Stewardship Program.

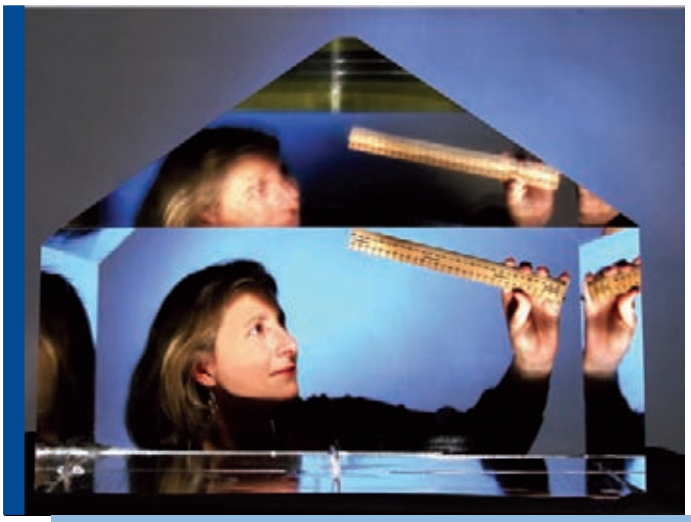
data to validate supercomputer codes.

Shots performed in August 2005 with eight beams achieved 152 kilojoules of infrared laser light.

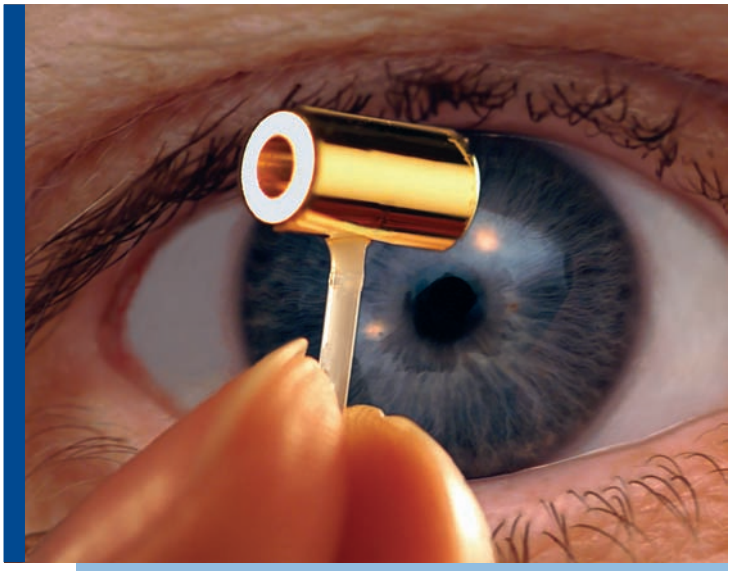
This performance, utilizing just four percent of the full system, exceeds the demonstrated infrared drive energy of any presently operating fusion class laser.

But, NIF is capable of doing much more. The intense pressures that lasers can create can be used by astrophysicists to better understand the evolution of supernovae, how stars evolve, the behavior of dwarf stars, gravitational effects at the center of large planets such as Jupiter, and ultimately, the origins of the universe.

NIF also is at the forefront of the effort to develop fusion energy. Fusion, along with fission and solar energy, is one of only three nearly inexhaustible sources capable of satisfying the world's energy needs for the next century and beyond, while avoiding the negative environmental impacts of fossil fuels. Russia, France and the United Kingdom have formally proposed cooperation with the United States in inertial confinement fusion technologies for NIF and/or for inertial fusion energy. More information about NIF is available at: www.llnl.gov/nif/project/.



RAPID GROWTH NIF CRYSTAL: A researcher measures a massive potassium dihydrogen phosphate crystal specially grown for use by NIF. The development of technology to more quickly grow high-quality crystals is a major technological success of the NIF project.



INDIRECT DRIVE NIF TARGET: Closeup of a gold hohlraum, about 6 mm in diameter and 10 mm long, where NIF energy is converted to thermal X-rays. The hohlraum contains a plastic fusion capsule about 3 mm in diameter.

Other Scientific Missions For NIF Include:

Hydrodynamics
— Hydrodynamics is the study of fluid motion and the fluid's interaction with its boundaries. NIF will allow us to further our understanding of so-called "stable" and "unstable" hydrodynamics, including those of inertial confinement fusion and shock wave phenomena in the galaxy. NIF will permit the detailed study of phenomena that to the present have been studied exclusively by astronomical observation or by computer theoretical simulation.

Material Properties
— NIF's capabilities for studying condensed matter physics at extreme conditions of pressure and temperature will make it an important new tool in the study of high-pressure physics.

Plasma Physics
— NIF will advance understanding of the plasmas, the predominant state of matter in our universe.

Radiation Sources
— The conversion of laser energy into short-wavelength radiation is a primary goal of many high-energy laser experiments. NIF will be able to convert laser energy to a wide variety of X-ray and particle sources needed to address several important physics questions in basic and applied physics.

U.S.-Origin HEU Removed From Argentina

Twenty-four fuel assemblies containing more than three kilograms of U.S.-origin highly enriched uranium (HEU) have been removed by NNSA from Argentina. The slightly irradiated nuclear fuel was safely and securely returned to the United States through a joint effort with Argentina's National Atomic Energy Commission.

"We applaud the leadership role that Argentina is taking to minimize and, to the extent possible, eliminate the use of HEU in civil nuclear purposes," said NNSA Administrator Linton F. Brooks. "This shipment of highly enriched uranium is part of NNSA's broad global effort to reduce the risk of terrorists acquiring nuclear material."

Under NNSA's Global Threat Reduction Initiative, the United States and Argentina have been cooperating over the last year on a wide-range of nuclear nonproliferation activities. The removal and return of the 24 fuel assemblies from the RA-2 research reactor is the first step in a three-part agreement reached between the U.S. and Argentina to remove or dispose of all U.S.-origin HEU materials in Argentina.

The second step in the agreement includes converting the RA-6 research reactor in Argentina from the use of HEU to low enriched uranium fuel, a material that is less attractive for proliferation. Lastly, U.S.-origin spent HEU fuel from the RA-6 research reactor will be returned to the United States.

Where There's Smoke, There May Be Fire

Several key agencies around NNSA's Nevada Test Site (NTS) have demonstrated that a collaborative spirit pays off, especially when it comes to addressing a fire season that has lived up to a prediction that it would be severe.

So far this summer, two significant events have occurred on the test site, which is 65 miles north of Las Vegas: the Mid Valley Fire flared up in the central portion of the test site on July 4, and the Benton (wildland) Fire sparked on July 9 near Area 27 on the test site.

Both fires elicited prompt response from NTS Fire and Rescue (F&R), which worked in tandem with a number of key agencies to quell the flames. These included the U.S. Bureau of Land Management (BLM), the Air National Guard, and the U.S. Forest Service. The Mid Valley Fire was contained three days after the initial spark while the Benton wildland Fire was contained the next day.

The primary response organizations for the Mid Valley Fire were NTS F&R, along with the BLM assisting with two, 20-person hotshot crews and aircraft providing water and retardant drops. In all, more than 60 personnel worked to quench the blaze, responding with four brush trucks, eight all terrain vehicles, a Llama 315B helicopter, two C-130 Hercules aircraft, and two single-engine aircraft tankers.

"Both of these fires reached 100 percent containment in a relatively short period of time due to the outstanding collaboration among a number of agencies who provided support to NTS Fire and Rescue," stated Steve Lawrence, assistant manager for site operations in NNSA's Nevada Site Office Emergency Operations Center.

HOLDING THE LINE: An All Terrain Vehicle conducts spot suppression and lays down a suppression line of fire retardant around NTS assets.

Russian HEU Consolidated At Secure Site

A two-year cooperative effort to remove highly enriched uranium (HEU) from a Russian research facility and consolidate it at a more secure site in Russia has been successfully completed. *(At newsletter publication time, NNSA also announced that 40 kilograms of HEU have been safely returned to Russia from Poland.)*

Teams from NNSA worked jointly with the Russian Federal Agency of Atomic Energy (Rosatom) to transfer the HEU from the Krylov Shipbuilding Research Institute in St. Petersburg, Russia to the Research Institute of Atomic Reactors in Dmitrovgrad.

HEU CHECK: Nondestructive analysis measurements taken by Krylov staff with data collection and observation by NNSA's monitoring team.

The material joins the 8,000 kilograms of material already down-blended to low enriched uranium for use in Russian nuclear power plants under NNSA's Material Consolidation and Conversion (MCC) program.

"With NNSA's support, a Russian institute has eliminated its entire stock of nuclear material," said NNSA Administrator Linton F. Brooks. "By reducing the number of sites with highly enriched uranium, the challenge of protecting the material from theft and the overall costs of doing so are reduced."

NNSA's MCC effort helps to reduce the proliferation risk of nuclear material inside Russia by supporting the consolidation and conversion of HEU. The MCC project has also supported the secure storage and conversion of Russian-origin HEU that has been returned from countries such as Serbia, Bulgaria, Uzbekistan, the Czech Republic, and Latvia.

U.S. Nuclear Weapons-Grade Material Converted Into Electricity

A nonproliferation initiative jointly conducted by NNSA, USEC Inc. and BWX Technologies, Inc. (BWXT) recently converted weapons-grade highly enriched uranium (HEU) into low-enriched uranium (LEU) fuel that will be used by commercial nuclear power plants to produce electricity.

The U.S. HEU Downblending Program is a component of the NNSA's nuclear nonproliferation mission to reduce quantities of surplus weapons-grade materials. Converting HEU to LEU fuel makes the material proliferation-resistent; reduces costs associated with storing, inventorying and safeguarding it; and recovers its inherent economic value.

The conversion process began in 1999 with excess HEU from DOE's Portsmouth Gaseous Diffusion Plant and NNSA's Y-12 National Security Complex.

Under the program, approximately 50 metric tons of weapons-grade HEU, which is enough material for 800 nuclear warheads, have been converted into nearly 660 metric tons of LEU fuel. Enough LEU fuel was produced to power a typical commercial nuclear reactor for approximately 34 years, generate enough electricity for every household in the United States for 81 days or meet 22 percent of U.S. annual household electricity needs.

"We have successfully turned weapons material into something people can use to turn the lights on in their house."

Administrator Linton F. Brooks

"We have successfully turned weapons material into something people can use to turn the lights on in their house," said NNSA Administrator Linton F. Brooks. "Reducing stockpiles of surplus weapons-usable material in the U.S. and around the world is critical to global security and a key part of NNSA's mission."

Weapons Railcars Now A Museum Exhibit In Amarillo

During the height of the cold war, railcars were used by what is now NNSA's Office of Secure Transportation to move weapons in support of the nation's nuclear deterrent. In July, a major part of the original weapons transport left the Pantex Plant in Texas for the last time and made its way to the Amarillo Railroad Museum.

"The work done at Pantex was a significant part of the Cold War," said Dan Glenn, Pantex Site Office manager. "This donation will provide the public with the opportunity to visit a piece of our nation's recent history."

The Pantex train will join a helium car at the museum. The Pantex Site Office, BWXT Pantex, Burlington Northern Santa Fe Railway and the Amarillo Railroad Museum worked together to coordinate the donation.

SMILE FOR DAY OF CARING: Hillary Drury, wife of NNSA's Kansas City Site Office (KCSO) employee Mark Drury, paints a smile on a ramp disabled children use to mount the horses at the Jackson County Therapeutic Horseback Riding Program. Mark and Hillary Drury were among the 17 KCSO employees, family members and friends that participated in the 2006 Day of Caring.

NNSA Labs Win 14 R&D 100 Awards For Industrial Innovations

Led by Lawrence Livermore National Laboratory with seven awards, NNSA's three national nuclear weapons laboratories won a total of 14 of the 2006 R&D 100 awards for developing advanced technologies with commercial potential. Los Alamos National Laboratory won five of the awards and Sandia National Laboratories received two.

Often described as the "Oscars of invention," the awards have been presented annually since 1962 by *R&D Magazine* in recognition of the 100 most technologically significant products introduced into the marketplace over the past year. All three NNSA labs are perennial winners of the awards. This year's awards will be presented in October in Chicago.

"I congratulate the researchers who have won these awards, which highlight the power and promise of DOE's investments in science and technology," said Secretary of Energy Samuel Bodman. "Through the efforts of dedicated and innovative scientists and engineers at our national laboratories, DOE is helping to enhance our nation's energy, economic and national security."

For a complete listing of the winning technologies contact Al Stotts at Astotts@doeal.gov.