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Deputy Secretary Discusses Complex 2030

By 2030, the U.S. will have a transformed nuclear weapons stockpile and supporting infrastructure, Deputy DOE Secretary Clay Sell recently told the U. S. House Appropriations Subcommittee on Energy and Water Development.

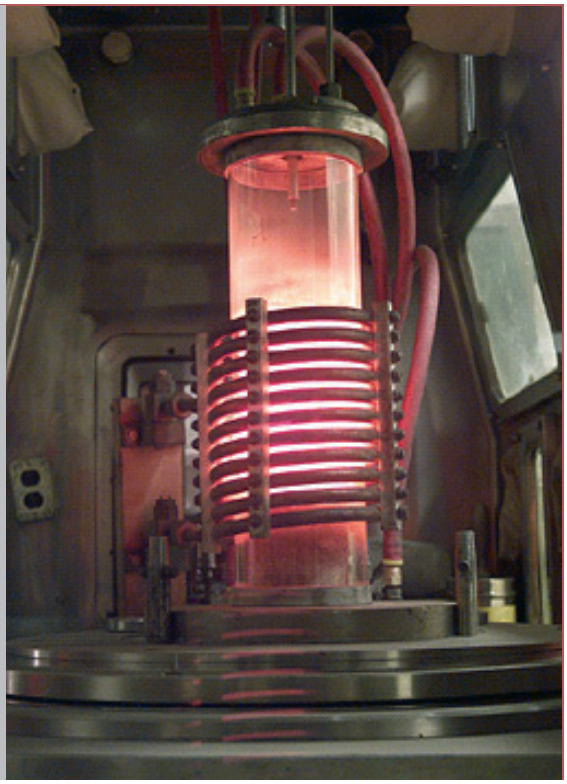
"Success in realizing our vision for transformation will enable us to achieve over the long term a smaller stockpile, one that is safer and more secure, one that offers a reduced likelihood that we will ever again need to conduct an underground nuclear test, one that reduces the nation's ownership costs for nuclear forces, and one that enables a much smaller but also much more responsive nuclear infrastructure," Sell said.

Sell also said dismantlements of U.S. nuclear weapons will jump approximately 50 percent from FY06 to FY07, continuing the historic reduction in nuclear weapons ordered by President Bush.

NNSA has started this major transformation that will affect each of its sites. For more information, see pages 4 and 5.

In This Issue

Pu FURNACE: Molten plutonium metal is prepared for casting operations using an induction coil furnace at Los Alamos National Laboratory Technical Area 55. Scientists and engineers at Los Alamos have recaptured the nation's ability to manufacture plutonium triggers, or pits, lost when the Rocky Flats plant in Colorado was closed. See story on pages four and five on the future of the NNSA complex as described by Deputy Administrator for Defense Programs Tom D'Agostino in recent congressional testimony.



Secret Mission To Remove HEU From Uzbekistan Completed Successfully

NNSA's Global Threat Reduction Initiative (GTRI) program recently announced that 63 kilograms (139 pounds) of highly enriched uranium (HEU) in spent nuclear fuel were safely and securely returned to Russia from Uzbekistan.

The United States, the Russian Federation, Uzbekistan, Kazakhstan, and the International Atomic Energy Agency (IAEA) jointly conducted four secret shipments. Most of the HEU spent fuel was enriched to 90 percent and could be used in a nuclear device or as part of a "dirty bomb."

"These shipments of highly enriched uranium spent fuel, to a secure Russian facility, are part of NNSA's efforts to make sure this type of material doesn't fall into the wrong hands. We will continue working hard with the international community to reduce stockpiles of high-risk, vulnerable material worldwide," Administrator Linton F. Brooks said. "It was only with the cooperation of Uzbekistan, Russia, Kazakhstan and the IAEA that we were able to successfully complete this important international nonproliferation mission."

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Secret Mission To Remove HEU From Uzbekistan Completed Successfully

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The shipments of HEU spent fuel from Uzbekistan took place under tight security. During each of the shipments, HEU spent fuel was packaged into Russian TK-19 spent fuel transportation casks and then trucked under guard from the Uzbekistan Institute of Nuclear Physics to a railroad station near the capital city Tashkent. At the railroad station, the secure casks were loaded into special railroad cars and shipped through Kazakhstan to a secure Russian facility near Chelyabinsk where the spent fuel will be reprocessed over the next several years.

Uzbekistan is the first country from which Russian-origin HEU spent fuel has been returned to Russia under the 2005 Presidential Joint Statement between Presidents Bush and Putin agreed to in Bratislava, Slovakia. The agreement helped enhance and accelerate nuclear site and material security work between the U.S. and Russia. A prioritized schedule was developed for the completion of all shipments of Russian-origin fresh and spent fuel currently stored outside of research reactor cores by 2006 and 2010 respectively.

The HEU, originally supplied to Uzbekistan by the Soviet Union, was used as fuel for the WWR-SM research reactor of the Institute of Nuclear Physics. Because the material was cooling for a long period of time it no longer emitted an immediate lethal dose of radiation as other spent fuel does, making it easier to handle and therefore vulnerable to theft or diversion.

Previously, eight successful shipments of Russian-origin highly enriched uranium fresh fuel were conducted under NNSA's GTRI program. To date, approximately 186 kilograms (410 pounds) of HEU have been repatriated to Russia from Serbia, Romania, Bulgaria, Libya, Uzbekistan, Latvia, the Czech Republic, and Uzbekistan.

HEU REMOVAL: IAEA inspector seals the loaded TK-19 cask with NNSA Assistant Deputy Administrator Andrew Bieniawski watching. Bieniawski directs the Global Threat Reduction Initiative.

NNSA On Path To Secure Russian Nuclear Sites By End Of 2008

NNSA's work to secure nuclear material sites in Russia is on course for completion by the end of 2008, according to recent congressional testimony by Jerry Paul, NNSA's principal deputy administrator.

The 2008 schedule is a result of accelerated U.S. and Russian cooperation as called for in the February 2005 Joint Statement on Nuclear Security issued by Presidents Bush and Putin in Bratislava, Slovakia.

"To date, we have secured over 80 percent of the sites where these materials are stored and we are on course to finish all security upgrades by 2008 – a full two years ahead of the schedule," said Paul.

Accounting for and securing nuclear material in Russia and the former Soviet Union, is a priority for NNSA's Office of Defense Nuclear Nonproliferation. In cooperation with the Russian Federation, NNSA works to upgrade security at Russia's Federal Atomic Energy Agency weapons complex, and at sensitive sites that store and process weapons-usable materials in Russia.

Working cooperatively with the Russian Ministry of Defense (MOD) and the U.S. Department of Defense, NNSA also works to secure nuclear weapons at sensitive MOD sites, including Russian Navy and Strategic Rocket Forces sites, and to consolidate weapons-usable material into fewer, more secure

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Packaging Expert Receives NNSA 2005 Federal Safety Professional Of The Year Award

Kathryn D. Schwendenman, a packaging certification engineer at the NNSA Service Center in Albuquerque, received the first NNSA Federal Safety Professional of the Year award from NNSA Administrator Linton F. Brooks.

A pit packaging expert, she has excelled at completing safety reviews on or ahead of schedule by providing exceptional documentation of technical issues, and communicating effectively with pit design and pit packaging experts at Lawrence Livermore National Laboratory and Los Alamos National Laboratory.

Kim Davis Takes The Field

Kim Davis, senior technical advisor to NNSA's Principal Deputy Administrator Jerry Paul, is enjoying a change of scenery and a new perspective while on detail as the acting deputy manager at the Sandia Site Office (SSO) in New Mexico.

Kim Davis

Davis has been filling in at the SSO for Steve Goodrum, who is in Washington serving as the acting assistant deputy administrator for Military Application and Stockpile Operations (NA-12).

While at SSO, Davis has been engaged in several key activities including leading a self-assessment at Sandia National Laboratories Technical Area-V that reviewed 16 functional areas. Other areas of focus have been on strengthening the facility representative program and the removal of special nuclear material. She has particularly enjoyed returning to the field and getting to know the SSO employees.

Davis had previously worked for the departmental representative to the Defense Nuclear Facility Safety Board, where she performed engineering and technical liaison duties between DOE and the board. Prior to that she worked at the NNSA Pantex Site Office and the Savannah River Site. Davis has also worked on Capitol Hill as a technical advisor to U.S. Representative Charlie Norwood from Georgia. Kim has a bachelor's degree in mechanical engineering from West Virginia University and a masters in environmental engineering from Clemson University.

NNSA Outlines Plans For Future Of The Nuclear Weapons Complex

NNSA's plan to establish a smaller, more efficient nuclear weapons complex able to respond to future challenges was detailed in a recent congressional hearing by Tom D'Agostino, NNSA's deputy administrator for defense programs.

"By 2030, the vision I set forth is of a world where a smaller, safer, more secure stockpile, with assured reliability over the long term, is backed by an industrial and design capability to respond to changing technical, geopolitical or military needs," said D'Agostino, who testified before the House Armed Services Committee Subcommittee on Strategic Forces. "It offers the best hope of achieving the President's vision of the smallest stockpile consistent with our national security needs."

In 2004, President Bush directed that the size of the nuclear weapons stockpile be reduced by nearly 50 percent by 2012. At that point the stockpile will be the smallest it has been since the Eisenhower administration.

D'Agostino noted that consolidating nuclear materials and eliminating duplicative capabilities at the nuclear weapons complex sites would allow NNSA to further reduce the "footprint," or total square footage, set aside for weapons work at eight sites around the country. The size of the weapons complex has decreased by more than 40 percent since the end of the Cold War.

B61 MAINTENANCE: BWXT Pantex production technicians work on a section of a B61 bomb. The B61 was first produced in 1966 at the Pantex Plant in the Texas Panhandle. Pantex is now charged with weapons maintenance and disassembly.

INSIDE OUT: The interior of the National Ignition Facility target chamber at Lawrence Livermore National Laboratory.

"We recognize that 'business as usual' is not sustainable, will not be successful, and cannot be the path we choose," D'Agostino said. "Our Complex 2030 vision represents a departure from the current strategy."

D'Agostino said NNSA

DARHT: Non-nuclear hydrotests are conducted at Los Alamos National Laboratory's Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility. Data from DARHT experiments is used to both inform and validate the nation's most advanced weapon computer codes and simulations.

W76: The W76 is an important part of the U.S. nuclear weapons stockpile. Refurbishments will enhance its safety and security, and extend its life an additional 30 years.

significantly benefited from the work of the Secretary of Energy's Advisory Board Task Force on the Nuclear Weapons Complex Infrastructure, and that many of the recommendations that the task force outlined were already underway or incorporated into NNSA's existing plans.

More details about NNSA's future plan and D'Agostino's full testimony can be found on NNSA's website: www.nnsa.doe.gov.

The principal elements of NNSA's "Complex 2030" include:

- **Continuing to work on a Reliable Replacement Warhead to ensure the long-term reliability and safety of the nuclear weapons stockpile and enable a more responsive supporting infrastructure while reducing the possibility that the United States would ever need to return to underground nuclear testing;**
- **Significantly increasing the dismantlement of retired war heads that are no longer part of the stockpile;**
- **Increasing security and reducing security costs by consolidating special nuclear materials used in nuclear weapons to fewer sites in the complex and fewer locations within the sites;**
- **Establishing a consolidated plutonium center for research, development, production and surveillance operations; and**
- **Introducing more uniformity in technical and business practices and more effective risk management to achieve more efficient operations.**

Y-12 Mentors Future Scientists

The Y-12 National Security Complex is helping South Carolina State University strengthen its science curricula through the Mentor-Protégé Program. Ken Lewis of Y-12's engineering group is on assignment to the school to set up a radiochemistry program.

"The Y-12 Mentor-Protégé Program at SCSU is working magnificently," Lewis said. "It's a win-win situation for both Y-12 and SCSU. The programs we're helping get established are producing students whose skills fit with national security needs."

FUTURE SCIENTISTS: Ken Lewis of BWXT Y-12 with students at South Carolina State discuss a radiochemistry experiment.

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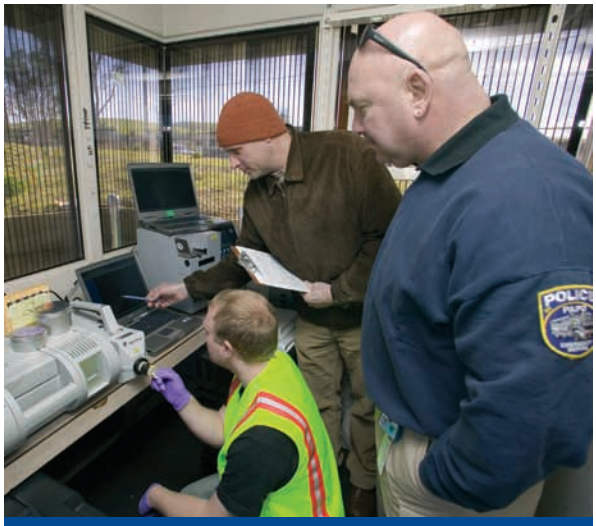
LLNL Leads Explosives Detection Pilot Program

Lawrence Livermore National Laboratory is leading a pilot program to evaluate technologies and procedures for detecting explosives transported on roadways.

Called the Vehicle-Borne Improvised Explosive Device Campaign, the program is analyzing a variety of explosives detection systems, selecting equipment for deployment, developing concepts of operations and detailed test protocols, and training operators.



Jeremiah Gruidl (left) of Lawrence Livermore National Laboratory analyzes a particulate sample for explosives as part of the Vehicle-Borne Improvised Explosive Device Campaign. Looking on are Fabien Raccah (middle) of the Department of Homeland Security and Raymond Cantelmo, a Port Authority of New York and New Jersey police officer.

LLNL researchers are partnering with the Environmental Measurement Laboratory of New York City, the Transportation Security Laboratory of New Jersey, and the Port Authority of New York and New Jersey. The program is funded by the Department of Homeland Security's (DHS) CounterMeasures TestBeds (CMTB) Program, which originally was created in NNSA's Office of Nonproliferation Research and Development, and later transferred to DHS. The pilot program takes advantage of LLNL's expertise in explosives and field testing, developed and honed in support of NNSA's defense missions.

In recent weeks, the team has been randomly screening vehicles entering New York City from New Jersey, assessing their ability to detect minute traces of explosives in an environment saturated with vehicle exhaust and grime, and where weather conditions can range from fog, rain, sleet and snow to hot and humid conditions.

Some of the questions the team hopes to answer include how well explosives can be detected, the rate of false alarms, how quickly vehicles can be moved through checkpoints and the reliability of the detection equipment.

Test results will be shared with manufacturers to help them increase product effectiveness, which is one of the key missions of the CMTB.

Future phases of the program are expected to focus on lessons learned and the deployment of advanced technologies, as well as expanding efforts to other cities and other modes of transportation.

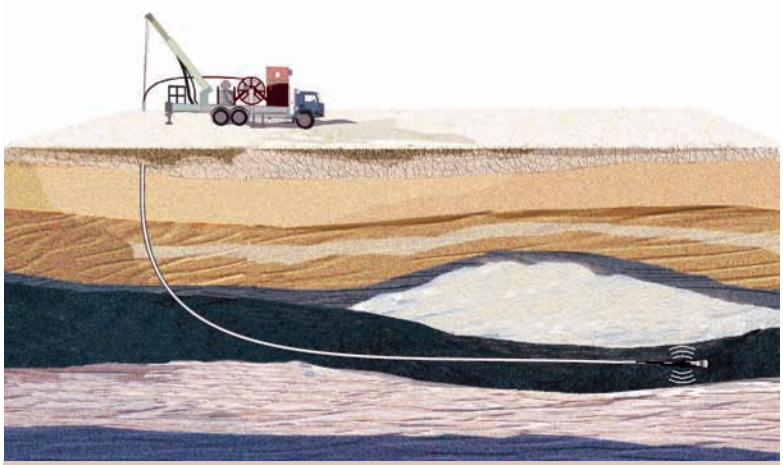
Kansas City Plant Facilitates Radar Technology

Ultimately it may help the U.S. reduce its dependence on foreign oil by locating missed oil and gas reserves, but the new Drill String Radar (DSR) was also developed with another mission: preventing nuclear proliferation and terrorism.

An advanced geophysical exploration system, DSR was engineered by Stolar Horizon, Inc. as part of NNSA's Global Initiatives for Proliferation Prevention (GIPP) program.

GIPP focuses on reducing the proliferation of weapons of mass destruction by redirecting the skills of former weapons engineers, technicians, scientists, and production workers to commercial, non-weapons product development and manufacturing. Under GIPP, NNSA's national laboratories and manufacturing facilities team up with U.S. commercial industries and former weapons scientists to form partnerships to evaluate opportunities for commercial projects and bring innovative technologies to market.

The DSR was developed through a GIPP partnership with NNSA's Kansas City Plant (KCP), Stolar and scientists from the Measuring Systems Research Institute (NIIIS) in Nizhny Novgorod, Russia. During the Cold War, scientists and engineers at NIIIS designed and manufactured radars for the Soviet Union's nuclear weapons programs. KCP, which has long been involved with the GIPP program, served as the project facilitator, funding provider and technical partner. The DSR project created 65 jobs in the U.S. and created or supported 250 civilian jobs for former weapons scientists in Russia.



DRILL STRING RADAR: DSR technology recently received the prestigious 2005 R&D 100 Award. Part of the NNSA's Initiative for Proliferation Prevention, the DSR project received funding, technical support and facilitation from the NNSA's Kansas City Plant, including program managers Dr. Chris Baumgart, LaCurtise Smith and DeWitt Miller. DSR's many benefits are only beginning to come into focus.

In addition to demonstrating an excellent GIPP success story, Stolar's technology has important commercial implications that are only beginning to come into focus.

When installed onto a drill bit for underground exploration, DSR is an efficient, advanced drilling system that helps to reduce overall costs. It allows for more accurate horizontal drilling by employing specialized radar to measure surrounding material and identify nearby structures and geologic layering to help detect, navigate and map unknown underground areas.

"The DSR system is a win-win for our national security. Not only was the detail design developed by former weapons scientists who might have been misdirected to illicit work, but it also resulted in a radar that will help make drilling safer, more efficient and productive," said Dr. Chris Baumgart, KCP project manager.

NNSA On Path To Secure Russian Nuclear Sites By End Of 2008

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locations.

With over 95 percent of the warhead and nuclear fuels sites completed, NNSA will finish work on securing Russian Navy warhead and nuclear fuel sites in 2006. NNSA is also working to secure all remaining 12th Main Directorate and Strategic Rocket Forces warhead sites on an accelerated schedule.

Paul noted that upgrades have been completed at 41 of 51 sites containing nuclear materials, or about 80 percent, and that upgrades were completed at 47 of 73 nuclear warhead storage sites, or about 64 percent.

"The Bratislava initiative truly elevated our dialogue to a national level. It has moved our cooperation to one of a shared partnership. One example would be our cooperation on physical protection of sensitive nuclear sites in Russia. That has been accelerated and will allow us to complete those by the end of 2008," said Paul.

Sandia Pulsed Reactor Resumes Operation

Resumption of programmatic operations for the Sandia National Laboratories Pulsed Reactor III (SPR-III) Facility means that Sandia can once again conduct experiments required for weapons surety.

The SPR-III is a low integrated-power research reactor employing an alloy of highly enriched uranium that provides pulse and steady-state neutron irradiation services in support of a variety of defense applications and related research and development. The SPR-III is designed to produce a neutron spectrum very similar to a pure fast fission spectrum, and it is primarily used to test electronic components.

In January, Sandia Site Office Manager Patty Wagner authorized resumption of operations following successful completion of an extensive restart operations plan. Included was a physics testing plan that verified proper reactor operation in both the steady-state and pulse modes.

"This is an important step in restoring a one-of-a-kind testing capability for weapons surety," Wagner said. "It's been a lot of hard work by a lot of people, both on the part of my staff and Sandia Tech Area-V. I want to thank every one of them for their dedication and perseverance in achieving this important milestone."

REACTOR CONTROL ROOM: Sandia SPR reactor operators monitor the operation of the SPR III reactor in the control room while an NNSA Sandia Site Office racility representative looks on.

Preparations for reactor operations included retrieving the SPR-III core, recertification of its operators, and updates to the Safety Basis. Both the Sandia National Laboratories and the Sandia Site Office conducted independent operational readiness reviews.

The SPR-III was restored to operation to support continuing defense applications. Effort are underway to replace the SPR-III with a simulation tool so that the reactor can be dismantled and the fuel relocated in support of the complex-wide special nuclear material deinventory initiative.

John O'Brien, classification and security systems manager at the Pantex Site Office, recently graduated from the Naval Postgraduate School earning a master's degree in security studies. The program, sponsored by the Department of Homeland Security, is the first master's degree program in the nation to focus on homeland defense and security issues. It offers disciplines that concentrate on developing effective defenses and responses to new threats facing our country.

SECURITY STUDIES GRADUATE: Dr. Francis J. Harvey, secretary of the army (left), presents a diploma to John O'Brien during graduation ceremonies on March 24.