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NNSA To Upgrade Last Russian Nuclear Warhead Site

Upgrading will begin on the ninth and final Russian nuclear warhead site assigned to NNSA under the 2005 joint statement between Presidents Bush and Putin in Bratislava. In the statement, the United States and Russia agreed to cooperate on nuclear security issues, and subsequently, NNSA was designated as the lead organization to provide security enhancements to nine Russian nuclear warhead facilities.

"NNSA's main nonproliferation goal is to secure weapons and nuclear material as close to the source as possible. Significant progress has been made to upgrade and improve security at sites within Russia, and with this final site, NNSA will take another significant step toward meeting its commitments under the 2005

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Y-12 NATIONAL SECURITY COMPLEX: The Y-12 National Security Complex is considered a "world leader" in microwave metal and ceramic processing technologies. Microwave technology for metal melting saves energy, reduces cycle time and improves quality when compared with conventional techniques. Y-12 uses microwave melting to cast uranium. See pages four and five for more on Y-12's modernization projects.

Special Nuclear Material Reduction Underway At Lawrence Livermore

NNSA has begun reducing the inventory of special nuclear material (SNM) at the Lawrence Livermore National Laboratory in California. SNM, including plutonium and highly enriched uranium, is fissile material used in nuclear weapons and for research and development purposes at the laboratory.

"Consolidating material is one of our main goals to transform the Cold War-era nuclear weapons complex to be even more secure, more efficient and more modern, said Acting NNSA Administrator Tom D'Agostino. "We are taking concrete steps to reduce the number of locations where we process and store significant quantities of nuclear

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Special Nuclear Material Being Drawn Down At Lawrence Livermore National Laboratory

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weapons materials."

The first shipment of material out of Livermore was recently completed in full compliance with existing safety and environmental authorizations. It was sent to a secure site at Los Alamos National Laboratory in New Mexico. NNSA plans to remove nearly all nuclear material from Livermore by 2014. A small inventory of nuclear materials will remain at the laboratory for research with overall security requirements greatly reduced.

NNSA's strategy is to reduce the number of sites and facilities with Category I and II amounts of special nuclear materials, which require the highest level of security. Consolidating nuclear materials and eliminating duplicative capabilities at facilities will allow NNSA to further reduce the total square footage set aside for weapons work at the eight sites around the country in the nuclear weapons complex, thus reducing resource-intensive physical security requirements.

Additional consolidation efforts are currently underway and planned across the complex. Facilities are being constructed to enhance security and consolidate highly enriched uranium at the Y-12 National Security Complex in Tennessee. Special nuclear materials will be removed from Sandia National Laboratories in New Mexico by 2008 and from Los Alamos National Laboratory by 2022. Like Livermore, Sandia and Los Alamos will retain small amounts of special nuclear materials.

KIM DAVIS JOINS SES: Acting Administrator Tom D'Agostino confers Senior Executive Service (SES) status to newly appointed Sandia Site Office deputy manager Kim Davis. The SES is comprised of the men and women charged with leading the continuing transformation of government. Davis has been the acting deputy manager since December 2005. Prior to SSO she served in Washington, D.C. as the senior technical advisor for the principal deputy administrator. She has a Bachelor's degree in mechanical engineering and a Master's in environmental engineering and science.

NNSA To Upgrade Last Russian Nuclear Warhead Site

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Bratislava agreement," said William H. Tobey, NNSA's deputy administrator for nuclear nonproliferation.

NNSA, through Sandia National Laboratories, completed the security upgrade design work and finalized contract negotiations under its Material Protection, Control, and Accounting Program in order to complete the work by December 2008.

The security upgrades that will be installed at the site, which is under the control of the 12th Main Directorate, are designed to protect against the risk of theft or attack by terrorists, and include installing physical protection systems, such as intrusion detection sensors, access controls and hardened defensive positions.

NNSA has previously provided security upgrades at 61 military-affiliated sites in the Russian Federation, and has contracts in place to install security systems at 23 additional sites by December 2008.

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Sandia Studies Anti-terror Technologies

Daily news stories about war and conflict around the globe mean that just below the consciousness of every American on any given day is the knowledge that terrorist activity could occur again in our own country. Although it is unsettling to consider such possibilities, NNSA's facilities are continuously involved in research and development to anticipate and mitigate that likelihood.

At NNSA's Sandia National Laboratories in Albuquerque, N.M., for example, scientists and engineers are creating new methods to track the illicit trade in radiological materials, to screen people and packages for hazardous and toxic materials, and to predict the consequences of explosive and nonexplosive radioactive dispersal devices (RDDs) or "dirty bombs."

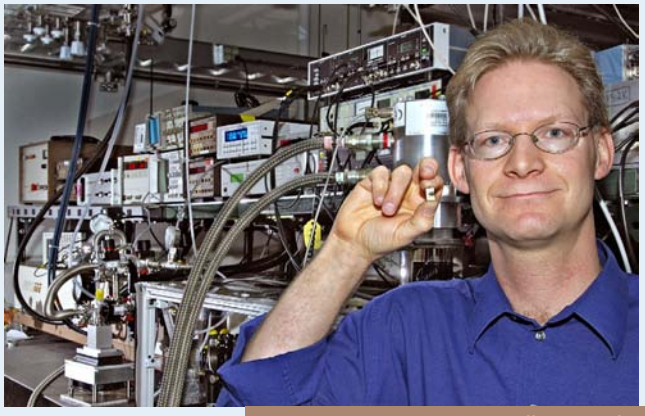
Monitoring Contraband Nuclear Material

Sandia has developed a simulation program designed to track the illicit trade in fissile and non-fissile radiological material well enough to predict who is building the next nuclear weapon and where they are doing it.

"By using a cluster analysis algorithm coded into a program," said Sandia researcher David York, "I evaluated those traffic patterns and routes in which thefts, seizures, and destinations of materials were reported. Data from these examinations were enough to allow me to retrospectively depict the A. Q. Khan network before it was uncovered."

Khan is a Pakistani scientist linked to the illicit proliferation of nuclear technical knowledge. Cluster analyses link data of common place, time, or material. Testing a computer simulation on a known past event is one accepted means of establishing the program's validity.

For his study, York collected and collated data from 800 open-source incidents from 1992 to the present, along with the movement of dual-use items like beryllium and zirconium. He plotted the incidents on a global information system software platform and came up with a network of countries and routes between countries indicative of an illicit nuclear and radiological trafficking scheme.



SCREENING DEVICE: Mike Wantke, principal investigator of the Sandia National Laboratories Terahertz Microelectronics Transceiver Grand Challenge, holds a miniaturized device that will eventually replace large pieces of equipment like those in the background.

The Next Generation of Screening Devices

Researchers at Sandia are developing the next generation of screening devices that will identify hazardous and toxic materials even if they are concealed by clothing and packaging materials.

Working in the underutilized terahertz (THz) portion of the electromagnetic spectrum that lies between microwaves and infrared, a Sandia team has a goal of building a highly integrated miniaturized terahertz transmitter-receiver (transceiver) that could make a number of applications possible.

The project, the Terahertz Microelectronics Transceiver Grand Challenge, is in its second of three years of funding through Sandia's internal Laboratory Directed Research and Development program.

"The technology being developed can be used to scan for items such as concealed weapons or materials, explosives, and weapons of mass destruction," said Mike Wanke, principal investigator. "In addition, we believe it will find applications in advanced communication systems and high-resolution radars. However, the infrastructure needed to move the terahertz technology from the laboratory to the field is unavailable right now. We want to develop that infrastructure and invent the necessary technologies."

The team is currently developing the receiver, doing systems tests and exploring packaging requirements. At the end of three years, the researchers expect to have a working prototype capable of detecting the materials and chemicals by reading distinctive molecular spectral "signatures." In addition to monitoring for concealed hazardous materials, Wanke said a terahertz system can be used to monitor the air for toxic materials.

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Future Y-12 National Security Complex

The future is being built today at the Y-12 National Security Complex.

Y-12's modernization is a site-wide effort that combines site consolidation, production, safety and security upgrades to create a modern, more responsive, efficient and cost effective plant able to meet mission needs faster and less expensively.

PRECISION MACHINING DONE SAFELY: A Y-12 employee using a micrometer measures the diameter of a part on a vertical milling machine.

The Oak Ridge, Tenn. facility serves as the nation's source of secondaries, cases, and other nuclear weapons components and provides enriched uranium for the U.S. Navy. Y-12 is a leader in materials science and precision manufacturing and serves as the main storage facility for enriched uranium. Y-12 also supports efforts to reduce the risk of nuclear proliferation and performs complementary work for other government agencies

"Y-12 is well down the path of an aggressive modernization plan that is reducing the footprint, consolidating material storage and replacing mission-critical facilities to ensure the health and safety of the workers, the public and the environment," said Ted Sherry, manager of the National Nuclear Security Administration's Y-12 Site Office.

Modernization at Y-12 is focused on building new, more efficient and secure facilities for special nuclear materials. At the center of this are the Highly Enriched Uranium Materials Facility (HEUMF) and the Uranium Processing Facility (UPF). HEUMF is approximately 45 percent complete, and significant progress is being made toward its 2009 completion date.

UPF, featuring consolidated operations and new technologies, will improve conditions for worker safety and health. UPF will consolidate production operations that are currently housed in multiple buildings, reduce the highest security area by 90 percent and improve the security posture. The current schedule is for UPF construction to start in 2009 with operations to begin in 2016.

"We can see the future of Y-12 today as these new facilities

OPERATIONS TECHNOLOGY: Y-12 has long be of advanced machine tool technology.

are completed and become operational," said BWXT Y-12's President and General Manager George Dials. "These projects are precisely the plan for Y-12 under NNSA's vision for Complex 2030."

Material consolidation—a nearly invisible aspect of modernization—is also having a significant impact at Y-12. Major work is currently underway at Y-12 to plan and prepare for the movement of special nuclear material in existing storage facilities.

"We have to be ready to move to HEUMF when the time comes," said Dials. "That means

Takes Shape With Modernization Projects

we are spending a lot of time preparing material to make sure it meets requirements for HEUMF."

Other elements of Y-12's modernization are progressing in

en involved with the development and deployment

phases that will ultimately lead to the new Y-12 footprint. The relocation of the Quality Evaluation mission is one such project. A second activity, Depleted Uranium Consolidation, is consolidating depleted uranium operations now occurring in three major production facilities into one central location. This activity, along with Quality Evaluation Relocation, will enable Y-12 to cease operations in approximately one million square feet of aging production facilities.

The most visible of the modernization projects are the Jack Case and the New Hope centers. At 75 percent complete, these new buildings are ahead of schedule.

The 413,000-square-foot Jack Case Center will contain office space for 1,200 people, a new cafeteria, a new occupational health center and conference space.

The 137,000-square-foot New Hope Center will be the new public face of Y-12. It will contain office space for 300 people, a visitor center, badging office and a public exhibit area to highlight Y-12's proud tradition. Built with private-sector financing, these new buildings could save nearly $100 million in operating, maintenance and renovation costs over the next 25 years.

A modernization project that will provide a needed upgrade for an existing facility is the Y-12 Steam Plant Life Extension project. This project, which will repair and replace existing components of the steam plant and peripheral facilities, will keep the steam rolling through 2025 to support the production mission and to supply building heat for employee comfort and winter freeze protection. Two additional line item projects, the Compressed Air Upgrades Project and the Potable Water Upgrades Project, also are under way to improve Y-12 utility systems.

Along with new construction, Y-12 has been steadily reducing and removing obsolete structures. More than a million square feet of excess facilities have been demolished. Y-12 is also working with the Department of Energy Oak Ridge Office of Environmental Management and the Oak Ridge National Laboratory to obtain approval of the Integrated Facilities Disposition Project to address the disposition of almost three million square feet of legacy facilities on the Y-12 site.

JACK CASE CENTER: This corridor filled with natural light from large windows leads to the new cafeteria that will be located in the Jack Case Center.

Weapons Complex Employees Donate More Than $11M To Fund Drives Throughout The Nation

Contractor and federal employees of NNSA and its facilities throughout the nation donated $11,288,593 last year to a wide variety of local, regional and national charities and non-profit organizations and institutions through the Combined Federal Campaign and local United Way-affiliated fund drives.

Acting NNSA Administrator Tom D'Agostino said, "I'm proud of the public spirit that our employees exhibit all over the nation. Not only do our people contribute their expertise to the security of the nation, but they are generous in their monetary contributions to support worthy efforts ranging from community-based programs for the needy to national health initiatives and educational programs. It is gratifying to be associated with so many people who want to make life better for their communities and their nation."

Sandia National Laboratories employees in Albuquerque pledged a record breaking $3.175M to the United Way of Central New Mexico. The total for Sandia, including the SHARE campaign in California and the Employee Caring Program in Carlsbad, N.M.; Las Vegas, Nev.; and Amarillo, Texas, is $3,586,379.

Overall, NNSA's contractor employees at all facilities pledged $10,522,316 to community fund drives and federal employees contributed $766,277 to the Combined Federal Campaign.

IF I HAD A HAMMER… Lawrence Livermore National Laboratory physicist Dan Kalantar gets into the swing of things at the HOME run, the kick-off 2.8 kilometer race for its annual Helping Others More Effectively fund-raising campaign for charity. Over the last decade, LLNL employees have given more than $13 million to local charitable organizations through the HOME campaign.

Here are the totals for each NNSA facility and federal office:

- Los Alamos National Laboratory - $1.5 million to Northern New Mexico United Way programs
- Lawrence Livermore National Laboratory - $1,472,086 for HOME (Helping Others More Effectively) campaign

COMMUNITY INVOLVEMENT: Forrestal and Germantown participants in NNSA's Future Leaders program (FLP) in the Washington, D.C., area have created a volunteer activity group to facilitate the donation of time and resources to their communities. In this photo, members of the group assist with a Christmas party organized by the National Center for Children and Families. In the coming year the group will participate in the Big Brothers, Big Sisters program.

- Pantex Plant - $559,104 (includes a $37,500 BWXT corporate pledge)
- Kansas City Plant - $475,000 (FM&T's Heart of America United Way and Honeywell Hometown Solutions partner agencies)
- Y-12 National Security Complex - $646,956 (BWXT Y-12)
- Nevada Test Site - $356,000 (NSTec)
- Savannah River Site - $1,926,791 (Washington Savannah River Company, Bechtel Savannah River Inc., Energy Solutions Savannah River Corporation, BWXT Savannah River Company and CH2 Savannah River Company employees; total includes a WSRC $60,000 corporate gift)
- NNSA Headquarters - $238,221
- Pantex Site Office (Amarillo, Texas) - $26,081
- Livermore Site Office (Calif.) - $34,069
- Los Alamos Site Office (N.M.) - $17,600
- Sandia Site Office (N.M.) - $27,000
- Kansas City Site Office (Mo.) - $27,771
- Nevada Site Office - $32,000
- Savannah River Site Office (S.C.) - $101,040
- Y-12 Site Office (Tenn.) - $ 35,095
- NNSA Service Center (N.M.) - $200,000
- Office of Secure Transportation - $26,500

Livermore Scientists Receive Gordon Bell Prizes

NNSA computer scientists at Lawrence Livermore National Laboratory (LLNL) played key roles in winning two prestigious Gordon Bell Prizes announced at Supercomputing 2006, the premier international conference for high performance computing. Named for one of the founding fathers of supercomputing, the Gordon Bell Prize, widely regarded as the Oscar for supercomputing, is awarded to innovators who advance high-performance computing.

A team led by scientists with NNSA's Advanced Simulation and Computing (ASC) Program at LLNL received the "peak performance" prize for "Large-Scale Electronic Structure Calculations of High-Z Metals" conducted on the world's fastest supercomputer, BlueGene/L. The calculation, of unprecedented size and detail, is of particular value to scientists studying the effects of aging on nuclear weapons. The team was led by François Gygi, formerly of LLNL and now at the University of California Davis, and included Erik Draeger, Martin Schulz and Bronis de Supinski of LLNL, as well as scientists from IBM, Carnegie Mellon University and Vienna University of Technology.

Another ASC researcher at Livermore, Ron Soltz, was a member of the IBM-led team that garnered a second Gordon Bell Prize for "special achievement" with a breakthrough quantum chromodynamics calculation important to cosmology and particle physics. This simulation was conducted on LLNL's BlueGene/L and BlueGene machine at IBM's Thomas J. Watson Research Center.

NNSA Tops List Of Fastest Computers In The World

Supercomputers at NNSA laboratories hold four of the top six slots on the industry-standard TOP500 list of the world's fastest computers. NNSA computers on this year's list are: BlueGene/L at Lawrence Livermore National Laboratory (LLNL) in first place, Red Storm at Sandia National Laboratories (SNL) in second place, ASC Purple at LLNL in fourth place, and Thunderbird at SNL in sixth place.

"Now fully operational, these systems are delivering on the promise of taking three-dimensional computer simulation into an exciting new domain - predictive science," Energy Department Secretary Samuel W. Bodman said. "This capability is not only important to resolving current, time-urgent questions, but it is producing results that are providing the kind of new insights that lead to ideas for additional applications."

Supercomputers are critical to NNSA's work to assess the safety and reliability of the nuclear weapons stockpile. After the United States entered a nuclear testing moratorium in 1992, the Advanced Simulation and Computing program was developed to help secure the stockpile through computer simulation.

NNSA uses supercomputers within the science-based Stockpile Stewardship Program to compile theoretical models, experimental results, and legacy databases into an aggregated picture that weapon scientists use to assess the viability of the nation's nuclear stockpile. Computer simulations of nuclear weapons are extremely complex, requiring a tremendous collection of physics, chemistry, engineering and material science. Supercomputers are vital to NNSA's work.

"The advent of these systems is ushering in a new era of predictive simulation in high performance computing," said Acting Administrator Thomas D'Agostino. "Users are very excited about early results - results that are providing the kind of new insights that lead to ideas for additional applications."

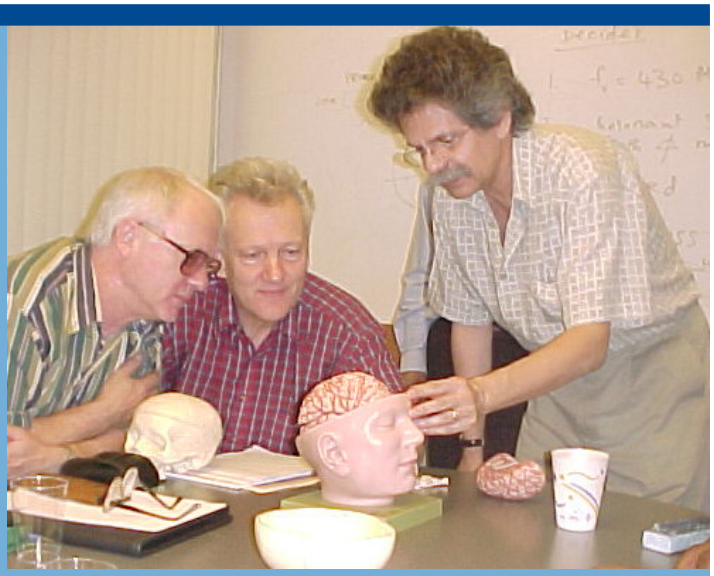
PERIMETER SECURITY: New vehicle access portals have been constructed and are now operational for all westbound vehicles coming into the Los Alamos National Laboratory Technical Area 3, or traveling to the Pajarito Ski Hill, and other areas on West Jemez Road near the New Mexico laboratory.

44 Years Of Public Service For SSO Staffer

After forty-four years of public service, NNSA Sandia Site Office (SSO) staff member Ron Holton has retired, receiving a Distinguished Career Service Award from Acting Administrator Tom D'Agostino and a personal note of congratulations from the President of the United States.

Holton's career began in the early 1960's when he served as an officer in the U.S. Air Force. He retired from the military as a Major in 1983 and went to work for the former DOE Albuquerque Operations Office in New Mexico where he was assigned to manage Office of Nuclear Energy-sponsored programs at various sites and facilities. Additional duties included the field management of the General Purpose Heat Source Program efforts at DOE's Mound Plant and at the Los Alamos National Laboratory. His outstanding oversight, management, and coordination of the assembly and testing activities at the Mound Plant and at Los Alamos were instrumental in DOE's successful delivery of radioisotopic power sources for NASA's Galileo spacecraft.

In 1989 he managed another Space Nuclear Power Program as part of DOE's support to the NASA Ulysses and Cassini space missions. From 1985-1988 he managed the DOE's Byproducts Utilization Program. For the next thirteen years he managed a variety of DOE sponsored science and technology programs in coordination with national laboratories, utilities, academia, and various industrial partners. He concluded his career as the Field Program Manager for Intelligence Work for Others Program at SSO.



EPILEPSY PREVENTION PARTNERSHIP: Victor Eroshenko and Gennady Kochemasov (left and center) of BioFil, a small, private science company in Sarov, Russia, examine a model brain with Dr. Ivan Osorio of the University of Kansas Medical Center. An initial contact with NNSA's Kansas City Plant for technical assistance with a portable device developed for detection, warning and quantification of epileptic seizures laid the foundation for a partnership with NNSA's Global Initiatives for Proliferation Prevention (GIPP). GIPP research projects are designed to lead to peaceful, long-term employment and income for Former Soviet Union weapons workers.

Sandia Studies Anti-terror Technologies

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Explosives Testing

A group of scientists from Sandia, two Canadian institutions, and experts from the United Kingdom are conducting experiments to better understand what happens on the ground and in the air when explosives detonate on specific surfaces.

Testing allows scientists to better predict the consequences of explosive and nonexplosive RDDs. The purpose of this series of tests performed at Sandia is to learn more about the interactions between explosive fireballs and different ground surfaces and to better characterize the buoyant behavior of the resulting plumes. This information will be combined with the results of the explosive aerosolization work that has been performed at the laboratory to understand the impact of RDDs detonated in urban environments.

Much of Sandia scientist Fred Harper's work has been in indoor experiments. Working with the Canadian teams and the UK experts allowed him to bring his work outdoors to study different aspects of dispersal.

"The soot and dust swept into the fireball can combine to change the nature of the aerosol originally produced by the dispersal device," he said. "This can significantly change the impact on the population. The indoor experiments are done on a smaller scale in a clean environment, and tell you what is produced after the interaction between the material and the shock wave on the microsecond time scale. The outdoor experiments tell you what happens to the material when it is exposed to soot and dust in the fireball on the millisecond time scale and how high the material initially rises on the second time scale."

The work will provide emergency preparedness personnel and first-responders invaluable data to identify potentially dangerous source items.