



OPENING CEREMONY: Ambassador Brooks participated in a ribbon cutting ceremony with the Chairman of the China Atomic Energy Authority, Sun Qin, at the opening session of the U.S.-China Integrated Nuclear Material Management Technology demonstration held recently in Beijing.

U.S. And China Jointly Host Technology Demo On Nuclear Material, Security And International Safeguards

To promote the adoption of modern security practices and technologies at civilian nuclear facilities, Administrator Linton F. Brooks and Mr. Qin Sun, the chairman of China Atomic Energy Authority (CAEA), recently presided over the opening of a joint U.S.-China 2005 *Integrated Nuclear Material Management Technology Demonstration* in Beijing, China. The event was hosted by the China Institute for Atomic Energy (CIAE).

Representatives from the U.S. Embassy and the U.S. Departments of Energy and State toured the facility with Chinese representatives from CAEA and China National Nuclear Corporation (CNNC). Approximately 100 representatives from civilian nuclear facilities and research institutes throughout the Chinese complex participated in hands-on training seminars and exercises during the week following the ceremony.

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Sensitive Nuclear Material Removed From Los Alamos TA-18 Facility

Completing a process that began last year, NNSA has successfully removed the most sensitive nuclear weapons-usable materials (category I and II special nuclear material) from Los Alamos National Laboratory's Technical Area (TA) 18 to more secure locations.

"I am proud of the hard work and cooperation that went into sending this material to more secure locations."
Linton F. Brooks

NNSA announced in December 2002 that the TA-18 mission would be moved to the high security Device Assembly

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U.S. And China Jointly Host Technology Demo On Nuclear Material, Security And International Safeguards

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Established physical protection, nuclear material control and accounting, and international safeguards technologies that provide a first line of defense against nuclear material theft, diversion and sabotage were demonstrated. Planning activities for the event included joint technical work on hardware and software, system design and installation, and topical workshops on vulnerability assessment and nondestructive assay, exchange of technical personnel, training and site visits.

The teamwork between the Chinese and the American representatives in organizing this demonstration is a model for successful cooperative projects and marks an important step in continued collaboration between the United States and China in the area of nonproliferation, nuclear security and safeguards.

NNSA and CAEA were the government sponsors of the event, conducted under the auspices of the DOE-CAEA *Peaceful Uses of Nuclear Technology Agreement*. Experts from the CIAE, the Fourth Institute of Nuclear Engineering of CNNC, and Los Alamos, Livermore, Sandia and Oak Ridge national laboratories provided the technical expertise to support the planning and implementation. Both the U.S. and China provided the required technical and financial resources.

Additional cooperative activities related to nuclear material security will follow the demonstration. Near-term plans include the execution of a regional training course on "Facility Systems of Accounting and Control" that will be implemented in partnership with the International Atomic Energy Agency in the Spring of 2006. In addition, the DOE and CAEA intend to continue bilateral consultation on best security practices and continue technical exchanges in the area of nonproliferation-related technologies.

Sensitive Nuclear Material Removed From Los Alamos TA-18 Facility

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Facility located on the Nevada Test Site in the Nevada desert, where more than half of the nuclear material formerly housed at TA-18 now resides. NNSA plans to have the balance of nuclear materials out of TA-18 by 2008.

Administrator Brooks said the special nuclear material, which includes plutonium and highly enriched uranium, has been sent to the Nevada Test Site, the Y-12 National Security Complex and Los Alamos' TA-55.

"It is important to U.S. national security that we have the highest level of security for our most sensitive assets, including the material formerly housed at TA-18," Brooks said. "This material transfer would not have happened without the cooperative efforts of a number of DOE and NNSA sites, including our Los Alamos Site Office and the lab itself, and the Nevada Site Office and its contractors. I am proud of the hard work and cooperation that went into sending this material to more secure locations."

The project began with the first shipment of TA-18 programmatic material in September 2004. Despite a seven-month Los Alamos stand-down, the relocation was completed less than a month after the originally forecast completion date of September 30, 2005.

The material transfer is part of Brooks' July 2003 five-part initiative to reinforce security oversight and strengthen long-term security operations in the nuclear weapons complex.

NNSA News is published monthly by the Office of Congressional, Intergovernmental and Public Affairs, C. Anson Franklin, Director.

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Ambassador Brooks Presents NNSA Weapons Excellence Awards At LLNL

NNSA Administrator Linton F. Brooks has presented NNSA Weapons Awards of Excellence to six individuals and teams at Lawrence Livermore

National Laboratory for work performed in 2004.

Thomas E. Healy developed the W80-3 program certification roadmap that has become a model for future

weapons development plans.

Omar A. Hurricane and **Mordecai D. Rosen** made significant contributions leading to the resolution of a long-standing weapons-physics uncertainty.

Barbara A. Atkinson and **Doug East** of the Livermore Computing TSF Team demonstrated extraordinary quality and productivity in culminating a multi-year \$91 million project as lead program representatives for the Terascale Simulation Facility.

Livermore's National Hydrotest Plan Team (John E. Heidrich - leader, Jim Janzen, Gordon Krauter, Denise Kuklo, Cliff Shang and Matt Wraith) implemented an improved approach to planning and executing hydrodynamic tests that has significantly increased the efficiency of this program element.

Livermore's Tilt Pour Furnace Development Team (Karen Dodson - leader, James Atkins, Michael Blau, Mark Bronson, David Dennison, Robert Klatt, Doug Mcavoy, Joe Phillips, David Riley and Michael West) was recognized for progress in developing and demonstrating the utility of this approach for key plutonium pyrochemical operations needed for a future pit facility.



WEAPONS EXCELLENCE AWARDS: Members of the Tilt Pour Furnace Development Team were honored by Linton F. Brooks.

NNSA Completes Czech Research Reactor Conversion

The VR-1 Sparrow Is The First Russian-Supplied Research Reactor To Successfully Convert From Highly Enriched Uranium To Low Enriched Uranium Fuel

The National Nuclear Security Administration (NNSA) has announced that the Czech Technical University's research reactor has become the first Russian-supplied reactor to convert successfully from highly enriched uranium (HEU) to low enriched uranium (LEU) fuel.

NNSA converted the reactor as part of its Global Threat Reduction Initiative program, which works to convert research reactors from the use of HEU fuel to LEU fuel by developing high-density LEU fuels and assisting reactors with the conversion process, including feasibility studies, conversion analysis, and licensing support. To date, 42 research reactors have either fully or partially converted to LEU fuel.

"The Czech Republic is at the forefront of international nuclear threat reduction efforts as a result of its repatriation of Russian-origin HEU fresh fuel and recent conversion of its Soviet-supplied research reactor to LEU fuel. The Czech Republic is the first country to convert a Soviet-supplied reactor and should be commended for showing leadership that benefits international security," said Linton F. Brooks.

The VR-1 research reactor is a low-power university training reactor that had been operating with an HEU fuel core. The HEU fresh fuel was removed and the reactor was converted to run on LEU. In October, replacement LEU fuel was delivered to the Czech Technical University and the VR-1 Sparrow research reactor went critical with LEU fuel.

Profesor Karel Matejka, head of the Department of Nuclear Reactors at Czech Technical University in Prague, said, "We are proud to lead the way in nonproliferation efforts, and in particular we are pleased to be the first Russian-supplied reactor to convert to LEU. We look forward to working with NNSA and other U.S. programs to further cooperation on nonproliferation efforts worldwide."

NNSA hosted the "RERTR 2005 International Meeting on Reduced Enrichment for Research and Test Reactors" in Boston, November 6-10. Supporters of HEU minimization from all over the world discussed progress on fuel development and conversion at this annual meeting.

ASC Program Marks Its Ten-Year Anniversary By Unveiling The World's Fastest Supercomputer Combination

Two new, next-generation supercomputers that will help ensure the U.S. nuclear weapons stockpile remains safe and reliable without nuclear testing have been announced by NNSA. The IBM machines will be housed at Lawrence Livermore National Laboratory (LLNL) in California.

At an event in the LLNL Terascale Simulation Facility (TSF), Linton F. Brooks said the announcement marks the culmination of a ten-year campaign by the Advanced Simulation and Computing (ASC) program to use supercomputers to run three-dimensional codes at lightning-fast speeds to achieve much of the nuclear weapons analysis that was formerly accomplished by underground nuclear testing.

Highlighting its phenomenal power, Brooks also announced that the BlueGene/L supercomputer can perform a record 280.6 trillion operations per second on the industry standard LINPACK benchmark. The supercomputing community uses the LINPACK benchmark application as the measure of performance to determine rankings on the Top 500 computer list. (For more information on the Top 500 list, see <http://www.top500.org>.)

Purple, the other half of the most powerful supercomputing twosome on Earth, is a machine capable of 100 teraflops as it conducts thorough simulations of nuclear weapons performance. The IBM

Power5 system is undergoing final acceptance tests at the TSF.

"The unprecedented computing power of these two supercomputers is more critical than ever to meet the time-urgent issues related to maintaining our nation's aging nuclear stockpile without testing," Brooks said. "Purple represents the culmination of a successful decade-long effort to create a powerful new class of supercomputers."

In a recent demonstration of its work capability, BlueGene/L ran a record-setting materials science application at 101.5 teraflops sustained over

deterrent. (A teraflop is one trillion computer operations per second.) Both machines were

10th ANNIVERSARY CELEBRATION: News media and other visitors tour the BlueGene/L supercomputer room at Lawrence Livermore National Laboratory during celebration of the 10th anniversary of NNSA's Advanced Simulation and Computing Program.



ASC PURPLE: One section of ASC Purple, which is capable of achieving a speed of 100 teraflops.

seven hours on the machine's 131,072 processors, as it ran an application of importance to NNSA's effort to ensure the safety and reliability of the nation's nuclear

developed through ASC and join a series of other supercomputers at Sandia and Los Alamos national laboratories dedicated to NNSA's

Stockpile Stewardship effort to maintain the nation's nuclear deterrent through science-based computation, theory and experiment.

Together, the Purple and BlueGene/L systems will put astounding peak performance at

the disposal of NNSA scientists and engineers (half of a petaflop, or half of a quadrillion (1,000,000,000,000,000) operations per second).

Largest Computational Biology Simulation Mimics Life's Most Essential Nanomachine

Researchers at Los Alamos National Laboratory have set a new world's record in biology by performing the first million-atom computer simulation. Using the "Q Machine" supercomputer, Los Alamos computer scientists have created a molecular simulation of the cell's protein-making

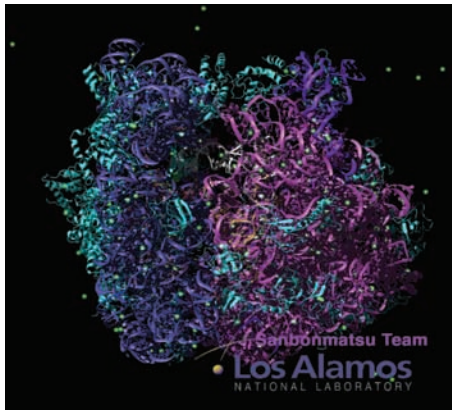


structure, the ribosome. The project, simulating 2.64 million atoms in motion, is more than six times larger than any biological simulations performed to date.

The ribosome is the ancient molecular factory responsible for synthesizing proteins in all organisms. Using the new tool, the Los Alamos team led by Kevin Sanbonmatsu is the first to observe the entire ribosome in motion at atomic detail. This first simulation of the ribosome offers a new method for identifying potential antibiotic targets for such diseases

as anthrax. Until now, only static, snapshot structures of the ribosome have been available.

Sanbonmatsu posits that this technique offers a powerful new tool for understanding molecular machines and improving the efficacy of antibiotics. Antibiotic drugs are less than one one-thousandth the size of the ribosome and act like a monkey-wrench in the machinery of the cell. Such drugs diffuse into the most critical sites of this molecular machine and grind the inner working of the ribosome to a halt.



LIVING FACTORY: Ribosomes are a fundamental model for future nanomachines, producing the protein building blocks of all living tissue.

Sandia Utilizes Parallel and Cluster Computers

Sandia National Laboratories (SNL) and Cray, Inc. have designed and developed a new massively parallel supercomputer, Red Storm. With over 10,000 AMD Opteron processors in a single system, Red Storm is functionally and physically integrated. SNL is using the new supercomputer to solve many large-scale problems including nuclear weapons safety, climate and asteroid deflection.

To supplement its high demand for cluster computing, SNL has also purchased a 4,096-node Dell high-performance computer cluster called Thunderbird. It provides more than 8,000 processors of computer capacity and is now operational at Sandia in Albuquerque. The aggregated capacity of the computer is approximately 24 tera-bytes of memory and operates at a speed of 60 tera-OPS (trillion operations per second).

"Our first institutional cluster was an important investment for the lab, and it has been fully utilized from the first day it was installed," says Ken Washington, CIO and director of Sandia's Information Systems and Services Program. "Thunderbird will make a huge impact by more than quadrupling our institutional capacity. The increase allows the labs to meet a significant fraction of previously unmet institutional capacity computing requirements in one fell swoop."

From Tom D'Agostino, Acting Deputy Administrator For Defense Programs

Q: How are the recent ASC achievements examples of good program management at NNSA?

A: Even before the NNSA was formed, the original Accelerated Strategic Computing Initiative (predecessor of ASC) set an ambitious goal to support high-confidence assessments and stockpile certification through higher fidelity simulations. We set a 100 teraflop computing capability milestone as the entry-level system needed to fulfill Stockpile Stewardship requirements. Through the efforts of outstanding program management and a well-integrated program, we were able to deliver on this grand challenge in 2005.

Q: How can the ASC experience be applied to other parts of NNSA?

A: These ASC achievements are some of the best examples of consistent program management done well over a sustained period of time—something that we'd like to see more of. Together we will work to ensure that all our managers and staff, at Headquarters and in the field, are aware of "lessons learned," both good and bad.

Message From Linton Brooks

The December 15th deadline for this year's Combined Federal Campaign (CFC) is fast approaching. As of November 16th, the Department of Energy



Linton F. Brooks

has collected nearly \$738,000 in pledges and donations towards our goal of \$1.03 million.

As the lead for this year's DOE campaign, I am extremely proud of our Department's generous support so far and thank you for going the extra mile to help those in need.

Today, many in our community face devastating losses as a result of natural disasters and others have grave needs due to difficult family, health and/or economic circumstances. It is my personal belief that those of us who are able must step forward and make a difference in the lives of the less fortunate. Proceeds from this year's CFC will go a long way towards helping those who cannot help themselves.

If you have not yet had a chance to make your pledge, please do so by December 15th. To those of you that have, my heartfelt thanks and to all who make up the DOE/NNSA family, my best wishes to you in the holiday season.

Ambassador Linton F. Brooks

Staffer Added to NNSA Congressional Affairs

Rounding out a seasoned staff of experienced professionals, **Scott Kopple**, a former staff member for the House Government Reform Committee Chairman Tom Davis (VA-11), has joined the congressional affairs staff of NNSA.

During his time with Rep. Davis, Kopple served in numerous legislative and political capacities including campaign manager, state political director, spokesperson, committee professional staff member and legislative assistant.

"Kopple's appointment rounds out the already considerable Capitol Hill experience of the NNSA congressional affairs staff led by **Rob Hood**," said **Anson Franklin**, director of the agency's Office of Congressional, Intergovernmental and Public Affairs. "Rob has worked in a variety of congressional capacities including professional staff member to the House Committee on Science, assistant to the Speaker of the U.S. House of Representatives, senior legislative assistant to

Congressman Newt Gingrich and as senior policy advisor to then-Governor of Wisconsin, Tommy Thompson in the state's Washington D.C. office.

Also working with Rob in congressional affairs is **Tim Nank**, who came from the White House where he served as director of Academe and Policy Research for the Homeland Security Council. He worked at the Heritage Foundation prior to joining the White House. Tim is responsible for covering nonproliferation and homeland security issues on Capitol Hill.

Peter Winokur is a physicist with extensive experience in radiation-effects science and technology and serves as a senior policy analyst on loan from Sandia National Laboratories. Prior to joining NNSA, Peter served as an Institute of Electrical and Electronics Engineers Congressional Fellow in the office of Senator Harry Reid, the Senate Minority Leader. While serving on Reid's staff, he supported a full range of energy and transportation issues.

Y-12 Volunteers Help Out With Community Projects



Approximately 400 volunteers from BWXT Y-12 painted, cleared brush, replaced doors and spread landscaping mulch, sorted library books and visited with nursing home residents as part of Y-12's Day of Volunteering Saturday, October 15.

Employees of BWXT Y-12 and the National Nuclear Security Administration and their families participated in some 30 volunteer projects at community organizations. Locations for projects included Oak Ridge, Knoxville, Claxton, Clinton, and Kingston.

Y-12 VOLUNTEERS: Betty Jones of Y-12 helped out with painting at Scarboro Day Care Center during Y-12's Day of Volunteering.

Pantex Expands High Explosives Facility

Pantex has completed an expansion project at its high explosives manufacturing facility that more than doubles the Pantex high explosives machining capability and substantially increases high explosive staging. The new facility will be used to machine both insensitive high explosives and inert materials.

"This eases some constraints on high explosive work and takes some of the load off the current high explosives machining facility," said Will Bivens, BWXT Pantex High Explosives Manufacturing Department manager. "We will now be able to focus our work on both the existing and new high explosives machining facilities and inert weapons components."

Bivens said the new facility was completed and set up to meet the current, as well as future, demands within the Nuclear Weapons Complex. The additional capacity provided

by the new facility will ensure BWXT Pantex continues to meet the high explosives needs of the complex.

"We can work more efficiently here at Pantex and offer the NNSA a much increased capacity if the weapons complex needs additional explosives work performed," Bivens said. In addition to increased production, the completion of the new facility allowed Pantex to modernize and upgrade its high explosives operations equipment.



PANTEX HE FACILITY COMPLETION: Pantex officially opened a new high explosives manufacturing facility. Scott Wood from the Pantex Site Office (left) joined Randy Massucci, facility manager (right), to open the new facility.

Awards Briefs

Distinguished Scientist Fellowship Award

Lawrence Livermore National Laboratory (LLNL) climate scientist **Benjamin Santer** has received a DOE Office of Biological and Environmental Research (BER) Program Distinguished Scientist Fellowship. Santer will receive \$1.25 million over five years for continued research at LLNL. This is the first year of the BER

fellowship program. Santer received the award in the climate change research category. Other award categories include environmental remediation sciences, life sciences and medical sciences. One scientist is honored in each category.

HENACC 2005 Award For Professional Achievement

Jaime Moya, a senior manager for ES&H Planning & Assurance at Sandia National Laboratories, is the winner of a 2005 Award for Professional Achievement from the Hispanic Engineer National

Achievement Awards Corporation. Before he became a group manager in ES&H, Moya was manager for the Test Capabilities Revitalization program at Sandia. The program's goal is to vitalize the NNSA's test capabilities. Moya personally recruits and encourages Sandia staff to participate in community projects such as the Wise Men & Women mentorship program, local and state science fairs, and the MANOS program, a Sandia/

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