



National Nuclear Security Administration Monthly News

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SAFE, SECURE, EFFECTIVE NUCLEAR STOCKPILE : Cielo, currently ranked number 10 in the world with a peak performance of 1.03 petaflops, was recently authorized to conduct classified operations for NNSA. See pages 4 and 5 for more on NNSA's important investment in the future.

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NNSA Celebrates Earth Week

In a week-long focus on greening and sustainability across the Department of Energy, NNSA recently celebrated Earth Week with a special website and daily news features.

There's a very strong connection between NNSA's commitment to energy efficiency and NNSA's efforts to invest in the future, implement President Obama's nuclear security agenda, and improve the way we do business. NNSA leads by example – when Secretary of Energy Steven Chu announced a new initiative to more broadly implement cool roof technologies on DOE facilities and buildings across the federal

government, he highlighted the leadership shown by NNSA's Roof Asset Management Program, which started in 2005.

Many NNSA facilities have received Leadership in Energy

While the primary mission is nuclear security, sustainability plays a very big role in everything NNSA does.

and Environmental Design (LEED) certification, including Sandia National Laboratories' MESA Complex and Ion Beam Laboratory; Lawrence Livermore National Laboratory's TeraScale Simulation Facility; Savannah River's MOX Administration Building; and Nevada's two new

fire stations. Both Los Alamos National Laboratory and Y-12 are pursuing certification for new buildings. NNSA has also received numerous awards for its sustainability efforts, including the Presidential GreenGov green innovation award for Sandia's solar powered vehicle.

NNSA laboratories and sites are also leveraging the best science in the world to create solutions to improve the environment. In finding cleaner and healthier ways to do business, the Pantex Plant near Amarillo, Texas, recently implemented a more environmentally friendly way to

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Administrator's Corner

I always enjoy the opportunity to highlight the incredible work done by the men and women working across our enterprise. But this month, you have truly shined. In the process, you have once again demonstrated both why we continue to play an indispensable role in implementing the President's national security agenda and why there is a strong bipartisan commitment in Washington to invest in our future.



This month, I visited the Remote Sensing Laboratory (RSL) at Nellis Air Force Base in Nevada to personally thank the teams working so hard to support the response to the Fukushima nuclear crisis. Since the first day of this crisis, the RSL team has been working around the clock – here at home and on the ground in Japan – to gather and analyze data in support of U.S. policymaker, our armed forces, and our partners in Japan. You can see the result of their work by visiting www.energy.gov/japan2011.

Similarly, our Principal Deputy Administrator, Neile Miller, visited the team at the National Atmospheric Release Advisory Center (NARAC) in Livermore. NARAC has been working since March 11 to analyze data gathered in Japan and provide predictive analysis and plume models as this crisis has unfolded.

Our ability to respond to the nuclear crisis in Japan is an example of why we need to continue to move toward One NNSA. Our partners across the U.S. Government and the Government of Japan are relying on the work our teams are doing to make life-and-death decisions. We are able to rise to the occasion because we are leveraging resources and expertise from across the entire enterprise.

We have Aerial Measuring System and Consequence Management Response Teams deployed to Japan from Nevada. Experts from Sandia National Laboratories and Pacific Northwest National Laboratory have been deploying to Japan to provide technical assistance. And the Consequence Management Home Team is, of course, drawing on expertise from the Remote Sensing Lab at the Nevada National Security Site and our other NNSA laboratories.

This notion of a truly integrated and interdependent nuclear security enterprise is the core of our One NNSA vision. It is a critical part of our efforts to improve the way we do business, critical to the success of our mission, and critical to the security of our country.

Tom D'Agostino

NNSA Celebrates Earth Week

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clean drinking water. At NNSA's Lawrence Livermore National Laboratory, experts developed new devices that help reduce the aerodynamic drag of semi-trucks, potentially increasing fuel efficiency by as much as 12 percent. It could prevent 36 million tons of carbon dioxide from being released into the atmosphere annually, roughly the same amount of CO2 that is emitted from four 1-gigawatt power plants every year.

At Los Alamos National Laboratory, a new virtualized data center was created to improve information technology efficiency and better serve the lab's core research and development efforts. And at Sandia National Laboratories, researchers are moving into the demonstration phase of a novel gas turbine system for power generation. The goal is to increase thermal-to-electric conversion efficiency to as much as 50 percent – an improvement of 50 percent for nuclear power stations equipped with steam turbines, or a 40 percent improvement for simple gas turbines.

Even NNSA's nonproliferation efforts have a green impact. Former weapon scientists funded through NNSA's Global Initiative for Proliferation Prevention (GIPP) helped bring to market new commercial biomass boilers that provide heat for agricultural enterprises, schools and local communities in Ukraine. GIPP has also been responsible for projects to improve soil health, reduce energy consumption, and develop the next generation of electric car batteries.

While the primary mission is nuclear security, sustainability plays a very big role in everything NNSA does.

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

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NNSA Conducts Successful JTA Test

NNSA in collaboration with the U.S. Air Force Global Strike Command, recently conducted a

"JTA tests demonstrate NNSA's commitment to ensuring that all weapon systems perform as planned and that systems are designed to be safe, secure and effective," said NNSA's Deputy Administrator for Defense Programs Don Cook. "The strong partnership between NNSA and Department of Defense (DoD) is vital to our national security and helps enhance the way NNSA does business and manages its resources."

A JTA contains instrumentation and sensors that monitor the performance of numerous weapon components during the flight test to determine if the weapon functions as designed. This JTA also included a flight recorder that stored the bomb performance data for the entire test. The data is used in a reliability model, developed by Sandia National Laboratories, to evaluate the reliability of the bomb.

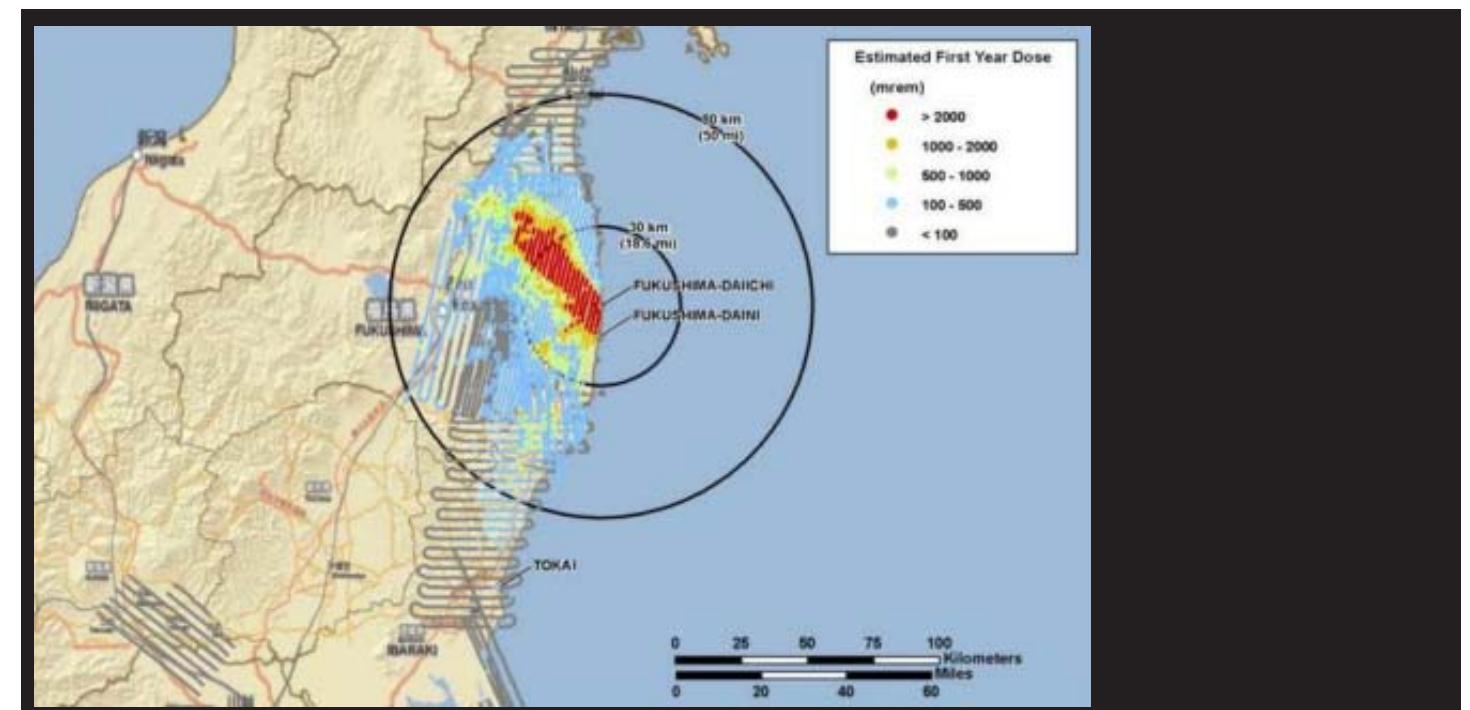
The JTA was produced by the NNSA in support of the Joint Surveillance Flight Test Program between the DoD and the NNSA, and was built to simulate the actual B61-11 weapon configuration utilizing as much war reserve hardware as feasible. It was assembled at the Pantex Plant near Amarillo, Texas, and was not capable of nuclear yield, as it contained no special nuclear materials.

A B-2A Spirit Stealth Bomber from the 509th Bomber Wing, operating out of Whiteman Air Force Base, delivered and released the B61-11 JTA at the NNSA's Tonopah Test Range in Nevada.



B61-11 FLIGHT TEST: The National Nuclear Security Administration, in collaboration with the U.S. Air Force Global Strike Command, recently conducted a successful surveillance flight test using a Joint Test Assembly (JTA) of the B61 Mod 11 (B61-11) Strategic Bomb.

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Supercomputers Keep the Nuclear Stockpile Safe, Secure, Effective

Through a scientific mixture of hardware, software, codes, and data, NNSA's Stockpile Stewardship Program performs a critical part of implementing President Obama's nuclear security agenda by using some of the most advanced computer systems in the world.

With the end of underground testing in 1992, supercomputers came to represent our ability to keep our nuclear stockpile safe, secure and effective. Run by NNSA's Advanced Simulation and Computing (ASC) program, the supercomputers help us understand everything from weapon design to safety features to overall performance.

An important investment in the future, NNSA's three national laboratories house some of the world's fastest supercomputers: Roadrunner, Cielo, BlueGene/L, RedStorm, and Dawn, an early version of a supercomputer named Sequoia, which will eventually reach 20 petaflops.

These supercomputers run large calculations that allow us look inside a weapon in nano-second sized chunks. The systems also

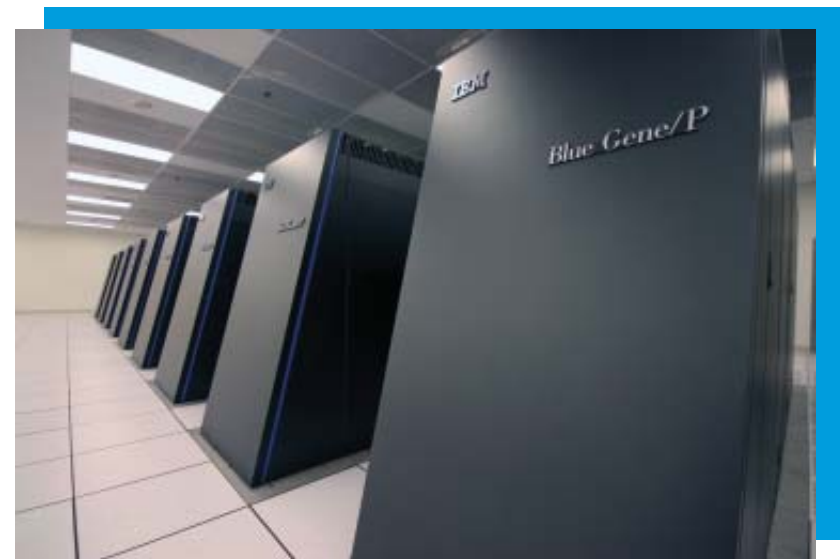


BLUEGENE/L: A revolutionary, low-cost machine delivering extraordinary computing power for the nation's Stockpile Stewardship Program, BlueGene/L entered the Top 500 supercomputer list in November of 2004 and, following life extensions, is currently number 12 with a peak speed of 596 teraflops.



technical disciplines that underpin the stockpile stewardship program."

ROADRUNNER: Built by IBM, Roadrunner is currently ranked as the seventh fastest supercomputer. It has a peak performance of 1.38 petaflops, and was the first supercomputer in the world to perform a sustained petaflops calculation. It is also the fourth-most energy-efficient supercomputer in the world on the Supermicro Green500 list.



DAWN/SEQUOIA: Dawn, 16th on the TOP500 list, is an IBM BlueGene/P machine with a peak performance of 501 teraflops. This is the initial delivery of a system named Sequoia, which is on schedule to deliver 20 petaflops in FY 2012. Dawn is not only used to prepare applications for the Sequoia system, but is also an important computational resource for the ASC program.

help us see data points like temperature and pressure that can't be found through experimentation. As John Morrison from

Los Alamos National Laboratory (LANL) said, "It's like trying to take the temperature of the inside of the sun. It's a hostile environment." To do that kind of complex work, NNSA relies on really smart people.

"There are actually many elements inside the Stockpile Stewardship Program," said Chris Deeney, assistant deputy administrator for Stockpile Stewardship. "You need nuclear physics, indeed, you need people who understand hydrodynamics, you need people who understand high-energy plasma physics, people who understand material under extreme conditions, and then you also need engineers, people who understand radiation damage in silicon, so there's a wide gamut of scientific and



Given how critical those scientific

and technical disciplines are to the success of the program, NNSA makes a concerted effort to recruit and retain the next generation of nuclear security experts. Just this month, students from across New Mexico participated in the New Mexico Supercomputing Challenge, which was sponsored by LANL and Sandia National Laboratories. Through the Predictive Science Academic Alliance Program, NNSA engages the academic community in making significant advances in predictive modeling and simulation technologies. In addition, NNSA supports an institute at each of its national laboratories to advance basic and applied research initiatives in computational sciences in support of the ASC program.

While NNSA's supercomputers exist to safely maintain the nuclear

RED STORM: Red Storm was the progenitor of the highly successful line of XT platforms offered by Cray. It is a massively parallel processing (MPP) supercomputer with a distributed memory, multiple instruction, and multiple data (MIMD) architecture with peak performance rated at 284 teraflops. While initially developed for the ASC program, is now serves a broader role in NNSA national security programs.

stockpile, there are often important non-nuclear benefits as well. For example, Lawrence Livermore

National Laboratory, in conjunction with Los Alamos and Sandia national laboratories, announced new space debris monitoring capabilities. When the Space Shuttle Columbia broke up re-entering the atmosphere in 2003, scientists used NNSA supercomputing resources to help model the effects of ice hitting the shuttle's wing. There have also been breakthroughs in HIV research, climate change, and research toward understanding an influenza pandemic.

The Science of Nuclear Security

Long-awaited Weapons Cleaner Saves Money – Solvent Cleans Components Minus Hazards

A new approach to cleaning weapons parts was brought online recently at the Pantex Plant. The old cleaning solvent created potentially flammable vapors which led to the task of finding a new solvent. Finding an ideal replacement for the commonly used isopropyl alcohol was an ambitious undertaking that involved multiple sites and spanned a decade.

Cleaning is paramount in the production of high-reliability weapons components, and most are cleaned prior to assembly. The cleaning method depends on the material, shape and size of the part, type of contamination, and its final disposition.

Rigorous testing and research conducted at Pantex, as well as national laboratories and universities, offered as a solution hydrofluoroether, itself a known fire suppressant.

one weapon's life-extension program.

"Adding a new material today to the incredibly large mix of materials that make up just one weapon system requires an enormous amount of testing and long-term aging to study all of the possible material interactions," said Jan Birkbeck, Ph.D., Explosives Technology Division scientist.

"Surprisingly, there is no universally accepted protocol in how to evaluate polymer compatibility with a solvent nor what is meant by 'clean.' We needed to be innovative in our approach to test and evaluate the affects the solvent might have on some of our materials."

Hydrofluoroether evaporates quickly and cleanly, leaving no residue. It's non-ozone depleting and has a very low global warming potential. It is non-carcinogenic, non-mutagenic and is reasonably non-toxic.

"Especially considering what Pantex works with, the most important aspect is that our work be done as safely as possible," said Bill Moddeman, Ph.D., Explosives Technology Division departmental scientist. "The reduction of flammable isopropyl alcohol removes the fuel component necessary to support a fire. The use of hydrofluoroether provides the benefits of solvent cleaning without the safety hazard."

The Plant Directed Research and Development program at Pantex was instrumental in the project and included representatives from NNSA, the Department of the Navy, Los Alamos and Sandia national laboratories, Kansas City Plant, Y-12 and Lockheed Martin Space Systems.

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**Jan Birkbeck,
Explosives Technology Division Scientist**

Hydrofluoroether is used for current life-extension program assembly operations, pit recertification and pit cleaning prior to repackaging in sealed inserts. It also is being proposed as a cleaning solvent for use on all systems at Pantex as a replacement for isopropyl alcohol and may be employed at other sites.

The result is a safer way to clean parts and systems without the burdens of bonding, task exhaust or stopping work due to lightning alerts because of the potential of fire. The latest in a series of tests proved that the non-flammable solvent is stable indefinitely when kept in refrigerated storage, which reduces by at least \$500,000 the material costs over

25 Years Later: PNNL Remembers Chernobyl

On April 26, 1986, in the early hours of the morning 70 miles north of Kiev, one of four reactors at the Chernobyl nuclear power plant exploded, resulting in the most severe civil nuclear power accident in history. Since that infamous day, halfway around the globe, scientists at Pacific Northwest National Laboratory (PNNL) have been called upon to help the Ukrainians recover – and the world community to learn – from that disaster.

PNNL has been instrumental in helping develop the safest and

most sustainable systems for stabilizing the Chernobyl site.

PNNL helped develop the conceptual design for a New Safe Confinement (NSC) structure over the destroyed unit to fully enclose the steel "tomb" constructed after the explosion. Currently being built nearby, the NSC will be slid into position to enclose the damaged reactor in 2014. Once in place, safe dismantlement of the reactor can begin using remote cranes and tools under the protection of the confinement structure.

PNNL also helped to provide a range of support activities that made the site more safe in the aftermath of the incident, from the development of a heat plant facility that supported operational facilities to stabilizing a ventilation stack in danger of collapsing.

Perhaps most importantly for the safety and environmental recovery at Chernobyl, Battelle, and PNNL have stationed professionals at the site for the past decade to provide their valuable expertise and guidance.

CAPABILITIES REPLACEMENT LABORATORY DEDICATION:

On April 19, 2011, Pacific Northwest National Laboratory (PNNL) celebrated the dedication of the Capabilities Replacement Laboratory (CRL), in Richland, Washington. These state-of-the-art replacement facilities allow PNNL to maintain and grow vital science, energy and national security programs funded by the Department of Energy,



NNSA, Department of Homeland Security, National Institutes of Health and others. Anne Harrington, deputy administrator for NNSA's Defense Nuclear Nonproliferation, commended PNNL's Capabilities Replacement Laboratory at the April 19 dedication. Harrington said that the CRL, and "especially the Physical



Sciences Facility, provides an important platform for collaboration between PNNL, NNSA and our interagency partners." Harrington applauded PNNL's work in national security stating that "this laboratory has a long tradition of performing cutting-edge work that is critical to enhancing our nation's security and promoting global peace and security."

B&W Pantex Receives Dwight D. Eisenhower Award for Excellence

SBA honors Pantex for exceptional utilization of small businesses

B&W Pantex Plant has received the 2011 Dwight D. Eisenhower Award for Excellence from the U.S. Small Business Administration (SBA). Pantex received the award based on its exceptional utilization of small businesses in subcontracting efforts during fiscal year 2010. In honoring Pantex in the manufacturing category, the SBA recognized the site for its "hard work, innovative ideas and dedication" and for its achievements in the community.

"This award is a reflection of NNSA's and Pantex's commitment to working with our partners in the small business community to invest in our future, implement the president's agenda, and improve the way we do business," said NNSA Administrator Thomas D'Agostino. "Small businesses drive our economy, so I applaud the men and women at Pantex for continuing to invest in small businesses in the Texas Panhandle and across the country."

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NNSA Awards Safety and Security Professional Awards

NNSA recently announced the recipients of the annual safety and security professionals of the year awards.

Stephen Scott from the Nevada Site Office (NSO) was selected as the federal employee and Bartolo Torres from Los Alamos National Laboratory was selected as the contractor to each receive the Security Professional of the Year Award.

Scott was recognized for spearheading the deployment of a wireless network around the Device Assembly Facility to improve tactical communications, secured funding for the Technology Deployment Integration Center to assess new security technologies, and facilitated a Memorandum of Understanding with the Air Force to establish Unmanned Aerial Vehicle support at the Nevada National Security Site (NNSS). He also expanded the Networked Automated Anti-Tampering and Assessment system on tactical vehicles for increased protective force survivability, and upgraded sand tables for enhanced vulnerability analyses. Scott's most notable achievement in 2010 was the successful deployment of the Mobile Detection Assessment Response System robot in Area 5 of the NNSS.

Torres was the primary security and budget expert responsible for developing and implementing significant enhancements to the Defense Nuclear Security (DNS) Program, Planning, Budget, and Evaluation process. He played a critical role in clearly defining the DNS scope

of work, issuing detailed costing guidelines, and implementing more granular and well-defined budget and reporting categories to track costs. Torres also helped established new budget review processes for DNS using technical subject matter experts from across the enterprise, scrutinizing protective force budgets in detail, and implementing a standard cost model for "bottom-up" pricing and comparing protective force work which comprised approximately 60 percent of the nearly \$770 million FY 2010 budget.

Bryan T. Rhodes, the Fire Protection Engineer at the Pantex Site Office recently received the Federal Safety Professional of the Year Award. Gerhardt (Gary) R. Griess, director of Environment, Health, Safety & Quality for National Security Technologies, LLC (NSTec) at the NSO, was named the 2010 NNSA Management and Operating Contractor Safety Professional of the Year.

Rhodes demonstrated strong leadership in the implementation of a robust Fire Protection Program at the Pantex Plant and in promoting high standards of performance through numerous document reviews and field observations, during which he identified and oversaw numerous improvements. He has a keen ability to identify and solve process weaknesses that have resulted in substantial improvements to both the systems he oversees and to the contractor's Fire Protection Program. Rhodes also worked closely with the contractor to develop fire protection performance indicators, which provide important metrics for the overall program.

Griess demonstrated outstanding leadership in orchestrating a value-added integrated approach to implementation of the NSTec Environment Safety & Health program. Due in part to this initiative, NSTec was awarded in 2010 the DOE VPP Superior Star Award, which cited NSTec as a leader in safety and health performance. Griess also led the NNSA, NSTec Aviation Programs to receive the DOE Office of Aviation Management - Jeff Snow Aviation Program Memorial Award and the GSA Federal Aviation Program Award (Small Programs) during 2010.

B&W Pantex Receives Dwight D. Eisenhower Award for Excellence

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In fiscal year 2010, Pantex awarded \$121.6 million in procurements, of which \$95.1 million (78.2 percent) was awarded to small businesses. This is well above the established annual small business goal of 61 percent. Roughly \$34.2 million of Pantex's procurements from small businesses in fiscal year 2010 was awarded to local vendors, which has a significantly positive impact on the Amarillo area economy.

Created in 1991, the Dwight D. Eisenhower Award for Excellence recognizes large prime contractors who have excelled in their utilization of small businesses as suppliers and subcontractors.