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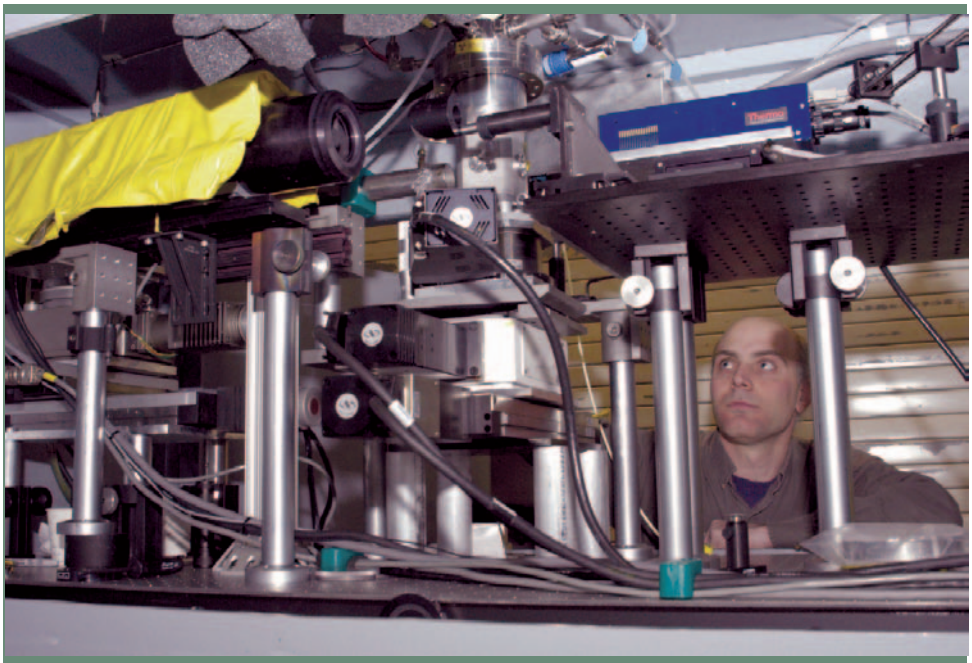
National Nuclear Security Administration Washington, DC 20585



**NIF CRYOGENICS:** Experimental physicist Bernie Kozioziemski of NNSA's Lawrence Livermore National Laboratory prepares a cryogenic refrigeration system used to study the deuterium-tritium fuel layer formed inside the National Ignition Facility target capsule.

# NIF Achieves Major Milestones

The National Ignition Facility (NIF), the 192-beam stadium-size laser system under construction at NNSA's Lawrence Livermore National Laboratory (LLNL) in California, has recently achieved several major milestones on the way to completion in 2009.

NIF's 192 beams are evenly split among two 400-foot long rooms designated laser bays. Each of the two bays is further subdivided into two sets of 48 beams, each known as a cluster. NIF's four clusters of laser beams are directed to a target chamber where the laser light is converted into ultraviolet beams and focused in the center of the chamber. It will be used to compress fusion targets the size of a pencil eraser to conditions required for thermonuclear burn.

Experiments at NIF will study physical processes at conditions that exist only in the interior of stars and in exploding nuclear weapons. NIF is a key component of NNSA's stockpile stewardship mission.

Recent milestones include the operational qualification of the first cluster of 48 beams and the scaling of the control system to operate an entire cluster. All 48 beams of the main laser first cluster were fired simultaneously, with all

*(continued on page 2)*

# Pay Banding Demo To Be Piloted For NNSA Personnel

A major project to improve the way NNSA attracts and retains its employees has been initiated. With recent approval of the proposed demonstration project by the Office of Personnel Management (OPM), employees at NNSA are on track to join the small, but growing, number of government personnel who work under "pay banding," which is the collapsing of the current 15 government pay grades into broader pay bands or groups. The new system will also give managers the ability to reward outstanding performance with extra pay.

"NNSA's dedicated federal workers at headquarters and throughout the country are the department's most important asset," said Tom D'Agostino, NNSA's acting administrator. "This new plan will give us the

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## In This Issue

## NIF Achieves Major Milestones

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subsystems participating to test end-to-end functionality. In the process, NIF became the world's most energetic laser facility, the first to demonstrate the capability to operate at over a megajoule of infrared laser energy (joules are a measurement of energy). In fact, this demonstration showed that the facility, when fully operational, will achieve over 4.2 megajoules in the infrared. For comparison, LLNL's Nova laser typically operated at just over one percent of this energy output.

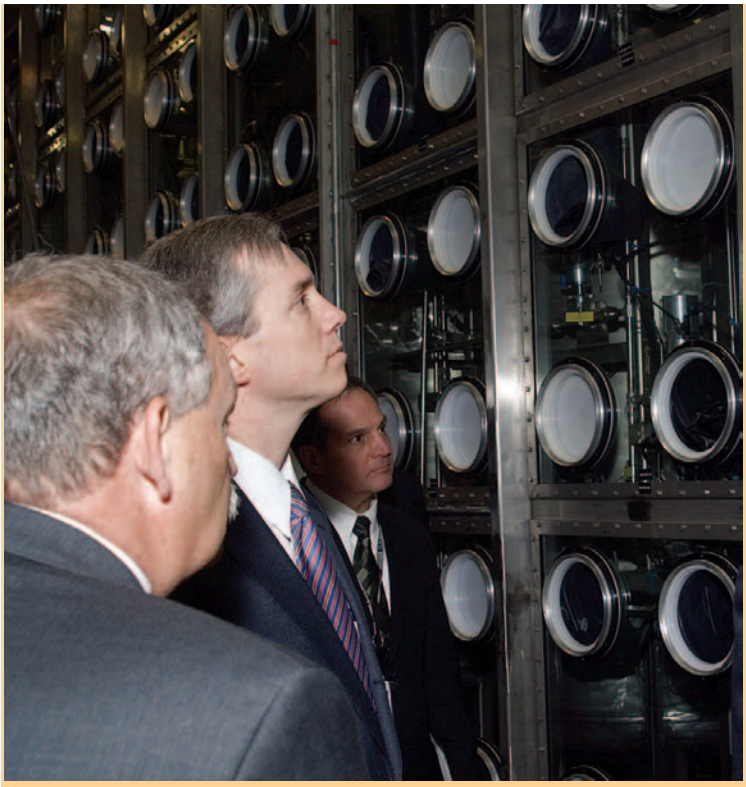
The recent tests also showed that the Integrated Computer Control System was able to fire the entire shot cycle for a cluster of 48 beams including shot set-up, data archiving, shot data analysis and post-shot amplifier cooling in just over three hours. This is the same time previously completed for a bundle of eight beams and demonstrates the scaling of controls to full NIF capability.

Additionally, beam measurements conducted by Precision Diagnostic System confirmed that the NIF lasers are meeting or exceeding all of their requirements, and are capable of providing the laser characteristics required to achieve ignition in the target.

Groundbreaking on the project was in 1997, and today it is about 90 percent complete.

The project has completed the installation of more than 3,500 modular assemblies of the 6,200 that comprise the laser system. Many of these assemblies contain large optics and are as complex as small satellites. Work now is moving into the target chamber area to prepare the beams for commissioning to the target chamber center in preparation for experiments.

Dr. Christopher J. Keane, assistant deputy administrator of inertial confinement fusion and the NIF project, said, “The 48-beam demonstration is a major step forward for NIF. It demonstrates our ability to assemble and operate individual NIF laser beams as an integrated unit, similar to what is planned for the full 192-beam NIF.”



**TRITIUM SOURCE ON LINE:** Deputy Energy Secretary Clay Sell (center) examines a glove box array at the new Tritium Extraction Facility at the Savannah River Site in South Carolina. Also pictured are Savannah River Site Office Manager Rick Arkin (left) and NNSA Principal Assistant Deputy Administrator for Operations Marty Schoenbauer (right). The tritium facility gives the U.S. the ability to replenish tritium supplies in nuclear weapons after eighteen years of recycling it. The extraction facility makes a key contribution to the capabilities needed to maintain America's nuclear weapon stockpile.

## Pay Banding Demo To Be Piloted For NNSA Personnel

(continued from page 1)

management tools that we need to attract and retain the kind of talent that NNSA needs to continue to carry out our vital national security mission."

Under the new personnel administration plan, NNSA's managers will have greater flexibility to set higher pay for their employees through appointments, promotions, and performance evaluations. The long-term goal of this project is to improve NNSA's recruitment efforts so that it can compete for high-quality candidates through the use of higher-entry salaries. Another goal is to motivate and retain key employees by providing faster pay progression for employees that perform well.

Over the next year, NNSA will roll out the new demonstration project that will impact about 2,000 of NNSA's 2,500 federal workers. The project is expected to last up to five years and, if it is successful, it could become a permanent alternative to NNSA's current personnel system.

OPM recently published an announcement about the new personnel system in the *Federal Register*. Before the new plan is implemented, NNSA's employees will have an opportunity to learn more about the project, and to offer comments and ask questions. The final project regulations are expected to be published in the *Federal Register* no later than January 1, 2008.

# Los Alamos Power Grid Upgrade Near Completion

Two months ahead of schedule and within budget, the Power Grid Infrastructure Upgrade project in Los Alamos, N.M. is nearing completion.

The $20 million project consists of three major components: the construction of a nine-mile transmission line, the construction of a switchyard, and the maintenance and upgrade of an existing substation. It will reduce the probability of widespread power loss at the Los Alamos National Laboratory (LANL) and in Los Alamos County, and raise the level of safety associated with electrical power distribution.

Previously, two existing transmission lines delivered power to a single electrical substation in Los Alamos. A newly constructed substation and nine miles of new transmission line allow the laboratory and Los Alamos County to be powered from any of three substations, eliminating potential single point failures and increasing system redundancy and reliability, a capability not possible during the last 40 years of operations.

The project, which began in June 2005, has been funded through NNSA's Office of Infrastructure & Facilities Management as part of the Facilities and Infrastructure Recapitalization Program. The project was managed by the NNSA Los Alamos Site Office and LANL's Facilities and Infrastructure Revitalization Program Office.

**ENERGY AND WATER:** North Dakota Senator Byron Dorgan (right), chairman of the Energy and Water Subcommittee of the U.S. Senate Committee on Appropriations, tours Sandia National Laboratories in Albuquerque with New Mexico Senator Pete Domenici (second from left), ranking member of the subcommittee. With them are Michael Anastasio (left), director of Los Alamos National Laboratory, and Tom Hunter (second from right), director of Sandia. The committee is scheduled to hold its NNSA budget hearing on April 18 in Washington, D.C.

# Kansas City Plant Receives Defense Programs Award

The Kansas City Plant's Readiness Campaign Team has received NNSA's Defense Programs Award of Excellence for its sustained superior performance in support of the Stockpile Stewardship Program.

The Readiness Campaign Team is a multi-site team, composed of federal and contractor members from NNSA headquarters, Los Alamos National Laboratory, the Pantex Plant, Sandia National Laboratories, Savannah River National Laboratory, Y-12, and the Kansas City Plant.

"The Office of Military Application and Stockpile Operations is proud to recognize members of the Readiness Campaign Team for the many efforts expended to support NNSA through the Readiness Campaign," said Julianne Levings, acting director of the Office of Stockpile Technology.

During the past 18 months, the Readiness Campaign ensured that proper technology was used to provide faster implementation of new requirements, reduced cycle time, decreased waste, and leaner manufacturing processes. The projects will also help to ensure that operating costs of production will be optimized and achieve greater efficiencies enabling the workforce to meet future requirements within the complex.

Kansas City Plant team members are Glenda Beaty, administrative specialist; Maxine Pennington, Readiness Campaign program manager; Kent Davis, federal project engineer, and David Prigel, advisor to NNSA.

# Design Selected For Reliable Replacement Warhead

A replacement warhead design by a team from NNSA's Lawrence Livermore and Sandia national laboratories has been chosen by the Nuclear Weapons Council (NWC) for a portion of the nation's sea-based nuclear weapons. The joint NNSA and U.S. Navy program will provide a means to ensure long-term confidence in a more secure, smaller and safer nuclear weapons stockpile.

The design was selected to develop the Reliable Replacement Warhead (RRW). NNSA and the national laboratories have determined that this design can be certified without requiring underground nuclear testing.

NNSA and the Navy will now work together to develop a detailed RRW project plan and cost estimate for developing and producing the system. This work will support a future decision to seek congressional authorization and funding in order to proceed into system development and subsequent production.

"The RRW design concept utilizes modern technology that was not available during the Cold War when our nuclear weapons were designed and built. This will permit significant upgrades in safety and security features in the replacement warhead that will keep the same explosive yields and other military characteristics as the current ones. RRW will take advantage of today's science to ensure the long-term confidence in the future stockpile," said Tom D'Agostino, NNSA's acting administrator. "RRW builds on the successful scientific accomplishments of our Stockpile Stewardship Program, which helps to maintain our nuclear weapons without underground testing."

**W76:** The W76 is an important part of the U.S. nuclear weapons stockpile. RRW refurbishments will enhance its safety, security and reliability.

**PANTEX PLANT:** Technic
Amarillo, Texas, work on a

This announcement comes at a time when there is a sharp increase in the number of U.S. nuclear weapons being dismantled, permanently removing them from the stockpile. NNSA has accelerated its dismantlement process, following President Bush's 2004 decision to cut the number of U.S. nuclear weapons dramatically.

"Our RRW effort is in parallel with our efforts to eliminate nuclear weapons from the stockpile that are no longer needed for national security purposes. We have increased this year's dismantlement rate to 50 percent above last year, and in just five years, the U.S. nuclear weapons stockpile will be at its lowest point since the Eisenhower administration," D'Agostino said.

Teams from NNSA's Lawrence Livermore and Los Alamos national laboratories partnered with Sandia National

Laboratories to submit design proposals to the NWC. In late 2006, the NWC evaluated the proposals and determined that the RRW concept was feasible to sustain the nation's nuclear weapons stockpile.

cians at the Pantex Plant in a W76.

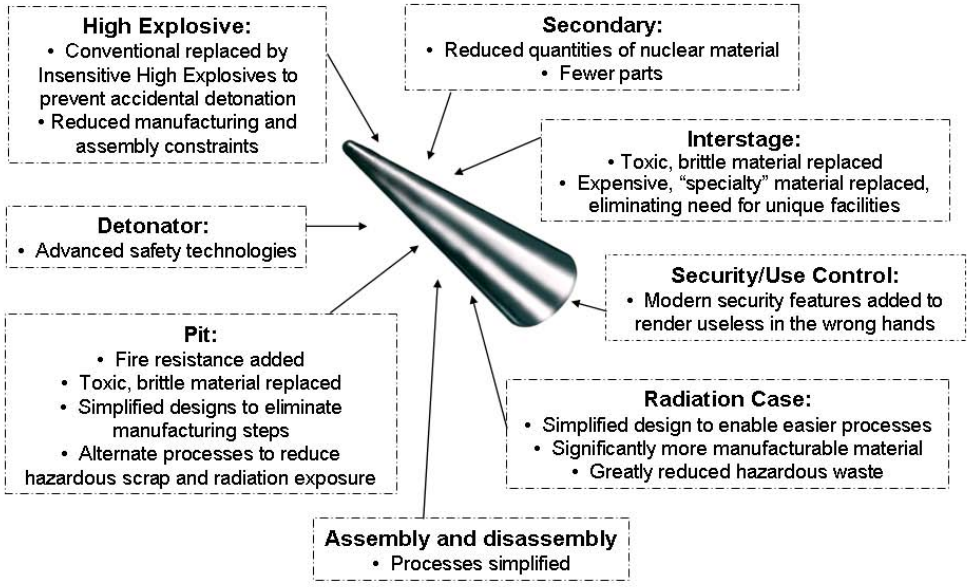
"Both teams developed brill designs," said D'Agostino. "Because of the superior scier across the nuclear weapons complex with assets like supercomputers, and the early design engagement with the production facilities, the laboratories were able to deve designs in nine months that w much more mature than they would have been after two yea work during the Cold War. Thi an amazing scientific accomplishment that should n overlooked."

The two nuclear weapons laboratories both submitted designs that fully met all RRW requirements. However, D'Agostino noted that higher confidence in the ability to certify the Livermore design without underground nuclear testing was a primary reason for its selection. That design was more closely tied to previous underground testing. While one of several factors, it was an especially important one to assure long-term confidence in the reliability of the nuclear weapons stockpile.

Several features of the Los Alamos design are highly innovative and will be developed in parallel with the Livermore effort. As they mature, the features may be introduced into the RRW design as it progresses.

An important aspect of RRW is its ability to exercise and maintain the critical skills of the country's nuclear weapons design, engineering and production personnel. An integrated team of designers and engineers led by Livermore will work with the production plants to develop the nuclear explosive component of the weapon. Sandia will develop the non-nuclear components and ensure compatibility with the Department of Defense's Trident submarine-launched ballistic missile delivery system. The U.S. Navy will lead the overall project team.

For the first time, NNSA's production facilities fully participated in the design process to ensure that components and materials used in RRW will be safer, and that parts will be easier to maintain and manufacture, moving NNSA toward a more efficient and smaller nuclear weapons complex.




## *Improved safety, security and manufacturability of the Reliable Replacement Warhead*

# New Y-12 Tack Cloth Cleans Contaminated Surfaces

For 30 years a Y-12 National Security Complex research chemist has been thinking about and experimenting with methods of removing contamination from surfaces, particularly legacy beryllium, to protect workers from exposure hazards. Beryllium metal, used at NNSA's Y-12 in nuclear weapons production, can cause serious illness in people who are sensitive to it.

After testing commercial cleaning cloths for years, Y-12 researchers had not found a product that would clean a contaminated surface to a non-detectable level while at the same time leaving no detectable residue.

Then Ron Simandl invented the Negligible-Residue Tack Cloth, or non-tacky tack cloth. His tack cloth removes beryllium contamination yet leaves no detectable sticky residue.

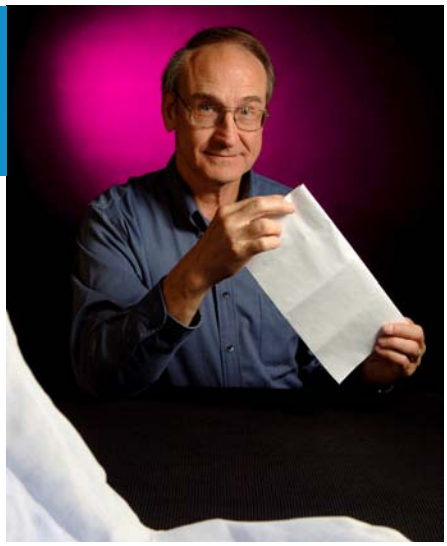
Tack cloth works by trapping dust, dirt or other particles in the cloth as it is wiped over the surface of the material being cleaned. While Y-12's primary application for the tack cloth is removal of legacy beryllium contamination, it also has the potential for wide application in industry, including the semiconductor and electronics industries, where surface cleanliness is critical.

"Tack cloths have been around for years. There's a whole clean-room industry that uses wipes and solvents to clean surfaces. A lot of the time they are just moving dust around. This new tack cloth is like flypaper for particulate. The curious thing about this new negligible-residue cloth and is that it doesn't feel tacky-sticky. It's a non-tacky tack cloth," said Simandl.

"Beryllium is an issue at Y-12. We are always looking for ways to lower to the maximum extent possible the potential for exposure to beryllium. We had tried a number of tack cloths, tackifiers and commercial cleaning agents, but none that would get us to the sort of 'holy grail' of below detectable levels for beryllium contamination. This new tack cloth has shown consistent results in cleaning surfaces below detection levels with no sticky residue," Simandl said.

This new negligible-residue cloth was designed to go after particles on the nanoscale because the level of detection for beryllium contamination is incredibly small, one-tenth of a nanogram per square centimeter.

"If you can visualize just one single speck of contamination that a young person could barely make out with his/her naked eye and then 'crush' that single speck and uniformly distribute this over one sheet of notebook paper, you will have our limit of detection with current technology," Simandl said.



**QUICKER PICKER UPPER:** Ron Simandl with his invention, the Negligible-Residue Tack Cloth, that will clean beryllium contaminated surfaces.

**ON SCHEDULE, UNDER BUDGET:** NNSA recently completed a $16.2 million Gas Transfer Capacity Expansion project at NNSA's Kansas City Plant. The project expanded the existing production department by 7,000 square feet and installed 23 pieces of new capital equipment. The expansion was necessary to increase production capacity in support of new tritium reservoir designs. Bob Schmidt, the NNSA federal project director, said the project was successfully completed on schedule and $2.3 million under budget. Schmidt credited the project's success to the integrated project team of professionals from Honeywell FM&T, Kansas City Site Office and NNSA headquarters.
Pictured left to right are: Bob Schmidt, Kansas City Site Office; Larry Sebolt, Honeywell FM&T; Jim Herrmann, Honeywell FM&T; Andy Gibler, Facilities Engineering Services; Dan Gehrke, Honeywell FM&T; and Dick Henry, Honeywell FM&T.

# U.S. And Panama To Combat Nuclear Smuggling

A Declaration of Principles has been signed with the government of Panama to help prevent smuggling of nuclear and other radioactive material. NNSA and the Department of Homeland Security's (DHS) Customs and Border Protection (CBP) cosigned the declaration. The document covers implementation of NNSA's Megaports Initiative and CBP's Container Security Initiative, as both programs continue working together to stop nuclear material from being smuggled to U.S. ports.

"Today's agreement with Panama represents a commitment on both sides to tackle the threat of illicit trafficking in nuclear and other radioactive materials, which will further the fight against terrorism," said NNSA Acting Administrator Tom D'Agostino. "Cooperating with the Panamanian government on the Megaports Initiative will help to secure global shipping lanes and ultimately protect U.S. ports."

***NNSA's Megaports Initiative is currently operational in six countries, and at various stages of implementation and negotiations with approximately 30 other countries around the world.***

NNSA's Megaports Initiative works with foreign governments to install specialized radiation detection equipment and enhance capabilities to deter, detect, and interdict illicit shipments of nuclear and other radioactive materials at international ports.

Under the CSI, officers from both CBP and DHS' Immigration and Customs Enforcement are stationed at key seaports abroad to work with host governments to identify high-risk shipments bound for the United States and to examine these shipments prior to loading. CSI operates at 50 ports in North America, Europe, Asia, the Middle East, and North, South and Central America. About 83 percent of all cargo containers destined for U.S. shores originate in or are transshipped through CSI ports.

**ENGINEERS DAY AT LLNL:** More than 500 area students and teachers participated in Lawrence Livermore National Laboratory's annual Engineers Day celebration. In this photo, fifth grade student Grace Rechers displays her entry in the parachute drop contest. Students took part in other hands-on activities such as creating DNA jewelry, learning about waves in a wave tank and playing a trash can guitar to understand sound waves and music. More than 70 Livermore employees volunteered their time and effort to conduct Engineers Day.

# LANL Staff Named AAAS Fellows; Nine Honored As APS Fellows

Three researchers at NNSA's Los Alamos National Laboratory have been named fellows of the American Association for the Advancement of Science (AAAS). The new AAAS fellows are Alan Bishop, associate director for theory, simulation and computation; Alan Perelson, group leader in theoretical biology and biophysics; and Toni Taylor, associate director of the Los Alamos-Sandia Center for Integrated Nanotechnologies.

Nine scientists have been selected as fellows of the American Physical Society (APS) and are recognized for their extraordinary efforts in physics - representing the most Los Alamos physicists selected as APS fellows in a given year. They are: Brenda L. Dingus (Neutron Science and Technology); Michael R. Fitzsimmons (Los Alamos Neutron Science Center - Lujan Center); George T. "Rusty" Gray (Structure and Property Relations); Neil Harrison (National High Magnetic Field Laboratory Pulsed Field Facility); Robert S. Hixson (Shock and Detonation Physics); Philipp P. Kronberg (Institute of Geophysics and Planetary Physics); Michael A. Nastasi (Center for Integrated Nanotechnologies); Eddy M. Timmermans (Atomic and Optical Theory); and Arthur F. Voter (Theoretical Chemistry and Molecular Physics).

# Two Los Alamos Scientists Win E.O. Lawrence Award

Two scientists from NNSA's Los Alamos National Laboratory (LANL) in New Mexico are among eight winners of the Ernest Orlando Lawrence Award announced by Secretary of Energy Samuel W. Bodman. The E.O. Lawrence Award honors scientists and engineers at mid-career for exceptional contributions in research and development that support the department and its mission to advance the national, economic and energy security of the United States. The award consists of a gold medal, a citation and an honorarium of $50,000.

Malcolm J. Andrews won in the national security category and My Hang V. Huynh won in the chemistry category.

"These brilliant scientists and their varied and important research inspire us," Secretary Bodman said. "Their work reminds us of the importance of continued investment in science and the need for increased emphasis on basic research and math and science education programs."

Andrews, a mechanical engineer and mathematician, is a world-renowned expert on Rayleigh-Taylor mixing and unstable or turbulent fluid flow processes that are critical to the quality of predictions of the nation's nuclear weapons stockpile.

Huynh, a chemist, is the pioneer for the groundbreaking discovery of Green Primary Explosives to replace mercury and lead primary explosives which have caused detrimental effects on the environment and humans for nearly 400 years.

The E.O. Lawrence Award was established in 1959 to honor the memory of the late Dr. Lawrence who invented the cyclotron (a particle accelerator) and after whom two major Energy Department laboratories at Berkeley and Livermore, California, are named. The Lawrence Awards, given in seven categories, will be presented at a ceremony in Washington, D.C.

Additional information on the winners and their work is available at www.sc.doe.gov/lawrence/.

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# NNSA Selects Federal Safety Professionals Of The Year

Two NNSA staff members have been named the 2006 NNSA Federal Safety Professional of the Year by Acting Administrator Tom D'Agostino. They are Dr. Jerry McKamy, NNSA Nuclear Criticality Safety Program (NCSP) manager and Teresa M. Robbins, Y-12 Site Office (YSO) Authorization Basis engineer.

"The award selection panel tells me that this selection was difficult because the nominees were all of high quality and demonstrated the characteristics we were seeking when we created this award," D'Agostino said. "Each nominee should feel proud to have been selected to represent his or her office. I am proud of the many talented and dedicated people working to ensure that our workers, the public, and the environment are adequately protected from both the common and the unique hazards that we face in the challenging work entrusted to us."

McKamy manages the $10.5 million NCSP and has re-established a national capability to conduct hands-on criticality safety training courses. He has led comprehensive criticality safety reviews at Los Alamos National Laboratory and provided criticality safety support for YSO, Savannah River Site, Los Alamos Site Office, Sandia Site Office, Nevada Test Site (Subcritical Experiment Readiness Assessment Issue Resolution) and Oak Ridge National Laboratory for Science (restarting the Electron Linear Accelerator for the first time since 2004).

Robbins leads YSO technical reviews of contractor documented safety analyses and technical safety requirements for the YSO Enriched Uranium Operating (EUO) facilities and for hazardous non-nuclear facilities. She is a qualified nuclear safety specialist and recently led the EUO facility risk review, piloting the new risk-informed decision-making process. She also supports the new Uranium Processing Facility Integrated Project Team and YSO Design Basis Threat safety and security integration approach.