National Nuclear Security Administration ● Washington, DC 20585 ● December 2004

FAA HONOR: This Savannah River Site helicopter is part of the Savannah River Site aviation program that won a Federal Aviation Program Award for the second consecutive year. The helicopter program has exceeded performance measures, which ensures a reliable capability to meet site aviation mission requirements. Earlier this year, the SRS Aviation Team earned the DOE Aviation Program Award for the third consecutive year. See story page four.

NNSA's Life Extension Program Meets Defense Needs Without Testing Or New Weapons

The National Nuclear Security Administration (NNSA) has completed the first leg of an ambitious program to ensure that the nation's aging nuclear weapons stockpile is capable of meeting national defense requirements without producing new warheads or conducting underground nuclear tests.

NNSA has successfully completed a life extension refurbishment program for the W87 nuclear warhead. The last W87 warhead to be refurbished rolled off the assembly line at the Pantex Plant after undergoing an extensive rebuild. The purpose of the W87 Life Extension Program (LEP) refurbishment is to extend the warhead's life by 30 years and to provide structural enhancements.

(continued on page 4)

NNSA Supercomputers Among The Fastest In The World

Three NNSA supercomputers are the among the six fastest computers in the world.

Citing the recently released TOP500 supercomputer list, Deputy Administrator for Defense Programs Everet Beckner said that NNSA labs not only topped the list with the BlueGene/L at Lawrence Livermore National Laboratory, but also claimed fifth with Thunder at Livermore and sixth with ASCI Q at Los Alamos National Laboratory.

"NNSA and our labs have half of the top six fastest computers in the world and we are helping to pioneer this field," said Beckner. "NNSA remains the leader in ultra-scale modeling and simulation, contributing to the strength of the nation's supercomputing industry and to the country's scientific competitiveness. We are now today doing things that in the past would have been impossible to carry out due to sheer complexity."

(continued on page 2)

NNSA Supercomputers

(continued from page 1)

With BlueGene/L, ASCI Q, and other systems, NNSA uses its supercomputing capabilities through its Defense Programs Office of Advanced Simulating and Computing (ASC) to ensure the United States nuclear weapons stockpile continues to be safe, secure and reliable without nuclear testing.

As part of NNSA's stockpile stewardship program, ASC computers develop models and simulations to understand and predict behaviors associated with aging weapons by, among other things, gauging various stages of a nuclear explosion. NNSA's national laboratories employ the supercomputers daily to answer some of the nation's most complex scientific and engineering questions.

"NNSA remains the leader in ultra-scale modeling and simulation"

NNSA's efforts in supercomputing are enabling fundamental shifts in scientific methods by putting simulation on equal footing with theory and experiments. This fundamental shift is occurring across the NNSA complex as the world's most capable supercomputers are being used to answer some of the nation's most complex scientific and engineering questions.

NNSA Ombudsmen Work To Resolve Workplace Concerns

Federal employees and contractors within NNSA who want an informal and off-the-record resource to discuss workplace concerns can talk to one of seven staff members who serve in the NNSA Ombudsman program.

Established by Administrator Linton Brooks, the program exists to provide a confidential, impartial and independent method for achieving fair and equitable resolutions to workplace problems, and to advocate for fair process. Although NNSA Chief of Staff Bill Barker is responsible for administrative aspects of the program, the ombuds have a direct line to Administrator Brooks.

Brooks has authorized ombuds to have direct access to all relevant information, except where restricted by law, as well as access to independent resources for legal counsel through the NNSA Office of General Counsel and access to all senior officials in the agency. Consistent with their charter, information shared with an ombuds is strictly confidential. No information provided to ombuds can or will be used in any official proceeding even if the employee consents.

Discussing a workplace issue with an ombuds does not constitute a formal notice of an EEO complaint, and ombuds are not authorized to become involved in an issue that is the subject of a collective bargaining agreement unless all parties jointly agree to allow it.

The program's charter stipulates that ombuds will not keep permanent records on behalf of individual employees or the agency. Ombuds are chartered, however, to identify new problems, provide feedback on trends, issues, policies and practices to Administrator Brooks without compromising confidentiality or anonymity. All ombuds are required to adhere to the code of ethics of the Ombudsman Association.

The seven ombuds are: Jonathan Kiell, Lauren Lovick, Betty Morris, John Kerr, John Ordaz, Jamileh Soudah and Ann Walls.

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Kansas City Plant Is World Leader In Detecting Organic Contaminants And Testing Cleanliness

The appearance of cleanliness on the surface is good enough for most of us, but when it comes to cleaning parts and components that will become part of the nation's weapons stockpile, it's very important.

The NNSA's Kansas City Plant is rapidly establishing itself as a world leader with its expertise in cleaning technology and cleanliness assessment. Mark Benkovich, staff engineer in materials engineering, is one of the two leading experts in the world on MESERAN™ analysis, a technique he has refined to detect organic contaminants at 1,000 times greater than industry standard methods for evaluating cleanliness.

The level of organic contaminants the technique is able to detect is roughly equivalent to finding a solitary grain of rice on a football field.

"We've been using this technology for more than 30 years," Benkovich said. "Other facilities in the weapons complex rely on us to quantify levels of cleanliness that are not easily detectible by other methods."

MESERAN™ – an acronym for "measurement and evaluation of surfaces by evaporative rate analysis" – was developed by Dr. John Anderson in the early 1960s. Benkovich has worked extensively with Anderson, including a two-year stint as technical director of The MESERAN™ Company and as general manager of MESERAN™ Testing Laboratories.

Benkovich continues to develop his expertise in using the technique, most recently having developed a library of calibrations of typical organic contaminants on a variety of substrates.

Measuring to those levels is valuable only if cleaning to those levels makes a difference.

Mark Smith, the Kansas City Plant's resident plasma cleaning expert adds, "the kinds of products we build require the strength of bonds to be very high: the cleaner the surface, the stronger the bond."

Additionally, cleanliness becomes more important as parts get smaller – contaminants are more likely to cause problems on very small parts such as microcircuits.

A newly developed piece of equipment, the MicroSolventEvaporator™, is enhancing the Kansas City Plant's ability to test cleanliness. When used in conjunction with the MESERAN™ Analyzer, the MicroSolvent-Evaporator™ permits evaluations of cleanliness for all sizes and shapes of parts, whereas before, only small flat parts or test coupons could be analyzed. In addition, the MicroSolventEvaporator™ allows non-volatile residues in solvents to be evaluated more precisely.

Using his techniques, Benkovich measures organic – or carbon-based – contaminants such as oil, grease, mold releases, solder flux, uncured resins, and coolants, all necessary to the manufacturing process. But once a part is made, it's essential to remove every trace of these organic contaminants, which in a finished component can inhibit adhesion, leading to electrical failures and catastrophic adhesion failures.

KCP CLEANING TECHNOLOGY: Mark Benkovich, KCP staff engineer, positions solvent that has been used to clean a part in the MicroSolventEvaporator™. The MicroSolventEvaporator™ quickly evaporates the solvent, leaving only extracted residue on a clean reference substrate, ready to be tested for organic contaminants in the MESERAN™ Analyzer.

Savannah River Site Aviation Program Earns Second Award From Aviation Administration

The Savannah River Site (SRS) aviation team, comprised of the Department of Energy Savannah River Operations Office (DOE-SR) and Wackenhut Services Incorporated has earned the Federal Aviation Program Award for the second consecutive year. The DOE Savannah River Operations Office provides line management oversight and policy direction for the aviation program and Wackenhut operates and maintains the two DOE-owned helicopters at the SRS.

"Federal government agencies that own or hire aircraft to perform their non-military missions may submit nominations for the Federal Aviation Program Award in either the Small Category or Large Category," said Steve Shelt, DOE-SR Aviation Program Manager. "The SRS earned the award, administered by the General Services Administration, in the Small Program Category, competing against other federal aviation programs with less than 20 aircraft."

The Federal Aviation Program Award honors the safest, most efficient and effective federal aviation operations. A panel of independent aviation experts evaluated aviation programs in the federal government for overall excellence and innovative achievement during the calendar year. Judges looked for nominees that excelled in all elements of a flight program: management and administration, operations, maintenance, training and safety.

"We are very proud of our aviation professionals," said Dr. Larry Brede, Wackenhut's General Manager at SRS. "The entire team is dedicated and committed to ensuring a safe and efficient program, and this award validates the site aviation program."

NNSA's Life Extension Program Meets Defense Needs

(continued from page 1)

"The W87 is an integral part of the nation's strategic defense. Completion of this important life extension program assures the continued safety and reliability of this vital part of the strategic nuclear deterrent," said Dr. Everet Beckner, deputy administrator for defense programs.

The W87 LEP was the first refurbishment program conducted by the NNSA's nuclear weapons complex, and the first program since the early 1990s that featured full utilization of the production complex. NNSA sites that participated in the work included the Pantex Plant, the Y-12 National Security Complex, the Kansas City Plant, the Los Alamos National Laboratory, the Sandia National Laboratories, and the Lawrence Livermore National Laboratory.

NNSA is taking a proactive approach to warhead refurbishment.

Beckner said NNSA is taking a proactive approach to warhead refurbishment. Through enhanced surveillance and assessment efforts, NNSA has developed an improved understanding of the effects of aging on warhead safety, security, and reliability. Using this knowledge, NNSA is able to plan refurbishments to replace or fix components systematically, before aging-related changes jeopardize warhead safety or reliability. Other warheads undergoing planned life extension refurbishments include the B61, W76, and W80.

The W87 LEP was authorized by Congress in 1994 and the first rebuilt warhead was delivered back to the Department of Defense in 1999.

Got an article for the NNSA Newsletter? *Submit it for consideration to AStotts@doeal.gov*

LANL "Holdup" Specialists Hit Kazakhstan Site

Four Los Alamos National Laboratory (LANL) scientists spent two weeks recently working at the uranium fuel fabrication facility of the Ulba Metallurgical Plant in Ust-Kamenogorsk, Kazakhstan.

Ulba was once, and may soon be again, the largest uranium fuel fabrication plant in the world. The principal goals of the trip were to measure uranium deposits, known as holdup, in plant equipment and to train facility staff to perform these measurements using equipment recently provided by NNSA's Global Nuclear Security Program.

The scientists, Anthony Belian, Douglas Reilly, Phyllis Russo and Steve Tobin of LANL's Safeguards, Science and Technology (N-1) group, have unparalleled expertise in holdup detection technology. Their efforts to seek to improve nuclear material accountability at Ulba are in accordance with goals of the International Atomic Energy Agency (IAEA) safeguards program. Abdellah Chahid of the IAEA participated during the first week and also assisted during a similar visit in July.

Working in teams, the Los Alamos personnel performed nearly 1,600 separate measurements, quantifying the uranium in vacuum lines, ventilation systems, filters and feed elevators. They also spent considerable time verifying the accuracy of the holdup measurements, comparing different measurement techniques, and training plant engineers and technicians to use the technique that was developed at Los Alamos which is used throughout the DOE complex. Next steps include writing a final report, in collaboration with Ulba and the IAEA, and developing a proposal to automate the measurements.

Office of Secure Transportation Competes in 2004 Defender Challenge

An NNSA Office of Secure Transportation (OST) team took third place in the annual Defender Challenge 2004 combat weapons event at Lackland Air Force Base in Texas. There was only a three-point difference between first and third place.

The annual Defender Challenge pits security forces teams from Air Force major commands, the Royal Air Force Regiment and the Department of Energy against each other in events that test marksmanship, tactics, physical fitness and teamwork.

Members of the NNSA team are Eastern Command Federal Agents Aaron Betts and Jeff Campbell, Western Command Federal Agents Mike Miller, Brian Nestler, Mike Restine, and Brian Westney, and Central Command Federal Agents Kevin St. Hilaire, Joshua Steele, and Matthew Watson.

DEFENDER CHALLENGE: NNSA Federal Agent Brian Nestler blasts targets down range with his machine gun during the Defender Challenge 2004 combat weapons event at Lackland Air Force Base in Texas. Agent Nestler is on the Department of Energy team, which took third place overall in the competition.

In addition to the team third place finish, Agent Miller placed first in the Individual M249 Squad Automatic Weapon. Agent Nestler placed second in the individual handgun competition while Miller placed third. Their performance, coupled with the overall strong team effort, allowed OST to win the Coleman trophy for the third year in a row.

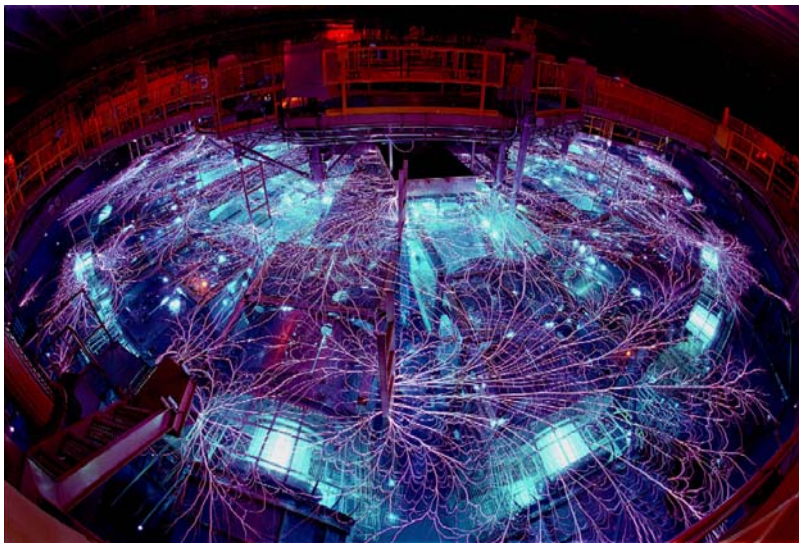
Sandia Z Machine Refurbished To Advance Fusion Capabilities And Serve Weapons Program

Sandia National Laboratories' Z machine, which last year emitted neutrons to enter the race to provide the world virtually unlimited electricity from essentially seawater, has received approval from the NNSA to proceed with a $61.7 million refurbishment. The project is called ZR, for Z-Refurbishment.

The machine's immediate purpose is to provide data to feed into supercomputers that simulate nuclear weapon explosions and to test materials under extreme conditions.

"The advance will support the weapons program and materials work not only at Sandia but at Lawrence Livermore and Los Alamos national laboratories," said Sandia Senior VP Tom Hunter, who managed the funding that made the new installation possible. "This significant upgrade and investment also will allow us to move to a new level of insight of z-pinches and their relationship to fusion. I give credit to the Sandia project team and NNSA for making this a reality."

Eight years ago, the Z machine startled the world when a technical advance enabled the machine's power output to rise nearly straight up. Output for Sandia's pulsed power projects, which had increased only slowly for more than a decade, rose dramatically. For Z, just coming on line, an expected usable output of 50 terawatts rose over the next two years to 230 terawatts. This made the machine not only more valuable as a data provider for nuclear weapons simulations but also showed that z-pinches were a possible candidate for peacetime fusion.



THE Z MACHINE: In the instant of its firing. Sandia National Laboratories has received NNSA approval to upgrade the facility, which provides data for supercomputer simulations of nuclear weapons explosions.

Last year, Z researchers announced that Z had generated neutrons by imploding a small capsule filled with deuterium. This emission signaled that the machine had joined a select group of machines capable of executing high-quality fusion implosion experiments.

The coming upgrade can only increase thermonuclear neutron emission, according to Z researchers. Z's overall form will be unchanged, but its working numbers will be significantly different.

Instead of 18 million baseline amps bathing the target, 26 million amps will make the journey. The X-ray usable peak emissions will rise from 230 to 350 terawatts - more than 100 times the entire world's output of electricity for a few nanoseconds. The (X-ray) energy output will rise from 1.6 to 2.7 megajoules.

Jeff Quintenz, director of Pulsed Power Sciences Center, is excited about the increase in the facility's precision. "Now we're able to produce only the same pulse shape each time, when operating with a particular experimental configuration," he said. "Without this investment, experimentalists got what we had. Now we can dial a pulse; we have 36 switches that can be timed separately instead of 36 under one control."

The machine also is expected to be lower-maintenance, with less downtime between shots. Current capacity is 200 shots/year, Quintenz says. The refurbished machine will be capable of 400 shots/year, assuming operational funding is available.

A less obvious but no less important reason for the new upgrade, says Jeff, is "to exercise our pulsed-power engineering capability so we don't lose it." The last big pulsed-power engineering project was for Sandia's Hermes III facility in 1988, he said.

Dr. Steven Aoki Named Acting Deputy Undersecretary For Counterterrorism

NNSA Administrator Linton Brooks has appointed Dr. Steven Aoki as acting deputy undersecretary for counterterrorism. The appointment has the concurrence of Energy Secretary Spencer Abraham.

Aoki is acting in the position formerly held by Ken Rapuano, who was appointed deputy homeland security advisor to the President. Aoki serves as the key senior point of contact for the department and NNSA with the Department of Homeland Security, the Homeland Security Council, the National Security Council, and other agencies, as appropriate.

In addition to reporting to Brooks, he reports to Secretary Abraham and Deputy Secretary McSlarrow on counterterrorism policy issues. His responsibilities include coordination of all technical programs of counterterrorism relevance; management of all emergency response assets; the coordination of threat assessments of actual or potential terrorist actions; and, evaluations of measures to support international and domestic programs to detect and prevent acts of nuclear or radiological terrorism. He also serves as the chair for the department's Counterterrorism Coordinating Council.

"Steve has the technical expertise, management experience, and detailed knowledge of how the interagency arena works, all of which make him perfect for this challenging assignment," Brooks said.

LANL TA-54 CLEANUP: Seven "stringers" formerly used to push targets in and out of a linear accelerator beam line for radioisotope research at Los Alamos National Laboratory have been safely removed from the lab's Technical Area 54. The twenty-six foot long hollow steel rods filled on the lower end with cement, sand, and lead were transported to a permitted treatment and disposal site in Utah. Removal of the stringers is part of the proposed closure plan for the Material Disposal Area L.

Livermore Projects Receive Awards From Public Relations Society of America

PR AWARD: The Public Relations Society of America's northern California chapter recently honored Lawrence Livermore National Laboratory with awards for two communications projects. "Edward Teller Remembered," a video documenting the life of the laboratory's co-founder, received the society's highest honor in the Audio Visual - Internal Video Programs category. A homeland security press kit produced by LLNL's Public Affairs Office and Homeland Security Organization was also honored by the society. (clockwise from lower left) Kelly Spruiell, Gary Graff, Leonard Walton, Steve Wampler, Jerry Johnson, Mimi Alford, John Danielson, Kirk Hadley, Maria Fogle and Lynda Seaver.

NNSA Staffer Volunteers Time For Indian Community Projects

Raised on the Yakama Indian reservation in Washington State, Kiutus (Ki) Tecumseh of the NNSA Service Center Office of Public Affairs has devoted a significant amount of his adult life as a volunteer for Native American community projects. Throughout his federal career, he has also volunteered as a liaison to American Indian communities and institutions in New Mexico.

As a board member of the American Indian Science and Engineering Society (AISES), Ki is actively engaged in developing a stronger partnership between AISES and NNSA. Ki also has a distinguished history of community leadership. He is the current secretary and the former chairman of the New Mexico Advisory Council on Indian Education for the State Board of Education and the president of the Board of Directors of the Albuquerque Indian Center. Earlier this year Albuquerque Mayor Martin Chavez appointed Ki to serve on the Commission on Indian Affairs.

Ki has used his membership on Albuquerque's Citizen Advisory Group and the Albuquerque Citizens Team —both mayoral appointments— as a means to channel nearly a million dollars in federal Housing and Urban Development funds to the Albuquerque Indian community over a six-year period.

"The funds enabled the Albuquerque Indian Center (AIC) to buy a building and half of a city block," he said. "Working within the city committee structure I was also able to help the AIC five years later to obtain renovation funding for the building. I was also instrumental in obtaining over $125,000 of HUD funding for the Morning Star House, an Indian Women's domestic violence shelter, that enabled them to purchase a building and thus better serve their clientele."

NNSA VOLUNTEER: Ki Tecumseh (center) convene's a meeting of the Albuquerque, NM, Indian Center board of directors. Ki has been instrumental as a community volunteer in helping the center to obtain funding to purchase and renovate a headquarters building.

He said the most important issues for him as a volunteer are helping to provide quality education and fostering open communication channels between Indians and non-Indians to help both tribal and urban Indians to become more skilled at economic and domestic interactions.

"Being a community volunteer is an honor because you can assist others in working within the secular, private, federal, state and local arenas to institute positive changes to benefit youth and the underprivileged, he said."

U.S. And Indonesia Governments Sign Arrangement On Nuclear Safeguards

NNSA Deputy Administrator for Defense Nuclear Nonproliferation Paul Longsworth has signed a bilateral arrangement on nuclear safeguards and security with the chairman of Indonesia's Nuclear Regulatory Agency, Dr. Azhar Djaloeis.

The arrangement, which provides a blueprint for U.S.-Indonesian cooperation on efforts to secure and safeguard nuclear materials, was signed at the 2004 Asia-Pacific Nuclear Safeguards and Security Conference in Sydney, Australia. "This is an important step in nonproliferation efforts worldwide," said Longsworth. "It is essential that we have international cooperation to prevent nuclear materials from getting in the wrong hands, and I look forward to continuing an already positive relationship with Indonesia."

In October 2004, the U.S. and Indonesia renewed the agreement for cooperation concerning peaceful uses of nuclear energy. NNSA officials have also worked with Indonesian nuclear experts to upgrade physical security at nuclear facilities in Indonesia and to address spent fuel disposal issues.

The new arrangement will expand the scope of cooperation between the United States and Indonesia in nuclear nonproliferation. Technical projects under the new arrangement will further both countries' efforts to support International Atomic Energy Agency safeguards to account for and verify nuclear materials under the Non-Proliferation Treaty.