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Nuclear Weapons Officials Agree To Pursue RRW Strategy

Senior officials at the Department of Defense and NNSA have determined that the Reliable Replacement Warhead (RRW) is feasible as a strategy for sustaining the nation's nuclear weapons stockpile for the long-term without underground nuclear testing.

"The Reliable Replacement Warhead will provide means to ensure the long-term reliability of the stockpile and enable us to establish a safer and more secure nuclear deterrent," said then NNSA Administrator Linton F. Brooks. "It will give us the tools we need to build on the President's vision of maintaining the smallest nuclear stockpile that is consistent with national security requirements."

The Nuclear Weapons Council (NWC), a working group of senior

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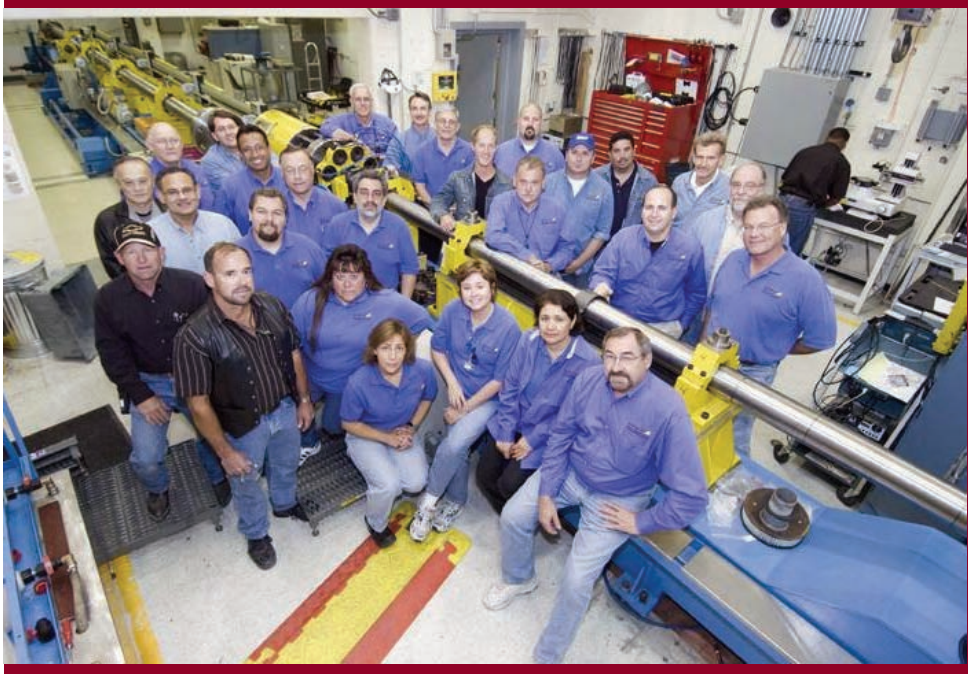


THE JASPER TEAM: Standing next to the two-stage gas gun, this Nevada Test Site (NTS) team has worked together to fire more than 60 shots. The team is made up of scientists and support staff from Los Alamos and Lawrence Livermore national laboratories and NSTec, the NTS operations contractor. JASPER is one of many such facilities at the test site where the focus is on getting the mission accomplished with an integrated work team. See page 7 for more on NTS.

In This Issue

Almost 600 Pounds Of HEU Returned To Russia

With assistance from NNSA, more than 590 pounds of highly enriched uranium was recently returned from a former East German civilian nuclear facility to Russia.

The shipment of 268 kilograms (over 590 pounds) of highly enriched uranium (HEU) is the largest shipment of Soviet-origin HEU ever conducted under a key nonproliferation program, the Global Threat Reduction Initiative (GTRI), since the inception of GTRI two-and-a-half years ago. The five-day operation took place at the Rossendorf nuclear facility near Dresden, Germany.

The effort was completed in cooperation with Germany, the Russian Federation, and the International Atomic Energy

(continued on page 2)

Nuclear Weapons Officials Agree To Pursue RRW Strategy

(continued from page 1)

officials from the Defense Department and NNSA that oversees nuclear weapons policy, made the decision after reviewing competing designs for a replacement nuclear warhead for the nation's sea-based nuclear deterrent. They were submitted by the nation's two nuclear weapons design laboratories, Los Alamos National Laboratory and Lawrence Livermore National Laboratory.

The NWC launched the competition more than a year ago to determine whether a replacement warhead could enable long-term confidence in the performance of the current stockpile without a return to underground nuclear testing. The program has been authorized by Congress, although no decisions to build or deploy the warhead have been made.

The council is continuing to discuss the two laboratory submissions and has not selected a preferred design. Once the NWC reaches a decision, the two departments will conduct a study to further define and develop detailed cost estimates for the RRW program. A move to the engineering development and production engineering phases will require congressional approval.

The NWC is chaired by Kenneth Krieg, undersecretary of defense for acquisition, technology and logistics. Other members are Tom D'Agostino, acting undersecretary of energy for nuclear security and acting administrator, Admiral Edmund Giambastiani, vice chairman of the Joint Chiefs of Staff, Ambassador Eric Edelman, undersecretary of defense for policy, and General James Cartwright, commander of the U.S. Strategic Command.

The RRW will:

- Assure long-term confidence in the reliability of the nuclear weapons stockpile;
- Enhance the security of nuclear weapons, through the use of state of the art technology to prevent use by terrorists, rogue nations or criminal organizations;
- Improve the safety of the stockpile, through upgrades such as the use of insensitive high explosives, rather than conventional high explosives;
- Help to develop a more responsive nuclear weapons infrastructure by:
  - Using replacement components and assemblies that are easier to manufacture and maintain;
  - Exercising critical nuclear weapons design and production skills;
- Enable a reduced stockpile size, by increasing confidence in the infrastructure to produce weapons if and when they are needed; and
- Decrease the likelihood that a nuclear test will be needed to confirm weapon performance.

HEU Returned To Russia

(continued from page 1)

Agency (IAEA). Dr. Igor Bolshinsky on detail to GTRI from Idaho National Laboratory and Stan Moses from Oak Ridge National Laboratory were both key to NNSA's efforts to successfully complete this mission.

The HEU fresh fuel was loaded into 18 Russian TK-S16 specialized transportation containers at Rossendorf with NNSA technical experts and IAEA safeguards inspectors monitoring the fuel loading process. The canisters were transported under heavy guard and then airlifted from Dresden Airport to a secure facility in Russia. The fuel will be permanently downblended from HEU to low enriched fuel in Russia to ensure that it cannot be used to make nuclear weapons.

"We applaud Germany's leadership in taking measures to return this material and we also appreciate the strong support of the Russian Federation and the IAEA for this important international nonproliferation project," said then NNSA Administrator Linton F. Brooks. "This successful removal is an example of the international community working collectively to reduce the threat of nuclear terrorism, and is the kind of concrete international security action that increases both U.S. security and that of our allies."

The shipment was part of the prioritized, accelerated schedule in support of the Bush-Putin Bratislava Joint Statement on Nuclear Security Cooperation. The Bratislava agreement was reached by Presidents Bush and Putin during their February 2005 meeting and includes initiatives to encourage U.S.-Russia nuclear security cooperation.

Remembering John Arthur

John Arthur, a past manager of NNSA's former Albuquerque Operations Office in New Mexico, died December 26 in Las Vegas, Nev., after an illness. He was 53-years-old. At the time of his death Arthur was director of the DOE Office of Civilian Radioactive Waste Management Yucca Mountain Site Operations Office in Las Vegas.

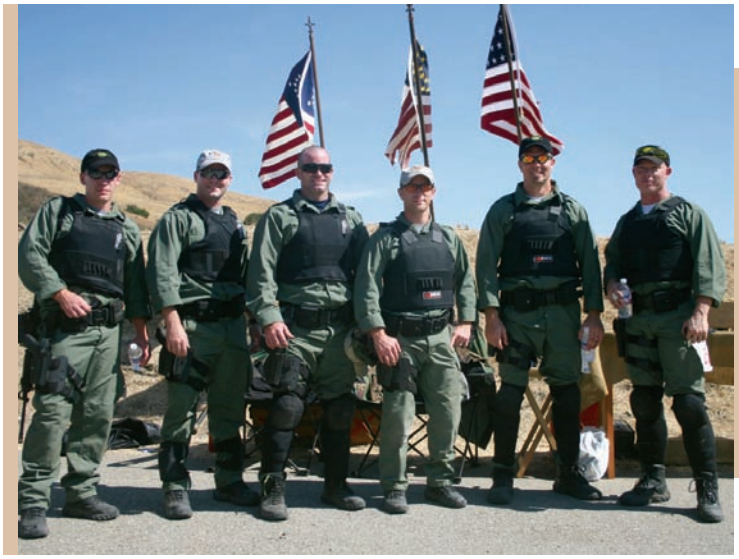
Then Administrator Linton F. Brooks said, "John provided extraordinary leadership during tumultuous times. As a strong and visionary manager, he worked selflessly to help devise and implement the 2002 reorganization that created the needed NNSA structure for the future, even to the point of working himself out of a job with the abolition of the Albuquerque Operations Office. John began every message with a warm greeting and ended every task with a 'thank you.' He showed enormous respect for each and every person with whom he worked and brought out the best in us. We are all better for having been associated with John and will always carry gratitude in our hearts for having had the privilege of working with him. The nation, the Department and NNSA will miss him deeply, both personally and professionally."

NNSA Service Center Director Karen Boardman said, "Many of us had the pleasure of working with John while he was in Albuquerque. He was extremely bright and energetic. He had that unique something that makes a natural leader who people want to follow and please. John will also be remembered for his compassion and integrity. He was an amazing person who touched all of us."

He is survived by his wife, Rita and son James of Las Vegas and his daughter Stephanie of Albuquerque.

Arthur managed the Albuquerque Operations Office (ALO) from mid-2001 to December 2002. At the time ALO had oversight for Sandia and Los Alamos national laboratories as well as the Kansas City and Pantex plants. Also at ALO he served as acting deputy manager, assistant manager for defense programs and assistant manager for environmental operations.

From March to May 2000, Arthur was the chief operating officer for the DOE Office of Environmental Management at DOE headquarters where he managed operations in support of the nation's largest environmental cleanup and nuclear materials management program. He played a major role in the 1999 opening of the Waste Isolation Pilot Plant, the nation's first deep geologic waste repository.



BEST OF THE WEST: A team of Lawrence Livermore National Laboratory (LLNL) security officers captured second place overall in this year's Best of the West invitational SWAT competition. Twenty-eight western law enforcement special-response teams competed in the event in Santa Clara, Calif. The team competition included physical challenge, team assault, jungle trail and long gun or sniper rifle. Individual events included shotgun and combat. Individually, out of 168 individual participants, LLNL officers took the second, third, fifth, twelfth, twenty-third and twenty-fourth places. LLNL's team placement qualifies it to compete next spring in the international Original SWAT Competition in Arkansas.

THE NEVADA TEST SITE

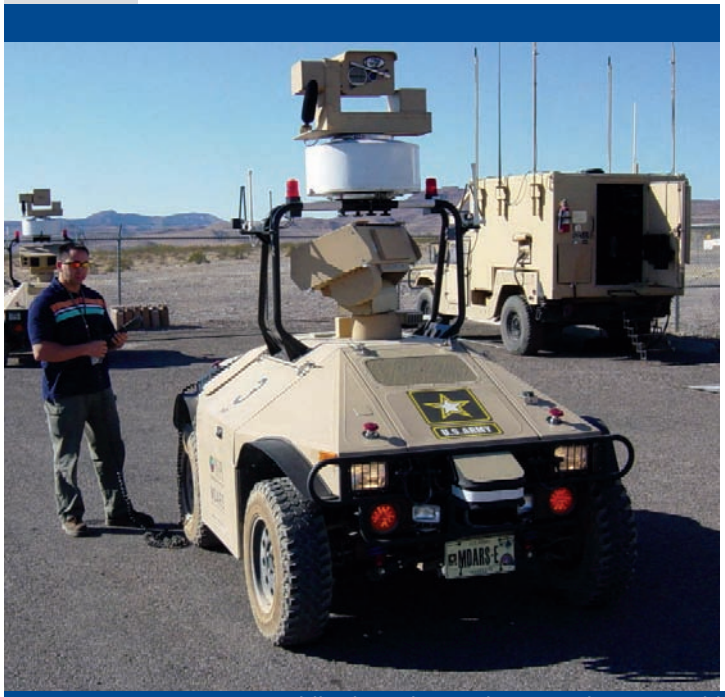
A UNIQUE NATIONAL RESOU

The Nevada Test Site (NTS) near Las Vegas is a unique asset for NNSA and the nation for a variety of reasons, but primarily because plutonium can be expended there while conducting experimental activities.

The site's remote location provides a place where NNSA's national laboratories convene to conduct their integrated experimental programs. This allows them to gather high-quality, high-fidelity data that supports the ongoing stockpile stewardship program and promotes opportunities for innovative research and development, which is key as NNSA transforms its infrastructure under the Complex 2030 plan.

Jay Norman, former acting manager for NTS said, "The test site provides a wide range of opportunities for NNSA as it moves through the process of Complex 2030. The ability to deliver consistently high-quality data and meet the needs of our customer base has always been a strong test site attribute."

Lawrence Livermore National Laboratory and Los Alamos National Laboratory— recognizing the need to manage work activities and assure a higher level of integration in their work at the site—jointly signed an unprecedented memorandum of understanding (MOU). The MOU was signed by both laboratory directors under the agreement that the labs will jointly implement efforts in the field, which include nuclear facility operations and experiment execution. This, in turn, will lead to higher productivity, better quality, and better performance.



ROBO SECURITY: A mobile detection and reconnaissance vehicle is shown being tested at the Nevada Test Site. These robotic systems are currently in use by the Army and are being evaluated for use to augment existing security forces throughout NNSA. These robots have the ability to detect intruders at great distances and provide security forces with the exact locations and number of intruders being monitored.

Bob Braddy, the inaugural joint test site program leader said, "It is increasingly important that the nuclear weapons complex identify and capitalize on opportunities to increase efficiency and reduce costs to the nuclear weapons program."

RIGOROUS TRAINING: Work
nuclear materials container. O
the test site. Prior to being us
training program on how to op

Getting the job done is not just a laboratory effort. Collecting data, designing and building unique complex data recorders, and assuring the facilities are ready for the experimenters is the domain of the site's management and operations contractor, National Securities Technology (NSTec). NSTec works hand-in-glove with the laboratories to assure they get the required data.

"When an experiment is being conducted we work side by side with the laboratories, other contractors, and our federal counterparts to get the job done and meet mission goals," said NSTec President and General Manager Steve Younger. "It's a seamless process that melds the right mix of expertise with the appropriate facility capabilities."

RCE TO MEET CUSTOMER NEEDS

Indeed, mission safety and mission security get the job done at the NTS. For example, Wackenhut Services Incorporated (WSI) is responsible not only for site security, but for protection of Category I and II nuclear material. WSI also provides security services for an expanse of real estate larger than the state of Rhode Island, which can be a daunting task.

ers at the test site's Device Assembly Facility are shown training on a mock ver the last 18-months, material from TA-18 in Los Alamos was relocated to ed for planned criticality experiments, workers go through a rigorous safety en containers, verify contents and remove the contents from the canisters.

To support the men and women who provide mission security, NNSA recognized that the test site's experience in testing and fielding experiments could be applied to emerging security technologies. In support of NNSA's mission, the Nevada Site Office Technology Deployment Program now identifies, tests, evaluates, and deploys existing and new emerging forms of security technology.

Ray Phifer, security director for the Nevada Site Office, said, "The ultimate result of this program is to ensure that our elite protective forces receive the technology and systems necessary to protect critical NNSA assets, save human lives, and in the process provide the greatest benefit at the least cost to the taxpayer. Through proper implementation of these resources, we will achieve a balance between personnel and technology that will ensure that the Nevada Test Site continues to provide an obstacle too great for any credible adversary to consider."

Execution of the program is fully wrapped in mission safety. Integrated into every activity is safety. Integration, again, is the key word. Safety works with the mission team to get the job done. The site office manager for safety programs, Don Seaborg, said that "safety obviously drives the inspections, audits, and oversight that is required. But, just as important as the safety experts, we are a part of the solution to assure that the job of the mission gets accomplished. We help the program get to the safety end-state that is necessary and required."

Recognizing the uniqueness of the Nevada Test Site and the role it plays in meeting national security requirements drives the people of the site. The people of the test site clearly recognize that "Mission Safety — Mission Security, Gets the Job Done."

The NTS Infrastructure

- 1,375 square miles in size
- 340 miles of paved roads
- 300 miles of unpaved roads
- 502 miles of power transmission lines with eight major substations and 166 minor substations
- Three public water systems consisting of 20 wells, 13 pumping stations and 24 tank storage areas
- 10 septic systems
- 11 sewage lagoons
- Three landfills
- Two runways
- Seven helipads
- 49 buildings covering 2.3 million square feet of office, industrial and programmatic space

Tritium Production Resumes At Savannah River After 18 years

When tritium gas was recently piped from the newly completed Tritium Extraction Facility (TEF) to the Tritium Loading Facility at NNSA's Savannah River Site (SRS), it completed an effort to resume tritium production at the Department of Energy that has been in the works for 18 years. Tritium was last produced by the department for the nuclear weapons stockpile in reactors at SRS in 1988.

TRITIUM HAPPENS: Shipping container with irradiated TPBARs being loaded into the TEF at SRS.

The $506 million TEF follows a $142 million upgrade of an existing SRS facility, called the Tritium Modernization and Consolidation Project. This upgrade allowed for the shut down and deactivation of SRS' original tritium facilities, which operated for almost a half century.

Tritium is a radioactive form of hydrogen gas that is an integral component in the nuclear weapons stockpile. Plans to resume tritium production were downscaled due to the end of the Cold War. As a result, tritium for the stockpile has been recycled from existing inventories ever since. Tritium has a half-life of 12.3 years, which means that tritium inventories decay into helium at a rate of about five percent per year. A new tritium supply was needed to replenish weapons and assure the future viability of the stockpile.

A new process for producing tritium was developed by NNSA's Office of Stockpile Technology. In the new process, Tritium Producing Burnable Absorber Rods (TPBARs) designed at DOE's Pacific Northwest National Laboratory are filled with lithium-6 pellets and loaded along with fuel rods into commercial power reactors operated by the Tennessee Valley Authority. Irradiation of the TPBARs produces tritium gas that is trapped in "getter" materials inside the rods. Once irradiated in a normal 18 month reactor cycle, the rods are trucked to SRS and loaded into the new TEF. The irradiated rods are cut and then lowered into an extraction furnace, where a combination of vacuum and high temperature causes the rods to give up their embedded tritium gas. The extracted gas is then cleaned up and piped directly to the Tritium Loading Facility where it is readied to be supplied to the Department of Defense for use in replenishing tritium in weapons.

"This is a great achievement for NNSA, the Savannah River Site and for the safety, security and reliability of our nuclear stockpile," said Thomas D'Agostino, acting NNSA administrator. "With the start of operations in this facility, all the elements of a tritium production enterprise are now in place. NNSA will be able to satisfy the nation's tritium needs indefinitely."

Radiation Equipment Up And Running In Slovenia

Radiation detection equipment installed by NNSA to screen for nuclear and radiological material at the Port of Koper in Slovenia is now fully operational. The equipment was installed in the Republic of Slovenia under NNSA's Second Line of Defense program, which works around the world to prevent the illicit trafficking of nuclear weapons and "dirty bomb" material.

"The enhanced screening capabilities at this port will improve the security of Slovenia, the United States, and all of our neighbors and allies," said then NNSA Administrator Linton F. Brooks. "The Slovenian Port of Koper is a major crossroad between eastern and western Europe. It is important that we have adequate detection there."

Since April 2005, NNSA has worked with the Customs Administration of Slovenia to install the radiation equipment and train the appropriate law enforcement officials to use the system and respond to alarms.

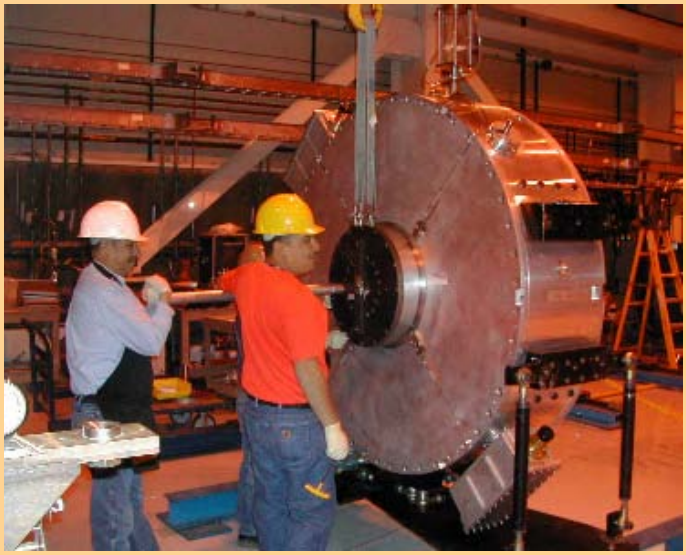
The Second Line of Defense Program works with foreign partners around the world to equip border crossings, airports and seaports with radiation detection equipment. The specialized radiation detection technology deployed under this program is based on technologies originally developed by NNSA laboratories as part of overall U.S. government efforts to guard against proliferation of weapons materials.

DARHT Axis 2 Has Two Successful Test Firings

Los Alamos National Laboratory (LANL) recently conducted two successful test firings of the Axis 2 accelerator at the Dual Axis Radiographic Hydrotest (DARHT) facility. Early data from the roughly half-power tests clearly showed four distinct pulses, each 60 nanoseconds long and 400 nanoseconds apart, just as expected.

In this photo, two refurbished DARHT cells are being vacuum checked by LANL technicians Armando Rendon and Dominic Tafoya before undergoing the final oil fill in the radiographic support laboratory at Los Alamos.

The DARHT project team expects to continue half-energy testing until February 2007 and then will begin installing the remaining complement of accelerator cells and ramp up to full power. The team hopes to conduct its first truly dual-axis hydrotest in early 2009.



Nevada Site Manager Named

Rear Admiral Gerald L. Talbot, Jr. has been named as the new manager of the NNSA's Nevada Site Office.

Upon his retirement, after serving 35 years in the United States Navy, Rear Admiral Talbot assumed his new position in January 2007. He succeeds Kathy A. Carlson, who retired in May 2006.

Talbot previously served as the director of military personnel plans and policy division where he lead the planning and execution for all U.S. Navy policies that governed the accession and career management of 360,000 officers and enlisted personnel and a $25 billion budget.

Thomas D'Agostino, NNSA's acting administrator, thanked Jay Norman for his service as the acting Nevada Site Office manager since Carlson's retirement.

Livermore's James R. Wilson Wins 2006 Hans Bethe Award

James R. Wilson, a Lawrence Livermore National Laboratory physicist, is the recipient of the American Physical Society's Hans Bethe award for 2006. It is one of the highest honors a physicist can receive, symbolizing both peer admiration and recognition of exceptional accomplishments by colleagues.

Wilson began work at Livermore in 1953. Fifty-three years later, he is as deeply embroiled in his research as ever—despite an official retirement that he said occurred "…either in 1987 or 1988."

While much of his work has focused on primary design within the classified community, he has made substantial contributions to unclassified research in both Aerophysics and Astrophysics.

Performing his high-speed computations on the lab's California Digital Linux Cluster machine know as Thunder, Wilson is best known publicly for his supernova calculations, proposing how one works and why it explodes.

He openly admits that his most controversial work covered neutron-star binaries. At last count, he said, "Fifteen papers have been written saying that I'm wrong."

The award commemorates Hans Bethe, a German-American physicist whose career spanned 60 years. He worked in the 1940s on the Manhattan Project.

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National Weather Service Says Pantex Plant Is Storm Ready

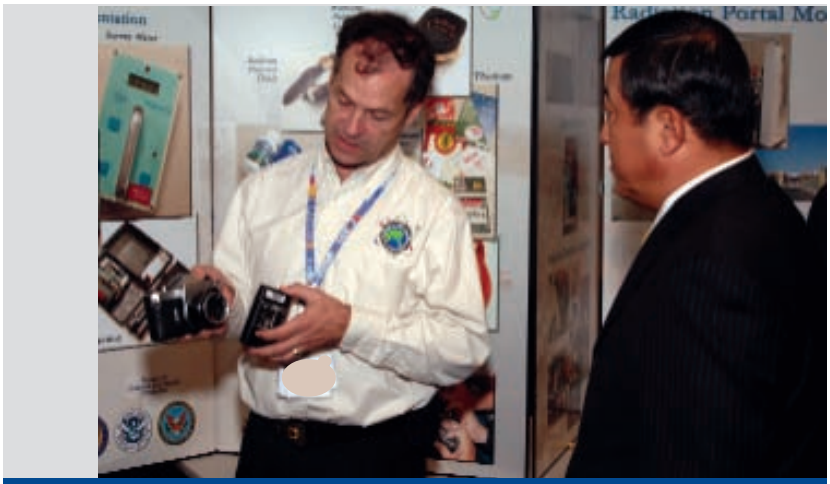
The National Weather Service (NWS) has recognized NNSA's Pantex Plant near Amarillo, Texas, as a StormReady® community. The StormReady recognition will be in effect for three years, after which the facility will go through a renewal process.

In addition to maintaining a strong working relationship with the NWS Amarillo forecast office, the plant's emergency management department coordinates closely with NNSA, the State of Texas and local jurisdictions.

"StormReady encourages communities to take a new, proactive approach to improving local hazardous weather operations and public awareness," said Bill Proenza, director of the NWS southern region. "StormReady arms communities with improved communication and safety skills needed to save lives and property – before and during the event."

The nationwide community preparedness program uses a grassroots approach to help communities develop plans to handle local severe weather and flooding threats. StormReady started in 1999 with seven communities. There are now more than 1,100 StormReady communities across the country.

"Every year, around 500 Americans lose their lives to severe weather and floods," said Brig. Gen. David L. Johnson, USAF (Ret.), NWS director. "More than 10,000 severe thunderstorms, 2,500 floods and 1,000 tornadoes impact the United States annually, and hurricanes are a threat to the Gulf and East Coasts. Potentially deadly weather can affect every person in the country. That's why the National Weather Service developed the StormReady program."



CHINA DELEGATION AT PNNL: Pacific Northwest National Laboratory (PNNL) recently hosted a delegation from the People's Republic of China as part of NNSA's Office of the Second Line of Defense Megaports Initiative. PNNL scientist Richard Arthur (left) shows Vice Minister Sun Songpu of the General Administration of Customs how common objects - such as this Pentax SLR camera from the 1960s - could have a surprising level of radiation within its components. The delegation participated in a PNNL-led training program focused on educating foreign customs officers on how to deter, detect and interdict potential smuggling of weapons of mass destruction.

Discover Magazine Recognizes Sandia Physicist Mark Boslough

Discover magazine has recognized work done by Sandia National Laboratories physicist Mark Boslough as one of the "Top 100 Science Stories of 2006."

Boslough's Red Storm computer exercise that modeled an asteroid impact with the atmosphere over the Sahara Desert is featured in the January 2007 issue of the magazine.

Every year, *Discover* magazine selects 100 important and interesting science stories of the previous year to be featured in special annual report.

Using Sandia's Red Storm — an air-cooled supercomputer that is rated second fastest in the world, and developed by Sandia and Cray Inc. using off-the-shelf parts — Boslough developed a simulation that suggests a 400-foot-wide stony asteroid slammed into the air at 12-miles-a-second and exploded.

For 20 seconds, the resulting fireball would have been hot enough to melt quartz on the ground, creating the glass that can still be found in the desert.

"I had stumbled into the debate by accident in 1996, when I attended a conference in Bologna on the subject of the 1908 explosion of an asteroid or comet that knocked down nearly a thousand square miles of trees in Siberia," said Mark.

"I stayed an extra day to attend a meeting about the desert glass, where I argued that similar — but larger — atmospheric explosions could create fireballs that would be large and hot enough to fuse surface materials to glass," he said. "Much like the first atomic explosion generated green glass at the Trinity site in 1945."

The main application of Red Storm is nuclear weapon stockpile work — designing new components; virtually testing components under hostile, abnormal, and normal conditions; and helping in weapons engineering and weapons physics.