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NATIONAL NUCLEAR SECURITY ADMINISTRATION (NNSA)
DEFENSE NUCLEAR NONPROLIFERATION (DNN)

DNN Sentinel

DEFENSE BY OTHER MEANS

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IN THIS ISSUE:

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Welcome from the Deputy Administrator

Dear Friends, Supporters, and Colleagues –

Welcome to the inaugural issue of DNN's newsletter, *DNN Sentinel*. DNN is proud of its mission, work, and people. We will publish *DNN Sentinel* three times in 2015 and hope to publish quarterly in 2016. Our goal is to keep you current on DNN's work in Material Management and Minimization (M^3), Global Material Security (GMS), Nonproliferation and Arms Control (NPAC), and Research & Development (R&D). We look forward to sharing the important and innovative work we carry out with our domestic and international partners and also will feature the special contributions that the DOE laboratories, plants, and sites make to global nuclear nonproliferation.

This inaugural issue of *DNN Sentinel* comes at a time of exciting transition at DNN. With an eye toward the future, DNN implemented its organizational realignment plan on January 1, 2015. The new organizational vision was produced by the DNN team, and we are confident that DNN is now better positioned to meet the current, enduring, and emerging nonproliferation and security challenges while ensuring improved organizational flexibility and responsiveness.

Thank you for your continued support and engagement. We hope that you will find *DNN Sentinel* stimulating and informative and welcome your comments and suggestions at DNNOutreach@nnsa.doe.gov.

Best wishes,

Anne Harrington
Deputy Administrator
Defense Nuclear Nonproliferation

The New DNN

DEFENSE NUCLEAR NONPROLIFERATION (DNN)

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DNN Organization Looks to the Future

In early 2014, there was no Russia-Ukraine crisis, no Ebola outbreak in Africa, and ISIL had not emerged as a major force in the Middle East. Events like these demonstrate that the unexpected has, in some important ways, become the new normal. Because proliferation and security threats continue to evolve, the ability to respond must evolve as well. Effective January 1, 2015, the Office of Defense Nuclear Nonproliferation (DNN) realigned its functions to create a more flexible, responsive, and agile organization that can adapt to both enduring and emerging threats.

"Through our *Over the Horizon* study in 2012 and our ongoing analysis, we've taken a hard look at evolving threats to national security, DNN's core competencies, and opportunities where we can take a proactive leadership role," said Anne Harrington, Deputy Administrator for DNN. "By undertaking this realignment, we have positioned DNN to stay relevant well into the next decade. Our new functionally-based structure clearly describes our priorities: Material Management and Minimization (M^3), Global Material Security (GMS), Nonproliferation and Arms Control (NPAC), and Research & Development (R&D)."

DNN's Core Competencies

- Remove, eliminate and minimize the use of proliferation-sensitive materials;
- Safeguard and secure nuclear and radiological materials, technologies and facilities;
- Detect and prevent the illicit trafficking of nuclear/radiological materials, technology, information and expertise;
- Provide R&D technology solutions for treaty monitoring, minimization of the use of proliferation-sensitive materials, and the application of safeguards and security; and
- Provide unique technical/policy solutions and develop programs/strategies to reduce nuclear/radiological dangers.

The *Over the Horizon* study that informed the realignment drew on a broad range of sources and methods, including literature searches, community workshops, program issue briefs, structured interviews with subject matter experts, and peer review meetings. The study highlighted ongoing challenges, such as state-sponsored proliferation, nuclear materials that are not fully secured, and transfer of dual-use technologies to name just a few. As we have seen with additive manufacturing, new challenges can quickly become enduring parts of the landscape, with the likelihood that future transformative events will continue to alter the national security landscape.

"The *Over the Horizon* process has confirmed that DNN's mission is enduring and our core competencies are and will remain fundamental to how the U.S. Government responds to emerging nonproliferation and nuclear security challenges," Harrington said. "But response to dynamic threats requires a more dynamic organization."

With the realignment, offices are organized by function, enabling synergy among subprograms. In addition, there are no offices with a single mission that focuses solely on one region or country. As a result, the offices are better able to prioritize resources to address the diverse threat spectrum.

Although the organizational architecture is now different, previous DNN programs have not been terminated, and budgets were not affected because of this realignment.

The timing of the January 2015 realignment took advantage of other simultaneous changes within NNSA. "Through the end of calendar year 2014, the NNSA and DNN leadership met with key stakeholders interested in our realignment—within DOE and NNSA, at OMB and the National Security staff at the White House, on Capitol Hill, and with our scientific and technical partners in the DOE complex," Harrington said. "We received strong support, and our new structure already is getting positive reviews."

DNN Staff on the Move

Among the other changes at DNN, most of the staff will soon have a new home just up the street at the Portals III building located at the intersections of Maryland Avenue, 12th Street, and D Street in Southwest, Washington, DC. Our front office staff will remain in the DOE Headquarters Forrestal building on Independence Ave.

Nuclear Smuggling Detection and Deterrence—Integrating Detection and Law Enforcement

By Erik Deschler

Beginning in 2009, what is now the Nuclear Smuggling Detection and Deterrence (NSDD) program (formerly Second Line of Defense) partnered with the Federal Bureau of Investigation (FBI) to provide partners with a "Radiation Detection Investigative Techniques (RDIT)" course designed to enhance the capabilities of international law enforcement agencies to deter, detect, and interdict the illicit trafficking of nuclear and other radiological materials. RDIT emphasizes the importance of integrating law enforcement investigative skills into radiation detection operations by focusing on the use of NSDD-provided mobile radiation detection systems through scenario-based field training exercises. NSDD and the FBI enjoy a strong partnership and have jointly delivered 18 courses to partners with the most recent course delivered in Tajikistan in September 2014.

To address multiple trafficking scenarios, NSDD deployed mobile detection systems, including vans, backpacks, and handheld equipment, to Tajikistan and conducted training on the operation and maintenance of this equipment. After Tajik authorities gained some experience with the use of these systems, Pacific Northwest National Laboratory and FBI trainers conducted a RDIT course to provide more hands-on training with the mobile detection systems through the use of scenario-based field exercises. Twenty participants from the Tajik agencies—including the Customs Service, Prosecutor General's Office, Ministry of Interior, Nuclear Radiation Safety Agency, and Committee on Emergency Situations and Civil Defense—participated in this training. The training was held at the Customs Practical Exercise Training Area facility, which was donated by the U.S. Department of State's Export Control and Related Border Security (EXBS) program in January 2014. This training was part of an integrated interagency capacity-building strategy. The training facility provides a variety of venues for enhanced weapons of mass destruction detection and interdiction training, including a land border crossing with a secondary inspection area; an airport passenger and baggage scanning area with operational baggage belts, X-ray machines, and metal detectors; and a full-scale functional commercial passenger aircraft.

Customs officers search vehicle for radioactive sources.

Packeye backpack and other handheld devices were used to locate and identify sources in an aircraft.

The RDIT training made use of this facility as participants worked through three scenarios selected in coordination with the Tajik stakeholders: 1) a "green" border crossing with radioactive material, 2) an interior public roadway interdiction, and 3) an operation to seize material during an exchange between a buyer and a seller. During the first two scenarios, participants set up a mobile van at a simulated border crossing and roadside point to detect and interdict illicit nuclear materials crossing the border. Participants operated the vans, detected materials, established secondary inspection areas, interviewed suspects, and conducted detailed vehicle searches. The final capstone scenario presented training participants with prior law enforcement information that smugglers intended to bring nuclear material to a soccer match and transfer that material to another group, who would assemble it into a radiological dispersion device (RDD) and take it to an airport for delivery by aircraft to its target. Participants set up discrete entry checkpoints using vans and backpacks and used metal detectors in conjunction with handheld radiation detectors at the entrance of the soccer stadium. They also collected evidence, establishing one team to search a makeshift shop that was suspected as the location for assembling an RDD and another team to search the cabin of an aircraft.

Feedback from the Tajik participants was very positive. The training helped participants understand the various smuggling scenarios that could occur, enhanced their readiness to respond to these types of scenarios, and improved internal coordination among the various Tajik agencies that would be involved in a smuggling response.

Looking forward, the new NSDD intends to continue its partnership with the FBI to support similar training opportunities for other partners. Through this partnership, NSDD is able to more effectively enhance the capabilities of international law enforcement agencies to deter, detect, and interdict illicit trafficking of nuclear and other radiological materials.

Erik Deschler began working with NSDD in 2002 and currently is engaged in overseeing its mobile detection efforts to provide mobile and man-portable radiation detection equipment to foreign law enforcement agencies. Mr. Deschler holds a Master's Degree in International Security Studies from the Josef Korbel School of International Studies, University of Denver.

Field Training Exercises Promote Counter Trafficking Coordination with Interagency and International Partners

By Richard Pappas

DNN's Nuclear Smuggling Detection and Deterrence (NSDD) program (formerly Second Line of Defense) has developed tabletop and field training exercises as a key component of its efforts to sustain NSDD-provided radiation detection systems. Practical exercises have proven to be effective in maintaining a state of readiness for combating illicit trafficking. With NSDD collaboration, partners design, develop, and deliver field exercises that provide realistic test of radiation detection systems, alarm response procedures, and operator skills and knowledge. Effectively designed exercises that employ real-life scenarios help to identify both strengths and deficiencies in the operation, maintenance, and management of a country's nuclear security measures. They are a proven methodology for continuously improving response while enhancing operational readiness for a wide range of hazards and emergencies.

When preparing for exercises, one size certainly *does not* fit all. NSDD actively collaborates with the U.S. Department of Homeland Security's Domestic Nuclear Detection Office (DNDO) to adapt proven and practical exercise guidance materials and a series of capacity-building activities. The goal is to customize tools to enable partners to develop a robust radiation detection exercise program. A step-by-step progressive approach has proven successful: 1) a practical, hands-on tutorial workshop is conducted to provide the framework and tools for the design, development, and delivery of exercises; 2) classroom training is immediately reinforced by developing and delivering a partner country's own national or regional exercise event within six to nine months of the workshop. This approach currently is being piloted with partners in Armenia, Djibouti, Kenya, and Slovakia—and will be refined throughout FY 2015. The inaugural exercise tutorial workshop was successfully conducted in September 2014 at the DOE Hazardous Material Management and Emergency Response (HAMMER) training center in Richland, Washington.

In addition to coordinating with DNDO, NSDD has worked closely with the Department of Defense's Defense Threat Reduction Agency, Department of State's Export Control and Related Border Security and WMD Terrorism offices,

Exercises Provide Training for a Real-World Risk

Many NSDD-developed exercise scenarios are based on actual incidents of material out of regulatory control encountered by partner countries. Such incidents are reported to the International Atomic Energy Agency Incident and Trafficking Database by Member States. The database contains information on 2,477 confirmed incidents from 1993 to 2013, including unauthorized possession and related criminal activities (424), theft or loss (664), and other unauthorized activities and events (1,337).

One of NSDD's earliest exercise collaboration efforts was with the Republic of Georgia's Ministry of Internal Affairs. The exercise focused on mobile detection technologies. NSDD began working with a number of countries in 2012 to develop and deliver detection and interdiction exercises. Since then, NSDD has worked with Armenia, Bulgaria, Georgia, Mexico, Poland, Romania, Slovakia, Thailand, and Ukraine to plan and conduct exercises.

the Federal Bureau of Investigation, the International Atomic Energy Agency, the European Commission Joint Research Centre, and the Global Initiative to Combat Nuclear Terrorism on a variety of exercise events. The goal of these partnerships is to develop and promulgate clear and consistent guidance to NSDD partners that will promote the long-term, routine application of exercises as a tool for the sustained operation, maintenance, and management of radiation detection systems.

Richard Pappas coordinates workshops and exercises for NSDD and has been with the program for more than 12 years, four years as a DOE employee. He holds a Doctorate Degree in Physics from Ohio University.

Exercise tutorial held at HAMMER with six countries in 2014.

Left: Field exercise with Georgia Ministry of Internal Affairs in 2012. Right: Field exercise with Thailand Customs in 2013.

Small Business Innovation Contributes to Monitoring—No Batteries Required

DNN's Research and Development program (DNN R&D) improves U.S. national security through the development of advanced capabilities that support foreign nuclear weapons proliferation monitoring, nuclear detonations monitoring, and nuclear security.

Stakeholders who benefit from these advanced capabilities include other offices within NNSA, other U.S. government agencies, and private industry, as well as international organizations, such as the Comprehensive Nuclear Test Ban Treaty Organization and the International Atomic Energy Agency, which leverage these promising technologies via DNN R&D's sister organization, Nonproliferation and Arms Control (NPAC).

In some cases, DNN R&D reaches out to small business for solutions to pressing technical concerns. DNN R&D formally supports such joint venture opportunities for small businesses and nonprofit research institutions via the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, which help bridge the gap between performance of basic science and commercialization of resulting innovations.

In one recent case, Dirac Solutions Inc. (DSI), a five year-old small business start-up located in Pleasanton, California, played a key role in improving technology for safeguard applications. DNN R&D sponsored an SBIR project to develop secure, passive, battery-free radio frequency identification (RFID) tags integrated with fiber-optic seals and sensors in support of international safeguards, arms control, and waste management and storage needs. For this project, DSI partnered with principal investigators from Lawrence Livermore National Laboratory (LLNL) to significantly improve reliability of a state-of-the-art seal and sensor by automating the inspection processes in safeguard applications. Normally in safeguard applications, most seal technologies lack real-time remote monitoring capabilities from a safe distance and require visual inspection. Seals that can be remotely monitored also usually require batteries.

The DSI-LLNL innovation is revolutionary in that the seal status and sensor data can be monitored from a safe distance without relying on batteries. The RF tag and seal encrypts and authenticates wireless data that reports the state of the physical seal that cannot be intercepted or spoofed by malicious adversaries and addresses data security problems such as the "man-in-the-middle."

DSI's testing of the seal and sensor has highlighted potential areas for expanded capabilities, such as increased reader range or added sensor technologies, including for movement, radiation, and temperature. DSI also is developing an optional wall-mountable battery back-up system, which would provide power to the readers in order to ensure interim tag-and-seal monitoring in the event of a facility-wide power failure. One of the objectives for this partnership with DSI is to enable the inexpensive reproduction of these tag-and-seal sensors when produced in large quantities.

LLNL researcher attaching an RFID tag to a container used in a technology demonstration.

Three Consortia Improve Links between Basic and Applied Research

DNN's Research and Development program (DNN R&D) directs an integrated research and development portfolio in support of its mission to detect signs of nuclear proliferation and nuclear detonations. DNN R&D leverages the unique facilities and scientific skills of the NNSA nuclear security enterprise, other DOE national laboratories, academia, and industry to perform research, conduct technology demonstrations, and develop operational systems and their prototypes in support of this goal.

As a critical part of its strategy of investing in the next generation of nuclear security experts, DNN R&D administers a university program constructed as three complementary university-national laboratory consortia. These consortia link basic research capabilities in academia with the applied research capabilities of the national laboratories, and in doing so, introduce students to career possibilities at the national labs while providing education in areas of great importance to the nonproliferation mission. The consortia have strong links to minority-serving institutions, are funded as five-year grants, and are viewed as sizeable, long-term investments.

All three consortia include student and early-career research fellowships and have long-term objectives aimed at building expertise in several technical areas relevant to nuclear security technology and policy. Research results are incorporated readily into university curricula and management plans are in place to allow students, faculty, and researchers to work unencumbered across organizational boundaries of the academic and governmental facilities engaged in their proposed consortium.

The **Nuclear Science and Security Consortium (NSSC)** supports the core set of experimental disciplines that support the nation's nonproliferation and nuclear security mission: nuclear physics, nuclear chemistry, nuclear instrumentation, and nuclear engineering.

The **Consortium for Nonproliferation Enabling Capabilities (CNEC)** develops technologies to enhance simulation capabilities, algorithms, and modeling; new test and evaluation models for detection sensors; new remote sensing capabilities; and applications of big data analytics and data fusion/management technologies to better characterize and detect special nuclear materials. Additionally, CNEC develops radiological source replacement technology research and development to reduce the risk of radiological or nuclear proliferation incidents.

The **Consortium for Verification Technologies (CVT)** focuses on analytics for improving nuclear safeguards effectiveness and the ability of the U.S. Government to verify nuclear arms control treaty obligations. Objectives include considerations of core technical challenges associated with these areas, such as geophysical modeling for the detection of underground nuclear detonations to support test monitoring.

As Deputy Administrator Harrington aptly sums up, "Developing the R&D expertise of tomorrow can take years to cultivate, but we are linking national laboratories and academia by funding the next generation of researchers to perform complex research and gain an understanding of technical challenges in areas of major importance for the nuclear nonproliferation mission that can only be garnered first-hand at the national laboratories."

Nuclear Science and Security Consortium

Lead University

Berkeley UNIVERSITY OF CALIFORNIA

Members

- Michigan State University
- UC-Davis
- UC-Irvine
- UC-San Diego
- University of Nevada, Las Vegas
- Washington University in St. Louis

Consortium for Nonproliferation Enabling Capabilities

Lead University

NC STATE UNIVERSITY

Members

- University of Michigan
- Purdue University
- University of Illinois at Urbana-Champaign
- Kansas State University
- Georgia Tech
- North Carolina Agricultural and Technical State University

Consortium for Verification Technologies

Lead University

Members

UNIVERSITY OF MICHIGAN

- Massachusetts Institute of Technology
- Princeton University
- Columbia University
- North Carolina State University
- University of Hawaii
- Pennsylvania State University
- Duke University
- University of Wisconsin
- University of Florida
- Oregon State University
- Yale University
- University of Illinois at Urbana-Champaign

New Academy is a Work of ART

By Eric Swanson

The NNSA Alarm Response Training (ART) course is a proud new homeowner—well, a new owner of an old home. The NNSA program recently completed renovations to an existing facility within the Y-12 National Security Complex, which saved roughly $5M in new construction costs. ART celebrated its move to a new location with an October 23, 2014 ribbon-cutting ceremony that featured NNSA Deputy Administrator for Defense Nuclear Nonproliferation Anne Harrington.

The purpose of the ART course is to train on-site radiation safety and security experts, local law enforcement officers, and other personnel on how to respond to a security incident involving nuclear or radiological materials. Since its inception in 2009, ART has trained over 3,400 personnel from 44 states and 18 countries.

Until now, ART has held its table-top and live-action exercises in a Manhattan Project-era facility that once housed the site's medical center. ART Program Manager Toby Williams had been hoping to move to a newer facility for some time when a frozen pipe burst, forcing a quick extraction from "Old Medical."

"We looked at possibly constructing a new facility for our global security training programs," Williams said, "but as we considered the cost of constructing a new facility, budget constraints, and being good stewards of taxpayer money, we looked around the site for a facility that would closely fit our needs. There was no need to spend additional money when we had something that was close enough and could be repurposed." That facility is now the Alarm Response Training Academy, a permanent home for the growing ART program.

"This course offers a unique opportunity for the responsible parties from sites that maintain radiological sources to come together to understand the response challenges, as well as develop and practice their own response tactics," Williams said. "After two days of classroom instruction, our expert trainers facilitate live-action scenarios so participants can test their newly gained knowledge in this environment."

The ART course is a key component of the DNN nuclear and radiological security program, which works domestically with volunteer sites such as hospitals, universities, industry, and state and local governments to install sustainable security enhancements for high-priority nuclear and radiological materials. Many of the props and equipment used by the program were donated by industry vendors, increasing the

The Alarm Response Training Academy officially celebrated its new location at the Y-12 National Security Complex Thursday, October 23, 2014. On hand to cut the ribbon were (pictured from left) Teresa Robbins, NNSA Production Office Acting Assistant Manager for Environment, Safety, Health and Quality; Anne Harrington, NNSA Deputy Administrator, Defense Nuclear Nonproliferation; and Morgan Smith, Chief Operating Officer, Consolidated Nuclear Security.

At the time of the ribbon cutting at the new training academy, a team from Sri Lanka was there to further its own tactics, techniques, procedures, and protocols for responding to a theft and/or sabotage event involving risk-significant nuclear and radiological materials. See our next article to learn the role earlier DNN training played in the safe and secure shipment of a highly radioactive material to Sri Lanka.

authenticity of the training environment. Y-12's 70 years of experience securing and protecting nuclear materials made it a natural fit to host the training.

"National Security is the foundation of the NNSA and Y-12 missions," Williams noted. "This new training academy will help us take the ART program to a higher level of excellence and continue to highlight the Y-12 site's experience in addressing security challenges."

At the ribbon-cutting ceremony, Harrington highlighted the continuing need for this and other DNN efforts. "Nuclear and radiological terrorism is a threat that affects us all. It is one of the greatest threats to national and global security, and the Alarm Response Training program directly addresses this threat," she said. "Reducing the risk of radiological or nuclear terrorism requires an organized approach that brings together officials and responders from the federal, state, local, and facility levels. NNSA is able to utilize its unique expertise and technical resources to partner with local communities and other agencies to make our cities safer here and around the world."

Eric Swanson is an editor and writer at the Y-12 National Security Complex. He holds a master's degree in English from the University of Tennessee.

DNN Involvement Across the Complete Supply Chain Supported Successful Shipment to Sri Lanka

By Randy Howell

Shipping hundreds of thousands of curies of cobalt-60, a highly radioactive isotope used for bulk sterilization, from Canada to Sri Lanka is a big undertaking—and a big target of opportunity for terrorists on the hunt for dirty bomb material. Instead, DNN training, assistance, and technology sharing with Sri Lanka was able to spur security awareness across the entire supply chain, resulting in the safe and secure transport of the material.

Over the last two years, personnel from DNN's radiological security program have been working intensively with the regulatory authority of Sri Lanka—the Atomic Energy Authority (AEA)—and the country's Special Task Force (STF), a paramilitary anti-terrorism group, to develop procedures for responding to security incidents involving radioactive sources. During an April 2014 training course, DNN learned of an upcoming shipment of cobalt-60 and discussed how to ensure the hundreds of thousands of curies were being properly protected en route to the site from the port. The material was bound for Ansell Lanka, a company approved to use cobalt-60 to sterilize products such as medical and industrial gloves.

Realizing more needed to be done to prepare for the shipment, STF took over. Its unique role in dealing with some of the most difficult challenges of Sri Lanka's long civil war and the specific experience of its head trainer, who spent time with the United Nations peacekeeping force in South Sudan, led the STF to quickly create and establish a Radiological Security Incident Response Team (RadSIRT).

Building on training received from DNN, commanders with the STF and representatives of AEA convened to offer an intensive course to members of the RadSIRT. They were given the background and information necessary for their unique mission: ensuring high-activity sources are protected in transit and responding to any security incident involving radioactive materials. In addition, instructors from Sandia National Laboratories and Oak Ridge National Laboratory facilitated an exercise hosted by Ansell Lanka with participation from the STF, RadSIRT, and other agencies.

The RadSIRT was fully prepared when the cobalt-60 arrived on a cargo vessel in July 2014. It had coordinated with the AEA to have a team with radiation monitoring equipment present and with Customs to

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DNN Involvement Supported Shipment to Sri Lanka
- Continued

ensure expedited unloading of the container. The Customs personnel manning the DNN-supplied radiation detection portal monitors were expecting the shipment and saw the radioactive signal when the truck exited the port. The escort team was waiting in a convoy of official vehicles just outside the port gates.

The lead cars cleared a path through the heavy Colombo traffic, with an armed response team and radiation monitoring vehicle following close behind. The trip was not far, but there were a variety of chokepoints along the way, with traffic police strategically positioned to ensure a smooth flow for the convoy. Safely and securely, the material made it to the irradiation facility—which also received assistance from DNN to improve its security—and was provided with additional site security while the sources were swapped during the subsequent hours.

After the material was loaded into the irradiator facility, the shipping container was to be sent back to Canada with some of the old cobalt-60 material. Taking advantage of an opportunity to test a prototype technology, the DNN team worked with the Sri Lankan authorities, the supplier, and the shipper to get permission to install and test a new tracking and ingress detection system. With the new system, everyone involved could track where the container was, when it was handled, and even remotely provide access to customs or port officials, as needed.

AEA Deputy Director Dr. Anil Ranjith stated to the Sri Lankan *Sunday Observer* that setting up the RadSIRT was a great achievement for the country and that it also will enable industrial activities related to the radiological field, boosting the country's economy.

Through the rapid reaction to a perceived threat and enabled by comprehensive DNN assistance and training, Sri Lanka successfully demonstrated its commitment to robust source security management—and the value of DNN assistance.

Although the cobalt-60 shipment is complete, DNN's collaboration with Sri Lanka continues, as demonstrated by the delegation that participated in the Alarm Response Training course at its new training academy (see previous article). Inviting them to the course held at Y-12 provided an opportunity to show how DNN has institutionized the type of training deliverered in Sri Lanka to prepare for last summer's shipment and to help ensure the country has a good basis for similar shipments in the future.

Randy Howell is the former project manager for radiological security projects in China and South Asia, previously with the Office of Former Soviet Union and Asian Threat Reduction within the former Global Threat Reduction Initiative. He managed that portfolio and did similar work in Central Asia for the better part of six years. He now supports the Mo-99 subprogram in DNN's Office of Material Management and Minimization.

The members of Sri Lanka's RadSIRT prepare for the shipment by creating an escort plan and discussing temporary site security measures.

RadSIRT members providing security during transport of the high activity radioactive sources from the port to the site.

DOE/NNSA Plays Significant Role in International Safeguards Symposium

By Melissa Einwechter

Every four years, the International Atomic Energy Agency (IAEA) convenes experts from around the world at its Symposium on International Safeguards in Vienna, Austria. The most recent symposium, held in October 2014, focused on the theme "Linking Strategy, Implementation, and People."

The symposium's opening plenary session featured remarks from IAEA Director General Yukiya Amano and a keynote address by DNN Office of Nonproliferation and Arms Control Assistant Deputy Administrator Kasia Mendelsohn.

In her remarks to the 700 symposium participants, Ms. Mendelsohn complimented the IAEA for its efforts to implement strengthened safeguards to address ever-increasing challenges to the nonproliferation regime. "More than ever," she stressed, "IAEA safeguards are an essential element of the nuclear nonproliferation regime and of international efforts to verify the peaceful uses of atomic energy." Mendelsohn thanked the Secretariat for going to "extraordinary lengths over the last year to explain how safeguards implementation has evolved, particularly at the level of the state as a whole."

While discussing the challenges posed by the greater availability of proliferation-sensitive information and the growing number of countries with nuclear activities,

"Safeguards 101"

What are international safeguards?

International safeguards comprise a set of technical measures to verify that a State's nuclear material is accounted for and not diverted to nuclear weapons or other nuclear explosive devices and to provide credible assurance of the absence of undeclared nuclear material and activities, in accordance with the terms of the State's bilateral safeguards agreement with the IAEA.

These measures include, for example, on-site inspections, nuclear material accountancy, facility design information verification, containment using tamper-indicating tags and seals, surveillance, and environmental sampling.

Why are safeguards necessary?

The peaceful uses of nuclear material include such applications as electricity generation, seawater desalination, the mapping of underground aquifers to improve groundwater management and investigate contamination events, the diagnosis of and treatment for cancer, and the control and eradication of disease-bearing insects. Unfortunately, some of the nuclear materials employed for these applications—and the facilities used to produce them—also can be applied for the production of nuclear weapons.

With its unique access to nuclear expertise, facilities, and information, the IAEA is in a critical position to reassure the international community that Non-Nuclear Weapon States are not diverting nuclear material from peaceful purposes to nuclear weapon programs. A robust IAEA capability to verify peaceful activities and to detect and investigate clandestine programs can reduce States' incentives to develop nuclear capabilities as a strategic hedge against an uncertain future. By the same token, confidence in the IAEA safeguards system can help encourage the peaceful uses of nuclear energy, thereby helping to meet growing global energy requirements.

How do National Laboratories contribute to international safeguards?

DOE/NNSA relies heavily on the policy and technical expertise resident in the National Laboratories to strengthen and sustain the international safeguards system. National Laboratories are essential partners in conducting policy studies, contributing to IAEA guidance documents, providing trainers to help other countries improve their safeguards infrastructures, fielding improved facility safeguards tools and technologies, and preparing the next generation of safeguards professionals through courses, seminars, and hands-on work experiences.

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she encouraged symposium participants to consider and identify options to help the IAEA, as appropriate, find the best possible technologies, procedures, and practices for safeguards implementation.

Mendelsohn talked in detail about U.S. contributions to the IAEA safeguards system, including the U.S. Support Program (USSP) to IAEA Safeguards and DOE/NNSA's Next Generation Safeguards Initiative (NGSI). In this context, she summed up her remarks by urging the assembled experts at the symposium to work together "to make real progress on promoting peaceful uses of nuclear energy, strengthening safeguards, and preventing proliferation."

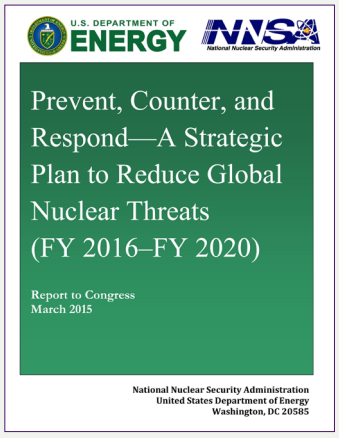
DOE/NNSA Laboratory and Headquarters representatives presented 43 of the 237 oral presentations featured during the four day event. A number of the 91 DOE/NNSA poster presentations received awards for best poster, presentation, or content. In addition, DOE/NNSA representatives chaired or co-chaired seven technical sessions featuring topics such as nondestructive assay measurements, training and education in nuclear nonproliferation and safeguards, new trends in the application of statistical methods for safeguards, challenges in spent fuel verification, and safeguards by design.

Overall, the symposium provided an opportunity to build awareness and understanding of the important accomplishments of DOE/NNSA and the national laboratories to strengthen the international safeguards system and set the stage for continued progress in the future.

DNN Office of Nonproliferation and Arms Control Assistant Deputy Administrator Kasia Mendelsohn delivered the keynote address at the 12th IAEA Symposium on International Safeguards held in October 2014.

Visit the 2014 IAEA Safeguards Symposium website at http://www.iaea.org/safeguards/symposium/2014/home/index.html to see a six-minute video of conference highlights.

Melissa Einwechter (née Scholz) is the federal program manager for NGSI Concepts and Approaches, NGSI Human Capital Development, and for the implementation of IAEA safeguards within the DOE complex. She is the recipient of the 2014 Linton Brooks Medal for Dedication to Public Service.



NNSA is pleased to introduce its first edition of *Prevent, Counter, and Respond—A Strategic Plan to Reduce Global Nuclear Threats (FY 2016–FY 2020) (NPCR)*. The NPCR report, which will be issued biennially with annual updates, describes NNSA's strategic approach to reducing nuclear and radiological dangers in a dynamic and complex global environment.

Download the full report online at:

http://www.nnsa.energy.gov/aboutus/ourprograms/dnn/npcr

Facilitating the Safe, Secure, and Peaceful Use of Nuclear Energy in Algeria

By Sean Dunlop

In 2014, DOE devoted an increasing amount of attention to its bilateral relationship with counterparts in the People's Democratic Republic of Algeria. Secretary Ernest Moniz met with Algerian Energy Minister Youcef Yousfi on three separate occasions between June and September: first at the Algiers International Trade Fair, then during the U.S.-Africa Leaders Summit in Washington, and finally on the margins of the General Conference of the International Atomic Energy Agency (IAEA) in Vienna. In addition to facilitating commercial cooperation on the development of oil, gas, and renewable energy resources, DOE is interested in accelerating collaborative efforts to ensure that Algeria's growing civil nuclear program develops in a manner that is consistent with the highest standards of nuclear safety, nuclear security, and nonproliferation and can potentially serve as a model for other nuclear newcomer countries.

Algeria currently operates four civil nuclear research centers, which include two research reactors, a pilot facility for converting yellowcake to ammonium diuranate and ammonium uranyl carbonate and fuel fabrication, and institutes for education and training in nuclear engineering and nuclear security. Algeria's future plans include modifying the NUR Research Reactor both to enable commercial radioisotope production using low-enriched uranium and to develop the capacity needed to implement a nuclear power program, potentially as early as 2025. Building upon the success of its initial engagement efforts, DOE is now poised to help facilitate a comprehensive program of technical exchange on a broad range of nuclear-related topics.

In 2007, DOE and Algeria's Commissariat à l'Energie Atomique (COMENA) signed an arrangement for information exchange and cooperation in peaceful uses of nuclear energy. Under this framework, DOE and COMENA successfully completed a five-year technical cooperation project in radiation protection, radiobiology, and medical physics. This included a joint assessment and evaluation of training, procedures, equipment, regulatory requirements, and organizational structure related to COMENA's existing programs, as well as focused training in radiation safety, radiation control, and dosimetry. DOE and COMENA continue to cooperate on projects initiated in 2012 on quality assurance and quality control and integrated management systems as well as on enhancing the implementation of international nuclear safeguards in Algeria, including through technical preparations to implement the Additional Protocol.

Last year, DOE and COMENA agreed to expand bilateral cooperation in the peaceful uses of energy by initiating three new multi-year projects in reactor safety, nuclear and radiological security, and nuclear forensics. DOE plans to help COMENA run modeling and simulation calculations for criticality safety and burnup in a way that is consistent with U.S. export control requirements and help develop project concepts and identify potential service providers for safety analysis of the NUR Research Reactor. DOE and COMENA also plan to design a training program incorporating the latest international recommendations on physical protection of nuclear material and nuclear facilities and the security of radioactive sources and form a working group to help meet the needs identified in Algeria's IAEA Integrated Nuclear Security Support Plan. Finally, DOE plans to work with COMENA to conduct a joint needs assessment and establish a working-level training program that enhances COMENA's nuclear forensics capacity, including its ability to play a technical role in responding to nuclear material found out of regulatory control.

This enhanced cooperation is a key part of DNN's regional engagement strategy. Several countries in North Africa, Sub-Saharan Africa, and the Middle East have plans to develop nuclear power for the first time and maintain active civil nuclear research programs. With its diversity of facilities and the significant resources it is investing in its nuclear training centers, Algeria is an ideal host for regional training courses. In June, COMENA hosted an IAEA regional training course on state systems of accounting for and control of nuclear material and non-destructive assay, for which DNN provided technical and financial support.

Nuclear Energy in Algeria - *Continued*

Possibilities for additional regional training opportunities already are being discussed.

It is always nice for DNN to have its efforts publicly acknowledged by foreign partners, and Algeria did just that during its plenary statement at the IAEA General Conference in September 2014. Minister Yousfi stated, "Algeria wishes to reiterate its support for the authority of the IAEA as an institution duly authorized for verification, as well as for the universalization of its safeguards as an effective tool for nonproliferation and nuclear disarmament. As such, we highly appreciate the contribution made in this area in recent years by the IAEA Department of Safeguards and the National Nuclear Security Administration (NNSA) of the Department of Energy of the United States of America."

DNN is pleased to be able to provide this support and looks forward to the prospects for broader and deeper cooperation with its Algerian counterparts in the months and years to come.

Sean Dunlop is a program analyst contracted by the Office of Nonproliferation and Arms Control. He is a graduate of the Monterey Institute of International Studies and has held various positions within the Department of Energy since 2010.

After meeting with Algerian President Abdelaziz Bouteflika on the margins of the 47th Algiers International Trade Fair in June 2014, Secretary of Energy Ernest Moniz and Minister of Energy Youcef Yousfi gave statements to the press.

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