



Summer 2013

# Highlights

## NNSA and JAEA Mark 25 Years of Partnership in Nonproliferation



BY ROSALYN LEITCH

**N**NSA commemorated 25 years of official cooperation with Japan on nonproliferation at the 25th Permanent Coordinating Group (PCG) Meeting between NNSA and the Japan Atomic Energy Agency (JAEA) in Tokai, Japan, in February 2013. This cooperation, now managed for the United States by NNSA's Office of Nonproliferation and International Security (NIS), represents one of NNSA's longest-standing international partnerships and has yielded over 100 successful nonproliferation and nuclear security projects to date.

NIS Assistant Deputy Administrator Kasia Mendelsohn served as U.S. Head of Delegation at the PCG meeting. Other NIS participants included James Conner, Heather Dion, and Rosalyn Leitch. Jeffrey Miller, Director of the U.S. DOE Japan Office, and technical experts from Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Brookhaven National Laboratory, Idaho National Laboratory, and Oak Ridge National Laboratory also participated in the week's events.

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## Mendelsohn at the NIS Helm

BY ELAINE SPECHT



Photo Credit: Japan Atomic Energy Agency

*During the 25th Permanent Coordinating Group Meeting with Japan, Kasia Mendelsohn presented a commemorative plaque signed by Deputy Secretary of Energy Daniel Poneman to Japan Atomic Energy Agency Executive Director Hideki Namba.*

*In November 2012, Kasia Mendelsohn was formally named assistant deputy administrator (ADA) of NNSA's Office of Nonproliferation and International Security (NIS). Highlights interviewed her on May 9, 2013, to discuss some of her recent activities and near-term initiatives for NIS.*

**K**asia Mendelsohn has come up through the ranks at NNSA, starting out as a contractor in NIS, where she spent five years as an action officer, team leader, and deputy office director. She then moved to the Global Threat Reduction Initiative for three years as an officer director before

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**From the Editor:** Past issues of *Highlights* and various blogs from NNSA have featured interns and post doctorate fellows that have served across the NNSA enterprise. Often, current or former Nonproliferation Graduate Program (NGP) Fellows contribute articles to the newsletter. This year, there are 23 outgoing NGP Fellows who have worked with NNSA. These young professionals have impressive credentials and valuable experience that would benefit any organization dedicated to nuclear nonproliferation.

**The Office of Nonproliferation and International Security applies program, technology and policy expertise to:**



**SAFEGUARD AND SECURE** NUCLEAR MATERIAL AND FACILITIES TO PREVENT DIVERSION, THEFT AND SABOTAGE.



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**NEGOTIATE, MONITOR AND VERIFY** COMPLIANCE WITH INTERNATIONAL NONPROLIFERATION AND ARMS CONTROL TREATIES AND AGREEMENTS.



**DEVELOP AND IMPLEMENT** DOE/NNSA NONPROLIFERATION AND ARMS CONTROL **POLICY** TO REDUCE THE RISK OF WEAPONS OF MASS DESTRUCTION.

Design and layout by Brooke Yaeger

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NIS Bookshelf

## Mendelsohn at the NIS Helm - CONTINUED

returning to NIS for the last seven years to serve first as the policy director, then deputy ADA, and most recently, ADA. In her transition to ADA, Mendelsohn says she has experienced a distinct shift in focus from day-to-day operations to thinking more about setting the vision and strategy for the program.

"It has really given me an opportunity to think about *what* the organization is doing, in addition to *how* the organization is working," she said.

Right now she spends a significant amount of her attention figuring out how to create efficiencies along with more strategic and effective interoperations and communication.

"My leadership philosophy is more about stepping back and letting people execute their programs and making sure that I am providing them with the resources and the space in which to operate," she explained.

One area where Mendelsohn has been working to build collaborative relationships is with her ADA counterparts across NNSA's Office of Defense Nuclear Nonproliferation. When building their FY 2014 budgets, "there was a lot of horse trading that was done voluntarily," Mendelsohn recalls. "We all realized that we're working together toward one mission, which is pretty remarkable. We still have work to do, but in the corporate planning functions, we've made big improvements."

### External Relationships

Mendelsohn also plays a role in maintaining positive relationships with external partners in nonproliferation. In early 2013, she participated in Permanent Coordinating Group (PCG) meetings in both Japan and Kazakhstan.

PCGs are formal mechanisms to review areas of collaboration and cooperation between two countries an-

nually. During PCG meetings, NNSA and bilateral partners develop new projects and assign action sheets similar to statements of work for each project.

The PCG with the Japan Atomic Energy Agency is the oldest, having just celebrated its 25th anniversary (see article, page 1). Mendelsohn attended the celebration commemorating this accomplishment and reflected, "It was a fantastic event. I was really grateful to be a part of it."

Mendelsohn also found it beneficial to visit facilities and to see equipment developed by Los Alamos National Laboratory actually in use. "Japan has an advanced fuel cycle and state-of-the-art safeguards," Mendelsohn explained. "We were able to partner with them to use their facilities as a test bed for a lot of safeguards technologies and approaches."

The most recently established PCG is with the Atomic Energy Committee of the Ministry of Industry and New Technologies and Kazatomprom in Kazakhstan.

With regard to Kazakhstan, Mendelsohn says, "I was surprised to learn that we didn't yet have a PCG established because we have been working on nonproliferation issues with them basically since the fall of the Soviet Union and they have been good nonproliferation partners." The first three action sheets established at the PCG span nuclear safeguards and security issues. They include helping Kazakhstan to develop procedures for management of the country's natural uranium ore concentrate, developing a "State System of Accounting for and Control of Nuclear Material," and helping them implement the *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities* (INFCIRC/225/Revision 5). Kazakhstan also asked for assistance in a variety of other areas

that NNSA is considering. Mendelsohn said, "This really is just the beginning of what will be—I have no doubt—a decades-long relationship."

#### Five Near-Term Initiatives

Closer to home, there are five specific areas where Mendelsohn is pushing NIS to make progress over the next few months.

First, Mendelsohn has a team that will be completing an Export Control Strategic Review. She said, "We have grown in many ways; the question is, are we growing in the right direction and are we making sure that we are not focusing on missions that rightly belong somewhere else?"

The team is looking to identify a common understanding of the threat and considering whether NIS is properly organized to address the threat. Her aim is to ensure NIS export control activities are "coordinated, communicating, and leveraging each other's work and that we have budget and personnel allocated in a prioritized way." The review is scheduled for completion in August 2013.

A second major activity for NIS is re-looking at the Next Generation Safeguards Initiative (NGSI). "It has been five years since we implemented it and it is time to make sure that the recommendations we had in place when we first stood up NGSI still stand," Mendelsohn said. Similar to the Export Control Strategic Review, the emphasis is to ensure NIS is addressing the appropriate challenges and threats to the international safeguards system and is allocating budget and resources accordingly. A series of interviews with key stakeholders in the U.S. National Laboratories, the International Atomic Energy Agency, NIS, and across the Interagency have been completed and will serve as a basis for meetings to discuss the path forward.

A third important priority for NIS is to better define the role of its cross-cutting policy function. Mendelsohn is exploring ways to increase coordination and communication while integrating policy across NIS activities.

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A fourth, and related effort, is to instill project management practices across NIS. Mendelsohn said, "We no longer have the right or the luxury to not have uniform program management plans in place." Mendelsohn has worked to put into place a managed structure as opposed to a collection of independent autonomous entities.

The fifth major initiative for NIS is standing up a new Part 810 export controls process, which is expected to include an e-licensing system and a revised application process. Mendelsohn expects the new e-licensing system and application process to be in place in the fall and explains that it will be the first export control function in the government that will be ISO 9001 certified.

*Elaine Specht of Battelle has been providing outreach assistance to NIS since 2009 and is the managing editor of Highlights.*

# New!

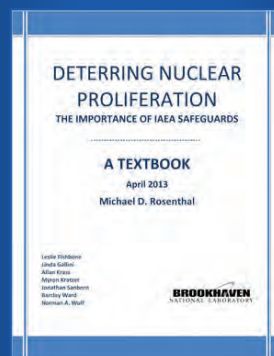
## Two Nuclear Safeguards Publications



### **Introduction to International Safeguards**

is a 16-page primer that explains how and why the International Atomic Energy Agency's safeguards play a central role in international efforts to prevent the spread of nuclear weapons.

Available at <http://nnsa.energy.gov/nonproliferation/nis/safeguards>. Look under "Related Links" to access the documents.



### **Deterring Nuclear Proliferation: The Importance of IAEA Safeguards**

is a textbook developed by Brookhaven National Laboratory and funded by NIS. Students of nonproliferation and newcomers to the field will benefit from the book, which analyzes the IAEA safeguards system and the global nuclear nonproliferation regime and delves into the complexities of limiting the spread of nuclear weapons while at the same time encouraging peaceful uses of the atom.

Available at <http://www.bnl.gov/gars/NNS/IAEAtextbook.php>.

## 25 Years of Partnership - CONTINUED

"I am delighted that our partnership continues to grow and to adapt to new and emerging challenges and that we—as steadfast allies and partners—continue to work together to address the most complex and urgent nonproliferation challenges," said Mendelsohn at the meeting. "Our work always has been and will continue to be a central component of the ongoing global mission to combat the spread of weapons of mass destruction and to ensure the peaceful use of nuclear technology."



*As part of the PCG Meeting, NIS staff and U.S. National Laboratory experts visited JAEA's ISCN Physical Protection Training Field. In the coming years, NIS and ISCN will continue to build and demonstrate joint leadership in strengthening nuclear security and safeguards through training efforts in Japan, throughout Asia, and beyond.*



*NIS staff and U.S. National Laboratory experts visited JAEA facilities to commemorate the significant advances in safeguards technology made through the DOE-JAEA PCG framework. This picture was taken in front of the Fuel Assembly Assay System designed by DOE and JAEA to support complex IAEA safeguards measurements at JAEA's Plutonium Fuel Production Facility.*

*Photos Courtesy of Japan Atomic Energy Agency*

During the two-day PCG meeting, participants reviewed ongoing collaborative projects, agreed to close ten projects that recently were completed, and initiated three new projects. Participants toured the JAEA Plutonium Fuel Production Facility and Tokai Reprocessing Plant to see safeguards technologies and methodologies pioneered under this partnership first-hand.

DOE began official cooperation on joint projects with JAEA's predecessor organizations in 1988. Since that time, NNSA and JAEA have collaborated to pioneer technologies and methodologies to resolve some of the most difficult safeguards challenges at aqueous reprocessing plants and other complex nuclear fuel cycle facilities. In particular, NNSA and JAEA joint development of unattended and remote monitoring safeguards systems has helped reduce the inspection burden on the International Atomic Energy Agency (IAEA) and its Member States and improve the effectiveness and efficiency of the international safeguards system overall.

Immediately following the PCG meeting, NIS and JAEA also held a workshop to jointly evaluate and address new safeguards challenges resulting from the accident at Fukushima Daiichi Nuclear Power Plant. During the two day workshop, participants discussed lessons learned from the accidents at Three Mile Island and Chernobyl and surveyed near-term safeguards technologies with possible applications to the Fukushima recovery efforts.

In recent years, NIS and JAEA have expanded cooperation significantly on nuclear security and nuclear forensics, supporting President Obama's vision of securing all vulnerable nuclear material worldwide and helping to achieve tangible deliverables through the Nuclear Security Summit process. NIS has worked with JAEA since 2011 to develop and host physical protection workshops and training at JAEA's Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN), including training on INFCIRC/225/Revision 5 for "The Physical Protection of Nuclear Material and Nuclear Facilities."

NIS and JAEA have worked together to develop the advanced capabilities necessary to support a robust program for forensic characterization of nuclear materials, including: improving the ability to age date uranium materials; developing protocols for sharing nuclear fuels in order to conduct advanced signatures analysis; and developing a national nuclear forensics library.

*Rosalyn Leitch completed a Nonproliferation Graduate Program Fellowship with NIS in May. Her responsibilities during the year included supporting the U.S. Delegation at the PCG meeting. Leitch has since joined the Pacific Northwest National Laboratory's National Security Directorate.*

# Believing Your Eyes: Strengthening the Reliability of Tags and Seals



BY CORNELIA BRIM AND LAURA SCHMIDT DENLINGER



*Light shining through crystal blocks containing optically stimulated luminescent material excites the material and causes it to emit light. The brighter the crystal blocks, the more highly irradiated the optically stimulated luminescent material is.*

NSA's Office of Nonproliferation and International Security (NIS) is working together with scientific experts at the U.S. National Laboratories to develop the tools needed to secure nuclear material from diversion—a task critical to support future arms control treaties that may involve the challenge of monitoring nuclear weapons dismantlement and ensuring that the resulting materials are not reused in a nuclear weapons program. Use of optically stimulated luminescent material is one method to enhance the security and robustness of existing tamper indicating devices such as tags and seals. In a verification scenario, the monitor must rely upon these tags and seals to confirm that treaty provisions are being met. In turn, the host must certify that the tags and seals meet the provisions of the treaty, while also protecting sensitive information.

Optically stimulated luminescent material is used widely in personnel dosimeters—small portable instruments used to measure and record the (usually minimal) accumulated dose of ionizing radiation a nuclear facility worker absorbs. The properties that make optically stimulated luminescent material useful for dosimetry also can be used as a security feature in tags and seals.

Here is how it works. When light of specific wavelengths shines on the

optically stimulated luminescent material, the material is excited and emits light at different, specific wavelengths with intensities that are proportional to the ionizing radiation dose and the intensity of the stimulation light. Researchers recognized that this unique property could be put to good use in safeguarding nuclear materials.

Experts at Pacific Northwest National Laboratory (PNNL) invented the optically stimulated luminescent technology and are working with NIS support to incorporate optically stimulated luminescent material into existing commercially available tags and seals. By customizing the ingredients and processing of the material, each tag and seal can have an optical signature unique to the device—a feature that would help thwart tampering and substitution. In parallel, PNNL experts are developing a hand-held reader to interrogate and measure the light emitted from tags and seals coated with optically stimulated luminescent material.

Although the technology to create this customized material is sophisticated, the tags and seals themselves are simple and robust—necessary characteristics for a verification scenario. The simpler these tamper-indicating devices are, the easier they are to authenticate and inspect.

Optically stimulated luminescent materials have other advantages. Since research has been ongoing for years, their durability, reproducibility, and environmental stability after manu-

facture are well known. The optically stimulated luminescent properties are stable for many years and to a minimum of 500°C. In the studies, intense near-ultra violet, visible, and infrared light exposure did not alter the material. Finally, irradiated optically stimulated luminescent material encapsulated in a polymer maintained its stability, even after several days totally immersed in water.

Another key advantage is that optically stimulated luminescent material has the ability to produce a tremendous diversity of unique optical signatures. Researchers envision developing a wide array of distinct security taggants (substances added to a product to indicate its provenance) so that each customer can have a unique set of optical features. The research team also would develop the instruments to read these diverse signatures. In addition, for arms control verification purposes, more than one measurement technique might be employed. The measurement of a portion or the entire optically stimulated luminescent emission spectrum at one or more excitation wavelength bands significantly raises the level of defense in depth.

In this and other areas, NIS's Office of Nuclear Verification is working with U.S. National Laboratory experts to develop tools and technologies that will safeguard and secure nuclear materials under future arms control treaties. The use of optically stimulated luminescent material in addition to current tags, seals, and enclosures will make these monitoring and verification tools more difficult to defeat.

*Cornelia Brim is a senior communications specialist at PNNL with more than 19 years' experience providing communications support in areas of national security, nuclear energy, environmental management, and fundamental science.*

*Laura Schmidt Denlinger is a senior non-proliferation specialist at PNNL with 18 years' experience in arms control, nonproliferation, diplomacy, and communications.*

# Kenya's Nonproliferation Efforts at Home and in East Africa



BY EMILY DIEZ

The Port of Mombasa serves as the largest port in the East Africa region, making Kenya a well-established international trading hub and a significant transshipment route for countries throughout Africa and the Middle East. However, the large port and the region's porous borders give active terrorist organizations such as al-Shabaab and al-Qaeda possible access to commodities of proliferation concern. NNSA, in partnership with U.S. Embassy Nairobi and the Government of Kenya (GOK), is enhancing Kenya's national capacity to prevent the proliferation of weapons of mass destruction (WMD)-related materials and commodities to non-state actors in the region.

Also, in coordination with the U.S. Department of State's Export Control and Related Border Security Program, NNSA's International Nonproliferation Export Control Program (INECP) is supporting the GOK's efforts to build a comprehensive export control system to counter state-based proliferators like

Iran and North Korea. INECP works with cadres of national technical specialists in partner countries to strengthen their ability to staff their systems of control in the areas of licensing risk analysis, outreach to enterprises that export WMD-related commodities and know-how, and WMD commodity identification for frontline enforcement personnel.

In February 2013, representatives from INECP, NNSA's Office of Counterterrorism Policy and Cooperation, and the Kenya Radiation Protection Board jointly conducted a Chemical, Biological, Radiological, Nuclear, and High Yield Explosives Commodity Identification Training (CBRNe CIT) and Interdiction Tabletop Exercise (TTX) for law enforcement officials from Kenya, Uganda, and Tanzania. The course trains enforcement officials to visually recognize material, equipment, and components required by non-state actors in the development and use of WMD. The Interdiction TTX provided a capstone

exercise to reinforce CBRNe CIT principles, familiarize participants with relevant national laws and international frameworks, and initiate discussion on procedures necessary to successfully detect, identify, interdict, and secure illicitly trafficked CBRNe-related commodities. The week-long course was part of a larger training academy program established by the U.S. Customs and Border Protection East Africa Attaché. The training academy is located at the Kenya Wildlife Service (KWS) Training School. KWS is one of the prominent national law enforcement agencies in Kenya, given that many Kenyan borders consist of national parks.

One of INECP's goals for capacity building on the African continent is working with partner countries to strengthen their ability to serve as regional nonproliferation leaders. To advance this goal, INECP is supporting Kenyan interagency efforts to pilot a national CBRNe CIT course and to train additional instructors to bolster the sustainable delivery of CBRNe CIT at the training academy and throughout the East Africa region.

INECP partner agencies include Kenya's Radiation Protection Board, National Council for Science and Technology, and the Kenya Medical Research Institute, which are charged with managing the import, export, sale, use, control, and disposal of CBRN-related materials for Kenya. These organizations are poised to become strong partners in the development and delivery of the standard WMD CIT for Customs officials at ports of entry, including seaports.

*Emily Diez coordinates NIS's International Nonproliferation Export Control Program's activities in Africa, including capacity building outreach in border security systems analysis and CBRNe commodity identification training to help countries establish the conditions needed to implement effective WMD-related export controls. Ms. Diez holds a Master of Science in International Affairs from Georgia Institute of Technology.*



A Government of Kenya official provides CBRNe Commodity Identification Training to front-line law enforcement officials from East Africa to help prevent terrorist acquisition of materials and commodities that could be used in the development of WMD.