



Fall 2013

Highlights

NIS Leads Part 810 Rulemaking Process



10 CFR Part 810 implements Section 57 b. of the Atomic Energy Act, as amended, which controls the export of unclassified nuclear technology and assistance. The regulation prohibits U.S. persons from directly or indirectly engaging in the production of special nuclear material outside the United States and empowers the Secretary of Energy to authorize such transfers provided they are determined to be non-inimical to the interest of the United States. During the review process, the Department of Energy (DOE) must obtain concurrence from the Department of State and consult with the Nuclear Regulatory Commission (NRC), the Department of Defense (DOD), and the Department of Commerce (DOC).

Today, the nuclear market is more global and more complex. There are new vendors, new technologies, and new markets. At the same time, there are new national security concerns. For these reasons, DOE, with NIS as the lead, is coordinating the U.S. interagency effort to update 10 CFR Part 810.

In order to update 10 CFR Part 810, NIS issued a Notice of Proposed Rulemaking (NPR) on September 7, 2011 (76 FR 55278). Following the public comment period for the NPR, NIS reviewed the comments received—formally, in writing, and informally, at meetings and in

Part 810 Rulemaking, Page 2...

NIS Contributes to Mexico's Participation in WMD Multilateral Supplier Regimes



BY ELENA HUSHBECK

In August 2013, the Australia Group (AG) welcomed Mexico as its newest member. This is the third multilateral export control regime to grant membership to Mexico over the past two years. Mexico was welcomed into the Nuclear Suppliers Group (NSG) in September 2012 and the Wassenaar Arrangement (WA) in January 2012. These informal, non-legally binding groups of like-minded countries contribute to global nonproliferation objectives by developing common guidelines that enable all suppliers to more effectively regulate the trade of Weapons of Mass Destruction (WMD)-related equipment, materials, and technology to ensure they are used only for peaceful purposes.

Working in coordination with the Department of State's Export Control and Related Border Security (EXBS) Program, NIS's International Nonproliferation Export Control Program (INECP) has provided capacity-building support across the licensing, enforcement, and industry outreach functions of Mexico's export control system. This support has helped to hasten Mexico's entry into the regimes and enabled Mexican specialists to play a critically important role in the regional promotion of nonproliferation export control norms.

In preparation for joining the multilateral export control regimes, Mexico requested support from EXBS and INECP to conduct outreach to industrial sectors covered by new national regulations.

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From the Editor: As more government agencies turn to social media to reach their stakeholders, NIS also engages in the trend. View NIS news periodically posted on NNSA's social media and blog sites at the following locations:

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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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Part 810 Rulemaking - CONTINUED

other exchanges—and addressed them in a Supplemental Notice of Public Rulemaking (SNOPR) on August 2, 2013. As with the NOPR, DOE also welcomes additional comments for the SNOPR. Originally, the comment period was set to conclude at the end of October 2013, but it has since been extended to the end of November to address time lost during the 2013 federal government shutdown. After the comments are received for the SNOPR, NIS will revise relevant sections, if appropriate, when it issues the revised Part 810 regulations.

During the initial SNOPR Rollout Meeting in August, Richard Goorevich of NIS characterized the SNOPR as “a true interagency product” that incorporated expertise from DOE, NNSA, NRC, DOD, and DOC. He also said that it reflects public input from the NOPR.

The SNOPR clarifies the technical scope of the regulations; only activities included in the scope require DOE authorization. It also defines activities that are generally authorized and therefore, do not require specific approval from the Secretary of Energy. Generally authorized activities, however, still carry reporting requirements that the SNOPR has clarified. Finally, it explains where case-by-case inimicality determinations are required and the process that will be used.

In parallel with the rulemaking process, NIS also is using the process improvement technique known as

“Six Sigma” to make the application process more transparent, predictable, and efficient. In keeping with NNSA’s efforts to be ISO-9001-compliant, the ultimate goal is to get the 810 process ISO-9001-certified. One of the changes that NIS has considered to achieve ISO-9001 compliance is to design and develop a Part 810 e-licensing system that would make applications easier to complete, streamline the review process, increase transparency by enabling applicants to track their submissions, and provide a search archive of past decisions. NIS is collaborating with the NNSA Office of the Chief Information Officer to develop an effective web-based system, which will be hosted on the NNSA cloud.

“We are modernizing the Part 810 regulations to be more open, effective, and efficient” Goorevich explains, “but we can’t do so at a cost where we compromise our proliferation controls. It is this balance that we are trying to strike.”

DEPARTMENT OF ENERGY

10 CFR Part 810

RIN 1994-AA02

Assistance to Foreign Atomic Energy Activities

AGENCY: National Nuclear Security Administration (NNSA), Department of Energy (DOE).

ACTION: Supplemental notice of proposed rulemaking and public meetings.

SUMMARY: On September 7, 2011, DOE issued a notice of proposed rulemaking (NOPR) to propose the first comprehensive updating of regulations concerning Assistance to Foreign Atomic Energy Activities since 1986. The NOPR reflected a need to make the regulations consistent with current global civil nuclear trade practices and nonproliferation norms, and to update the activities and technologies subject to the Secretary of Energy’s specific authorization and DOE reporting requirements.

NIS Contributes to Mexico - CONTINUED

INECP helped lay the groundwork for Mexico's outreach strategy by providing a seminar for Mexican export control implementing agencies. With the support of NIS experts and the U.S. interagency, an outreach strategy was outlined, leading to Mexico's first WMD-related export control awareness seminar for industry. EXBS and the Government of Mexico (GOM) have since conducted over 20 outreach events throughout the country. INECP also worked with Mexican specialists to establish and strengthen licensing procedures through a series of progressively advanced licensing analysis courses that were built on a licensing officer training curriculum developed by EXBS. By ensuring that license reviewers understand the controls lists and have the technical knowledge and resources needed to assess proliferation risk, these workshops helped build Mexico's capacity to detect and thwart illicit procurement activities.

INECP has simultaneously partnered with a new GOM interagency WMD Commodity Identification Training (CIT) Sub-Working Group, which is part of the EXBS-sponsored trilateral Nonproliferation Working Group with the United States, Canada, and Mexico to develop Mexico's capacity to implement a national training program that enables frontline customs and enforcement personnel to recognize WMD-related items and to prevent their illegal export. Working together at an accelerated pace, INECP and Mexico have undertaken one of the fastest transfers of CIT training capacity to an international partner to date. Since September of 2012, Mexico has had a dedicated cadre of INECP-trained CIT instructors from seven separate participating agencies.

Mexico has successfully conducted two independent training courses for Mexican customs and enforcement personnel in FY 2013, with a third scheduled for October 2013. Mexican instructors also have participated as instructors in INECP activities with Panama. In addition, five representatives from Panama's Customs Administration participated during the most recent CIT instructor development activity in Mexico City, providing an initial base to further develop a regional CIT training capability.

By not only joining the multilateral supplier regimes but also making a concerted effort to ensure effective implementation of regime guidelines, Mexico has strengthened its nonproliferation commitments and has worked to ensure the security of its industrial base. Implementing export controls is an evolving and ongoing challenge for regime newcomers and veterans alike. Building on these recent successes, INECP specialists will continue to deepen their partnership with Mexican counterparts and their collaboration with the Department of State's EXBS Program, working together to prevent WMD proliferation and to improve export control implementation and outreach throughout the Western Hemisphere.

Elena Hushbeck is group leader for Nonproliferation Engagement and Training at Argonne National Laboratory in support of INECP. She is the technical lead for INECP's capacity building and outreach and activities with Mexico. Ms. Hushbeck holds a Master's Degree in International Policy Studies from the Monterey Institute of International Studies.



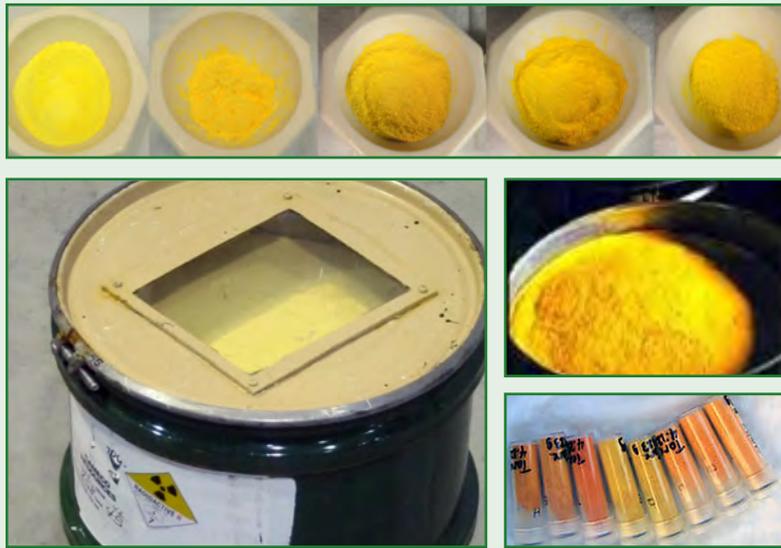
Tool Helps Identify Sources of Uranium



sample (e.g., major and trace elements, uranium isotopes, lead isotopes, strontium isotopes, stable isotopes, concentrations of oxygen, nitrogen, carbon, sulfur, etc.). It contains elemental and isotopic measurements, sample images (photographic and scanning electron microscope), visible and near-infrared spectra, and x-ray diffraction data.

BY LISA SZYTEL

The Nuclear Noncompliance Verification (NNV) Program within NIS has significantly improved the U.S. Government's Uranium Ore Concentrate (UOC) sourcing capabilities by nearly tripling the number of samples represented in the Uranium Sourcing Database. The Uranium Sourcing Database, together with an Internet-accessible query tool known as the Discriminate Analysis Verification Engine (iDAVE), enables the U.S. Government to effectively and quantitatively estimate the likely origin of uranium samples.



Because iDAVE is a comparative analysis tool, having data from more samples in the Uranium Sourcing Database improves its overall value to nuclear forensics.

The Uranium Sourcing Database is a National Nuclear Forensics Library containing data for materials involved in the early stages of the fuel cycle: uranium ore, uranium ore concentrate (UOC or yellowcake), and uranium tetrafluoride (UF₄). It is a multi-laboratory effort led by Ian Hutcheon at Lawrence Livermore National Laboratory (LLNL) involving other experts from LLNL as well as Oak Ridge National Laboratory and Los Alamos National Laboratory. The project includes sample acquisition, sample analysis, relational database development, database population, and data evaluation. It has been used for general queries for basic research and for specific national and international nuclear forensic cases. Additionally, the Uranium Sourcing Database project is ideally suited for international nuclear forensics technical engagement and has been the launching pad for many of NIS's international outreach efforts in nuclear forensics.

The Uranium Sourcing Database now contains over 185,000 data points, representing over 6,300 uranium samples from 133 distinct sources and 31 different countries around the world. The database stores approximately 80 analytes per

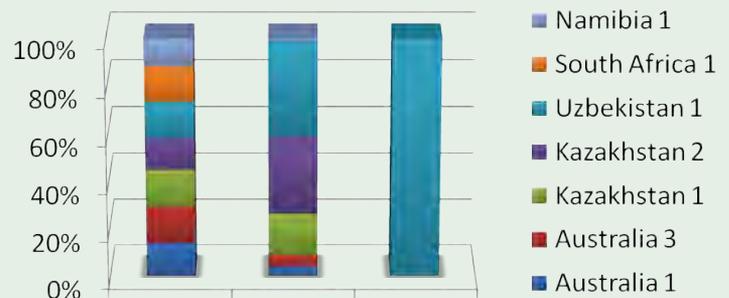
Given the large number of samples represented in the database and the large range of data parameters for each sample, it is essential to have a query tool that can quickly utilize the critical parameters for origin identification and ferret out the likely origin of the sample. iDAVE, developed by LLNL, is a statistical pattern classification application that uses the Uranium Sourcing Database for uranium sample attribution. iDAVE utilizes iterative Partial Least Squares – Discriminate Analysis (PLS-DA) to quantitatively and statistically compare data from a uranium sample of unknown origin to the data stored in the Uranium Sourcing Database.

Since this technique is a comparative one, the tool is as robust as the data contained in the database; increasing the number and breadth of samples represented in the database greatly improves the confidence in the results derived from the tool.

In a recent exercise to evaluate query response processes and procedures, NNV's Uranium Sourcing team correctly identified the origin of a hypothetical sample and presented the defensible results within a four-hour window. The DOE-led interagency Nuclear Materials Information Program stated that the team's performance was "very impressive" calling the results "stellar."

The Uranium Sourcing Database project remains an active project as NNV continues to acquire samples from around the world, analyze the multitude of parameters associated with each sample, incorporate the data into the relational database structure, and evaluate data for the future sample attribution needs of the U.S. Government and international community.

Likelihood Unknown is From Source



The iDAVE tool iteratively excludes unlikely matches as it statistically compares the data from an unknown sample to the data in the Uranium Sourcing Database.

Lisa Szytel, a General Engineer in the NIS Office of Nuclear Verification, manages projects for the NNV Program, developing technologies and

Nuclear Security Conference Draws Broad Participation



DOE, NNSA, and the U.S. National Laboratories were well represented at the International Nuclear Security Conference convened at the International Atomic Energy Agency's (IAEA) headquarters in Vienna, Austria, in July 2013. The conference, the first of its kind held to address nuclear security issues at the ministerial level, was open to all 159 IAEA Member States. Secretary of Energy Ernest Moniz was joined by NNSA Deputy Administrator for Defense Nuclear Nonproliferation Anne Harrington for the ministerial sessions.

IAEA Director General Yukiya Amano said at the conference opening that, "The threat is real, and the global nuclear security system needs to be strengthened in order to counter that threat ... this conference will help in our continuing efforts to ensure that no terrorist attack ever succeeds."

Among the 1,300 participants from 125 Member States in attendance were NIS staff members Scott Purvis and Martie Larson who participated in the parallel technical sessions to represent NIS as well as inform ongoing NIS activities of the IAEA's plans. Jim Solit of NIS provided additional support in the conduct of the conference. NIS works with IAEA Member States bilaterally to help them meet their nuclear safeguards obligations and to follow nuclear security recommendations.



During his opening remarks, IAEA Director General Yukiya Amano held up a container used in an actual attempt to smuggle highly enriched uranium to highlight how serious the threat of nuclear terrorism is.

The *Ministerial Declaration*, adopted by the 34 government ministers and other Heads of Delegation at the conference, notes that all States are responsible for their own nuclear security, but that international cooperation is important in supporting States' efforts to fulfill their responsibilities. It affirms the central role of the IAEA in strengthening nuclear security globally and leading coordination of international activities in this field.

The declaration states, "We encourage all States to maintain highly effective nuclear security, including physical protection, for all nuclear and other radioactive material, their transport, use and storage and their associated facilities, as well as protecting sensitive information and maintaining the necessary nuclear security systems and measures to assess and manage their nuclear security effectively."

The declaration also recognizes the threat to international security posed by theft and smuggling of nuclear material and affirms the responsibility of States to keep all nuclear material secure. It encourages all States to use, on a voluntary basis, the IAEA's nuclear security advisory services and peer reviews such as International Physical Protection Advisory Service (IPPAS) missions, which are based on internationally accepted guidance and tailored to national needs.

The Conference results fed into the IAEA's *Nuclear Security Plan for 2014–2017* approved at the September 9–13 meeting of its Board of Governors.



Secretary of Energy Ernest Moniz (center) and NNSA Deputy Administrator for Defense Nuclear Nonproliferation Anne Harrington (far right) were among the high level officials at the conference.

Photos Courtesy of IAEA.

methodologies supporting the International Atomic Energy Agency and U.S. Government missions for verifying nuclear programs in countries of concern. She has managed a variety of nuclear safeguards and verification technology development projects, ranging from nuclear forensics to nuclear process monitoring to nuclear material sampling.

She has participated in equipment demonstrations, field tests, hands-on equipment training, and has led in-country verification teams. Ms. Szytel holds a Master of Science in Industrial Engineering & Operations Research from the University of California at Berkeley.

Strengthening International Nuclear Explosion Monitoring and Verification for the CTBT



CTBT Entry Into Force

Entry into force of the CTBT requires the signature and ratification of 44 States designated in Annex 2 of the Treaty. Three of these States (India, Pakistan, and North Korea) have not signed the Treaty, and five additional Annex 2 States (China, Egypt, Iran, Israel, and the United States) have not yet ratified the CTBT. NIS and DOE are vital to the U.S. effort to build and improve the CTBT monitoring and verification regime and to work with the Congress, the U.S. interagency, and international partners to achieve ratification by the United States and the other remaining Annex 2 States.

BY TIM EVANS

NIS experts at NNSA Headquarters and the U.S. National Laboratories are key contributors to improving the effectiveness of the monitoring and verification system for the Comprehensive Nuclear-Test-Ban Treaty (CTBT). NIS coordinates efforts with the NNSA Office of Nonproliferation Research & Development and other NNSA offices, and NNSA experts are part of a strong interagency team partnering with the Departments of State and Defense to provide a broad range of U.S. diplomatic, scientific, and logistical support for the Treaty.

Unlike the Limited Nuclear-Test-Ban Treaty and the Threshold Nuclear-Test-Ban Treaty that currently are in force, the CTBT, when it enters into force, will ban all nuclear explosions at all locations. It also puts in place a worldwide International Monitoring System (IMS), which will consist of 321 seismic, radionuclide, infrasound, and hydroacoustic stations. This system, now over 87% complete, is supported by the International Data Centre (IDC) in Vienna, Austria. In addition, 16 radionuclide laboratories, including one supported by NIS at Pacific Northwest National Laboratory (PNNL), analyze radionuclide samples from IMS stations.

The IMS is now in provisional use for testing and evaluation purposes, and it is already providing valuable data to understand the nature of events of interest around the world. The IDC collects and analyzes information from the IMS and provides it to States Signatories through their National Data Centers. After entry into force, an on-site inspection also can be approved to investigate a suspect event with inspectors drawn from any of the CTBT States Parties, including the United States.

DOE's main equities with regard to CTBT ratification and entry into force are: (1) ensuring a safe, secure, and effective U.S. nuclear weapons stockpile in the absence of nuclear testing; (2) providing technical solutions for the development of U.S. and international verification and monitoring capabilities; and (3) providing technical support for implementation of the CTBT.

U.S. technical experts supported by NIS are some of the world's leaders in key fields such as seismic and radionuclide detection and analysis and on-site inspection techniques. U.S. National Laboratories contribute to the U.S. Government's CTBT efforts with the support of NIS and other NNSA offices. Participating laboratories include PNNL, Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), and Idaho National

Laboratory (INL). Examples of key projects supported by U.S. experts with NNSA support include:

- Redesign and modernization of the IDC, in coordination with a modernization of the U.S. National Data Center operated by the Department of Defense;



In his June 2013 speech in Berlin, President Obama reaffirmed the Administration's support for the CTBT saying, "... we will work to build support in the United States to ratify the Comprehensive Nuclear-Test-Ban Treaty...."

Photo Courtesy of KSDS.com.

International Monitoring System - CONTINUED

Integrated Field Exercise 2014 (IFE14)

NIS experts at the U.S. National Laboratories also play a major role in advancing CTBT on-site inspection (OSI) readiness by assisting the international effort to establish an effective OSI capability, helping to establish a pool of trained “surrogate inspector candidates” ready for nomination as CTBT OSI inspectors, and helping to ensure that equipment, training, and procedures are ready at Treaty entry into force. NIS experts are playing key roles in preparing for a large-scale OSI exercise planned for late 2014 in Jordan (IFE14). NNSA’s support for IFE14 includes planning events and providing training; loan of almost \$1 million in OSI-related equipment; five OSI surrogate inspector trainees from three U.S. National Laboratories (LANL, LLNL, PNNL); providing the Radionuclide Subteam Leader for the Inspection Team, the Chairman of the IFE14 Scenario Development Task Force, along with many NNSA experts providing expert advice to the Task Force, and members of the Peer Review and Evaluation Teams; and managing over \$2 million in IFE14-focused Department of State funding.

- On-site inspection development, including training of international inspectors, preparations for a large-scale on-site inspection Integrated Field Exercise planned for November/December 2014, and loans of on-site inspection equipment (see the NNSA blog posted on August 8, 2013, at <http://nnsa.energy.gov/blog/ctbto-officials-visit-doe-labs-and-nnsa-hq>);
- Projects to assure the effectiveness of the IMS, including mitigation of the effects of radionuclide emitted from fission-based medical isotope production (see the NNSA blog posted on July 18, 2013, at <http://nnsa.energy.gov/blog/doe-and-nnsa-labs-work-ctbto-reduce-medical-isotope-emissions-enhance-effectiveness-nuclear>); and
- Collaboration on seismic monitoring with other countries to enhance national capabilities to support Treaty implementation and civil seismic monitoring purposes.

NIS’s efforts to support the CTBT are closely coordinated with other NNSA offices and other agencies of the U.S. Government and are balanced with capabilities and contributions from other CTBT States Signatories. Two NIS experts serve as international Task Leaders and a third as Chair of the Radionuclide Experts Group for Working Group B of the Preparatory Commission for the CTBT Organization (CTBTO) in Vienna. NIS experts participate fully in all activities of the Preparatory Commission, such as the international CTBT: Science and Technology 2013 conference held in Vienna, June 17-21, 2013.



Secretary of Energy Ernest Moniz and NNSA Deputy Administrator for Defense Nuclear Nonproliferation Anne Harrington at the IDC in Vienna, Austria in July 2013 with (from left to right): U.S. Permanent Representative to the United Nations Organizations in Vienna Ambassador Joseph E. Macmanus; then-Executive-Secretary of the CTBTO Tibor Tóth; Secretary Moniz; then-Executive-Secretary-elect and current CTBTO Executive Secretary Lassina Zerbo; Deputy Administrator Harrington; and U.S. Assistant Secretary of State for International Security and Nonproliferation Tom Countryman. Photo Courtesy of The Official CTBTO Photostream.

International Monitoring System

With over 87% of planned stations already certified or installed, the International Monitoring System (IMS) uses four complementary verification methods. Seismic, hydroacoustic, and infrasound stations monitor the underground environment, the oceans, and the atmosphere for nuclear explosions. They also can provide important information for monitoring earthquakes, tsunamis, and other natural phenomena, such as the 9.0 earthquake in Japan during March 2011 and the February 2013 bolide (exploding meteor) over Chelyabinsk, Russia. Radionuclide stations detect radioactive debris and radioactive noble gas from atmospheric, underground, or underwater nuclear explosions. Radionuclide laboratories assist the radionuclide stations in identifying the substances. Radioactive isotopes of the noble gas xenon (radionuclide) provide particularly important information for analysts, which can help them determine if an explosion detected by the IMS was in fact nuclear.

Tim Evans is the Nuclear Testing Limitations Program Manager in NIS's Office of Nuclear Verification. He has been with DOE for 22 years, with the last four in NIS managing NNSA's support for CTBT activities and preparation for U.S. ratification and entry into force.

New Online Resources

Two new online resources promote international nonproliferation goals.

Website Fosters India/Pakistan Understanding

In partnership with The Stimson Center, NIS launched *South Asian Voices: Generation Why* (www.southasianvoices.org) in September 2013. It is the first website built to foster discussion and promote engagement between next generation Indian and Pakistani strategic analysts. This initiative complements and builds from existing Track II dialogue and other confidence-building measures in the Subcontinent, while creating a space specifically for young commentators to address current and emerging security issues in South Asia.

South Asian Voices: Generation Why features articles and multimedia examining the full spectrum of factors that have shaped India and Pakistan's security environment. All southasianvoices.org's content is produced by rising analysts and academics in the two countries. This new virtual space also facilitates commentary from authors and guests to cultivate

free-flowing interaction across borders. Such a forum not only encourages innovative solutions to security challenges, but also invites participants to invest in a more transparent and interactive future for the Subcontinent.

The website is part of a series of NIS activities that focus on the Subcontinent's nuclear heirs and promotes dialogue and confidence-building measures among them.



Safeguards By Design

The Next Generation Safeguards Initiative, a program within NIS, promotes moving the concept of "Safeguards By Design" from a slogan to standard practice for integrating safeguards into the design process of new nuclear facilities. The main objectives are to

1. Avoid costly and time-consuming redesign work or retrofits of new nuclear facilities.
2. Make the implementation of international safeguards more effective and efficient at nuclear facilities.

To aid facility designers and operators, NGSI has developed a series of guidance documents that are posted on the NNSA website at www.nnsa.energy.gov/safeguardsbydesign.