





OFFICE OF  
**NONPROLIFERATION AND  
ARMS CONTROL (NPAC)**



OFFICE OF **INTERNATIONAL NUCLEAR SAFEGUARDS**



OFFICE OF **NUCLEAR EXPORT CONTROLS**



OFFICE OF **NUCLEAR VERIFICATION**



**NONPROLIFERATION POLICY**

FY 2018  
**IMPACT  
REPORT**

## The National Nuclear Security Administration

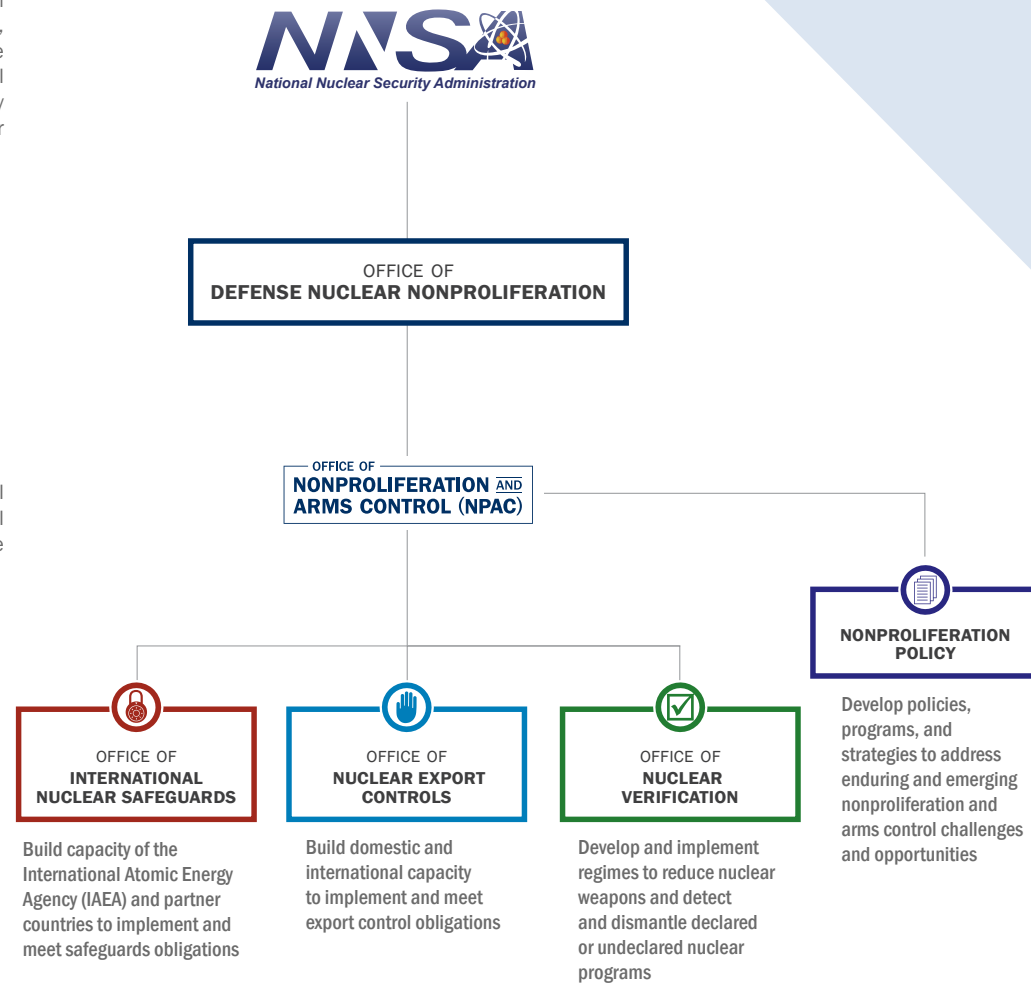
The National Nuclear Security Administration (NNSA) is responsible for enhancing national security through the military application of nuclear science. NNSA maintains and enhances the safety, security, and effectiveness of the U.S. nuclear weapons stockpile without nuclear explosive testing; works to reduce the global danger from weapons of mass destruction; provides the U.S. Navy with safe and effective nuclear propulsion; and responds to nuclear and radiological emergencies in the U.S. and abroad.





## Office of Defense Nuclear Nonproliferation

NNSA's Office of Defense Nuclear Nonproliferation (DNN) works globally to prevent states and non-state actors from developing nuclear weapons or acquiring weapons-usable nuclear or radioactive materials, equipment, technology, and expertise.

## Office of Nonproliferation and Arms Control

Within DNN, the Office of Nonproliferation and Arms Control (NPAC) works to prevent proliferation, ensure nuclear material and capabilities are used only for peaceful purposes, and enable verifiable reductions in nuclear weapons.



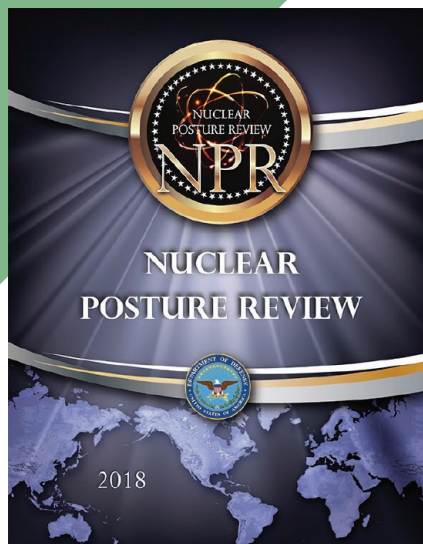
	IMPACT AREA	WHY IT MATTERS	WHAT NPAC DOES
	<b>INTERNATIONAL NUCLEAR SAFEGUARDS</b>	The International Atomic Energy Agency (IAEA) uses a set of technical measures, or safeguards, to provide credible assurances to the international community that nuclear material is accounted for and not being diverted for illicit purposes.	The <b>Office of International Nuclear Safeguards</b> strengthens the international safeguards regime by implementing programs that develop into policies, concepts and approaches, human capital, technology, and international capacity. The office also coordinates the implementation of IAEA safeguards at U.S. Department of Energy facilities and fulfills the legislative mandate to ensure that U.S.-obligated nuclear material held in foreign partner facilities is adequately protected.
	<b>NUCLEAR EXPORT CONTROLS</b>	Threats of nuclear proliferation and nuclear terrorism are ongoing challenges to U.S. national security and to the international community. In particular, the risk of nuclear and dual-use materials, equipment, technologies, or information being diverted to non-peaceful purposes persist.	The <b>Office of Nuclear Export Controls</b> facilitates legitimate civil nuclear cooperation by strengthening global and domestic efforts to detect and prevent illicit or unintended transfers of weapons of mass destruction (WMD)-related material, equipment, and technology. Using its ability to comprehensively analyze, integrate, and apply expert knowledge of nuclear and other dual-use technology to export controls, the office bolsters the efforts of both the U.S. Government and the international community to prevent and interdict transfers with the potential to contribute to foreign WMD programs.
	<b>NUCLEAR VERIFICATION</b>	The development and implementation of arms control treaties, other government-to-government agreements focused on nuclear weapons and material limitations, and the preparation for and implementation of nuclear weapon material verification and monitoring activities with foreign partners requires the support of extensive technical expertise.	The <b>Office of Nuclear Verification</b> , working with other elements of the U.S. Government, monitors compliance with arms control treaties and other international agreements, supports negotiation and implementation of nuclear weapon reduction initiatives, and develops and exercises the U.S. capability to independently verify and monitor nuclear weapons development and production programs. The office maintains both human and technical resources that permit rapid deployment to locations world-wide where U.S.-led on-site verification and/or monitoring activities are required.
	<b>NONPROLIFERATION POLICY</b>	Containing global proliferation and implementing U.S. nonproliferation initiatives to address enduring and emerging challenges requires the development of innovative policies and approaches.	The <b>Nonproliferation Policy</b> team applies its knowledge and expertise across NPAC to develop and execute crosscutting programs and strategies to support enduring U.S. Government nonproliferation and arms control policy objectives. The team coordinates NNSA efforts to develop and represent DOE/ NNSA positions in the negotiation and implementation of U.S. Government obligations and provides statutorily required technical assistance to the Department of State.



# 1 HIGH PURITY $^{244}\text{Pu}$ FOR INTERNATIONAL SAFEGUARDS

A continuing and critical aim for NPAC is strengthening the capabilities of the IAEA and its member states to implement international safeguards. To support this mission, in FY 2018, Lawrence Livermore National Laboratory (Livermore) completed purification and certification efforts to produce a high-purity  $^{244}\text{Pu}$  certified reference material (CRM). This new CRM is needed by IAEA network laboratories to analyze for traces of plutonium in environmental samples that IAEA inspectors take to confirm IAEA member state declarations about their nuclear material. The new Livermore plutonium spike contains precisely measured concentrations of  $^{244}\text{Pu}$  with trace (but known) amounts of the other plutonium isotopes. The extremely low abundance of these other isotopes enables higher precision measurements of the ratio of  $^{239}\text{Pu}$  to  $^{240}\text{Pu}$  in environmental samples. These high-purity  $^{244}\text{Pu}$  spikes will become extremely valuable to the safeguards community for improving analyses and measurement quality of very low-level plutonium in environmental samples.





*“While we will be relentless in ensuring our nuclear capabilities are effective, the United States is not turning away from its long-held arms control, non-proliferation, and nuclear security objectives.”*

*Nuclear Posture Review  
2018*

## 2 NPAC SUPPORT TO THE NUCLEAR POSTURE REVIEW

On January 27, 2017, the President of the United States directed the Department of Defense (DoD) to conduct a new Nuclear Posture Review (NPR). Beginning with the kick-off of this DoD-led multi-agency effort in March, through the completion of the report and its publication on February 5, 2018, NPAC supported every aspect of the review. NPAC represented NNSA's Office of Defense Nuclear Nonproliferation and worked closely with the NNSA Offices of Defense Programs and Counterterrorism and Counterproliferation to ensure NNSA expertise and equities were well represented and reflected throughout the NPR deliberations and final report writing process. NPAC's work included participation in the weekly Working Group meetings, Senior Steering Group meetings and Arms Control, and Nonproliferation Sub-Working Group meetings. NPAC team members also reviewed, assessed, and contributed to the numerous products that formed the analytical basis for the NPR's conclusions and that supported the final report's public roll-out and messaging.



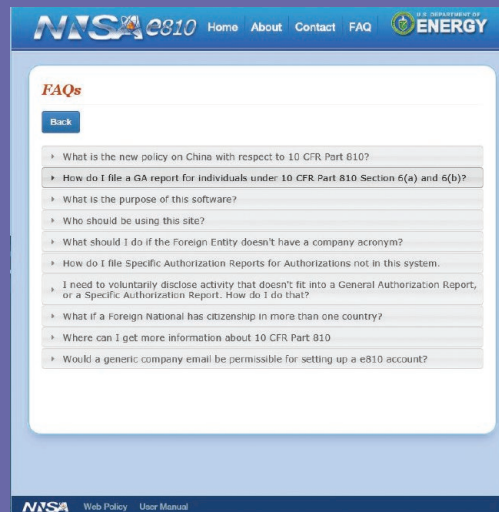
### 3 TRAINING FOR THE U.S. EXPORT ENFORCEMENT COMMUNITY

NPAC's International Nonproliferation Export Control Program (INECP) provides tailored training for the U.S. export enforcement community on technically complex, export-controlled commodities to aid investigators, customs officers, and others as they pursue those attempting to acquire U.S. goods for potentially illicit, WMD-related purposes. One such training, a two-day workshop at Los Alamos National Laboratory (LANL), covered components and testing equipment used in nuclear weapons and also provided information on the weapons programs seeking them. Conducting the training at LANL allowed participants to view especially sensitive and highly sought after commodities—such as flash x-ray equipment, explosive containment vessels, and detonators—up close, while learning about their manufacturers, price, and nuclear and non-nuclear uses. This course is an example of the in-depth, hands-on training that equips U.S. export enforcement personnel with the knowledge and tools they need in the field to counter proliferators' acquisition attempts.



## 4 STREAMLINING THE PART 810 AUTHORIZATION PROCESS

The Secretary of Energy has the legal authority to authorize the transfer of unclassified nuclear technology and assistance to foreign atomic energy activities within the United States or abroad. Such authorizations are known as Part 810 authorizations, after the relevant part of the Code of Federal Regulations (10 CFR Part 810). To support this responsibility, NPAC staff provide analysis and recommendations to the Secretary on all Part 810 requests. In FY 2018, NPAC continued its efforts to streamline the Part 810 authorization process through procedural improvements and by providing information to assist potential and current exporters. NPAC worked with other DOE offices and the U.S. interagency to eliminate duplicative reviews, establish timely and realistic review deadlines and ensure that required reviews are performed in parallel where possible. As a result of these and other changes, the average processing time to approve a Part 810 authorization decreased over 40 percent in FY 2018, relative to the previous year. In addition, NPAC developed and disseminated new Part 810 Awareness Training, which highlights individuals' obligations under the Part 810 regulation, especially as related to independent consulting activities. These changes will help the U.S. civil nuclear industry compete in the global marketplace, while maintaining strong nonproliferation controls on U.S. nuclear technology.



### Determining Coverage – Where is Technology Going?

- Whether Part 810 applies to a given transfer of technology or assistance also depends on the type of recipient, including who they are and where they are located.
- Part 810 may apply to transfers to any of the following three types of recipients:





## 5

### RAISING VERIFICATION READINESS LEVELS

NPAC stands ready to support negotiated agreements by deploying teams and technologies to monitor and verify the operating status, fissile material inventory, process history, and disablement/dismantlement of any foreign nuclear fuel cycle facility. NPAC's Uranium and Plutonium Verification Teams (UVT and PVT), are called upon to address nuclear fuel cycle facilities ranging from uranium mines to facilities that form nuclear weapons components. In FY 2018, NPAC established a dedicated team of health & safety experts that will deploy with the UVT and PVT to ensure radiation and industrial safety of deployed personnel. Additionally, NPAC raised readiness levels for the UVT and PVT with specialized verification tool training and verification scenario exercises. In February, the PVT trained at the Hanford Site on the specifics of graphite moderated reactors and associated material processing facilities. In June, the PVT trained and exercised with a specialized reactor disablement tool. In May and July, the UVT participated in scenario-based exercises in uranium chemical processing facilities at the Y-12 National Security Complex to develop and practice verification mindsets and techniques. As a result of these team development, training and exercise activities, NPAC is better prepared to safely and effectively characterize and verifiably disable nuclear weapons material processing facilities on future verification and monitoring missions.





# 130

Countries implementing the IAEA Additional Protocol providing the IAEA with additional tools for verification

BY THE  
**NUMBERS**

# 58

Countries yet to bring Additional Protocols into force

# 40+

Countries worked directly with NPAC to execute Additional Protocol implementation helping to ensure that all nuclear materials remain in peaceful hands



## 6 UNIVERSALIZING THE IAEA'S ADDITIONAL PROTOCOL

NPAC leads NNSA's efforts to promote universal adherence to the IAEA's Additional Protocol (AP), a key U.S. nonproliferation objective. The AP gives the IAEA additional tools and information to verify that countries are using nuclear material only for peaceful purposes. While over 130 countries are currently implementing APs, including the United States, 58 countries have yet to bring APs into force. Since 2008, NPAC has worked with over 40 countries that are preparing to implement or already implementing APs. Drawing on the experience of the National Laboratories in implementing the U.S. AP, these engagements typically focus on three areas: creating the necessary legal and regulatory infrastructure, educating policymakers on the importance of the AP, and providing training and tools to help countries implement the AP.



## 7 NEW 123 AGREEMENTS WITH MEXICO AND THE UNITED KINGDOM

Agreements for peaceful nuclear cooperation (also called 123 Agreements, after the relevant section of the Atomic Energy Act) establish the legal framework for significant U.S. exports of complete nuclear reactors, major components of nuclear reactors, associated equipment and nuclear material. NPAC is the office within DOE that provides statutorily-required technical assistance to the Department of State in the negotiation of a 123 Agreement. In FY 2018, NPAC staff helped support the successful negotiation of 123 Agreements with the United Kingdom (UK) and Mexico. Both 123 Agreements passed through the statutorily-mandated 90 days of continuous Congressional session review. A new UK 123 Agreement will provide a legal basis for continued civil cooperation with the UK after it withdraws from the European Atomic Energy Community. A Mexico 123 Agreement will provide broader civil nuclear cooperation with Mexico and supersede a prior agreement which was limited to support for Mexico's Laguna Verde Nuclear Power Plant and conducted in partnership with the IAEA.



# 8

## TABLE-TOP EXERCISES IMPROVE INTERNATIONAL EXPORT CONTROL SYSTEMS

NPAC's INECP determined that the use of Table-Top Exercises (TTX) is an effective mechanism for helping foreign partners to test and validate their export control procedures. As a result, starting in late FY 2017, INECP added TTXs and other facilitator-led scenario-based exercises to its course catalogue. These events are custom-designed to assist foreign partners to strengthen export control procedures and identify training gaps and needs. INECP tailors subsequent cooperative activities based on the insights gained from these TTX events. INECP first used this approach in the Philippines in September 2017, when it delivered a TTX to support the Philippines' development of export control licensing procedures. Participants from multiple Philippine government agencies involved in implementing the export control system were able to discuss proposed policies and procedures and then test them in two simulated scenarios. INECP, the Department of State's Export Control and Related Border Security program, and the Philippines were able to plan and conduct a series of workshops in FY 2018 aimed at addressing gaps identified during the TTX. INECP has now used a similar approach in regional and bilateral events in Eastern Europe, Central Asia, and Southeast Asia. Outcomes from these exercises have proven useful in identifying partner gaps and needs and in planning future events with participating countries. As a result, TTXs and scenario-driven exercises are now a fundamental part of INECP's outreach work.





## 9 BOLSTERING NATIONAL INSPECTIONS IN LATIN AMERICA AND THE CARIBBEAN

International safeguards are the technical measures used by the IAEA to verify that States are using nuclear technology solely for peaceful purposes. NPAC supports the IAEA's efforts to implement nuclear safeguards around the world through building partner country capacity. National inspections support a country's obligation to account for and control nuclear materials within its territory and support IAEA verification. When countries proactively inspect their own nuclear materials and facilities, the IAEA can more efficiently and effectively carry out its verification mission. Building on 25 years of bilateral partnership, NPAC and Argentina's Nuclear Regulatory Authority (ARN) co-hosted a National Safeguards Inspections Regional Workshop in Buenos Aires in June 2018. This first-of-a-kind event drew participants from all of the countries with nuclear facilities in the Americas, including Brazil, Canada, Chile, Colombia, Jamaica, Mexico, Peru, and Venezuela. The workshop allowed participating countries to share best practices for national inspections as well as to improve regional collaboration and communication on safeguards issues.



## 10 LETTERPRESS EXERCISE STRENGTHENS VERIFICATION CAPABILITIES

In October 2017, NPAC staff and technical experts from the National Laboratories participated with representatives from Norway, Sweden and the United Kingdom in the Quad Nuclear Verification Partnership's first live-play exercise. The exercise, called LETTERPRESS, took place at Royal Air Force Honington, a former UK nuclear weapons storage base, and was the culmination of two years of extensive planning and preparation. The verification event scenario jointly developed by the Quad's nuclear and non-nuclear state partners exercised the deployment of a range of monitoring and verification equipment. The exercise provided practical experience in designing and applying a "negotiated" treaty-document among the participants, a realistic testbed for exercising and evaluating monitoring and verification technologies, and procedural guidelines that helped develop lessons-learned for future Quad activities and exercises.





## 11 ADVANCING THE NUCLEAR SUPPLIERS GROUP GUIDELINES AND CONTROL LISTS

NPAC staff and technical experts from the National Laboratories support U.S. participation in the Nuclear Suppliers Group (NSG), a voluntary group of 48 supplier governments of nuclear and dual use goods and technology. NSG Governments seek to contribute to the nonproliferation of nuclear weapons through the development and maintenance of NSG guidelines and control lists, which govern the transfer of nuclear and nuclear-related dual-use items, material, equipment and technology. NSG Governments commit to implement the Guidelines and Lists in their national laws and regulations. The NSG remains the principal venue for the United States and likeminded governments to advance standards for responsible nuclear supply behavior. In FY 2018, NPAC staff supported the review of 16 technical proposals and adoption of four new technical amendments to the Trigger and Dual Use Lists, including one U.S. amendment, each intended to modernize and strengthen the guidelines and control lists.



## BY THE NUMBERS

6,000

Export licenses annually for dual-use commodities

25

Days in which NPAC commits to complete at least 80% of its reviews

5

Days earlier than required by EO 12981

# 12

## INCREASED EFFICIENCY IN EXPORT CONTROL REVIEW

Billions of dollars' worth of goods are exported from the United States each year. Ensuring that those exports do not contribute to a weapons of mass destruction program is a key element of the NNSA nonproliferation mission. NNSA's NPAC reviews approximately 6,000 license applications each year from U.S. industry seeking to export dual-use commodities. The Department of Commerce (DOC) refers these export license applications to NNSA and other agencies for review, and Executive Order (EO) 12981 mandates that departments and agencies submit positions on these applications to DOC within 30 days of receipt. In order to measure efficiency in review of license applications, NPAC has established a new performance measure, starting in FY 2019, by which it proposes to achieve at least 80% of its license reviews and responses to DOC within 25 days, five days earlier than required by the EO. NPAC, with support from the National Laboratories, conducts technical reviews of these export license applications to assess the appropriateness of the items for the stated end use and to determine if there are known proliferation concerns with the end users. By completing its technical reviews in a timely fashion, NPAC not only will ensure that its work in assessing the risk of these transfers does not impede the flow of legitimate trade; but also, will allow DOE to use the full amount of time allotted (30 days) to evaluate the most sensitive and complex transactions that could pose significant proliferation concerns or threats to national security.



## FY 2019 Plans and Priorities

NPAC follows a disciplined approach for setting, pursuing, and evaluating plans and priorities. Across the spectrum of international nuclear safeguards, nuclear export controls, nuclear verification, and crosscutting policy issues, NPAC staff will continue to provide integrated policy, programmatic, and technical solutions to nonproliferation challenges. Key NPAC priorities for FY 2019 include:



### International Nuclear Safeguards

- Strengthen the capacity of the IAEA and partner countries to implement and meet international safeguards obligations.
- Support the training of new safeguards professionals in the United States.
- Engage with partner countries to ensure effective and efficient implementation and fulfillment of IAEA safeguards obligations and promote the broadest possible adherence to safeguards agreements.
- Develop mature technologies to support the needs of the IAEA and partner countries in implementing safeguards obligations.
- Engage with and advise the U.S. interagency on safeguards related programs and policies.



### Nuclear Export Controls

- Perform ~6,000 technical reviews of U.S. export licenses and ~3,000 interdiction technical analyses.
- Develop, maintain, and streamline, as needed, information technology systems to support licensing, interdiction, and multilateral export control regime activities.
- Provide nonproliferation and export control training and analytical support to the DOE complex, U.S. interagency, and international partners.
- Support U.S. Government sanctions activities by providing technical analysis of cases that may be subject to sanctions pursuant to the Iran, North Korea, and Syria Nonproliferation Act.
- Implement new OMB metric to complete the review of 80% of dual-use license applications within 25 days of receipt from the Department of Commerce five days ahead of the mandated 30-day deadline.



### Nuclear Verification

- Arms control implementation and preparing the U.S. Government policy community and DOE facilities for future negotiations and requirements.
- Development of novel technology concepts for warhead verification and nuclear weapon material verification and monitoring.
- Strengthening international partnerships under current and future verification initiatives.
- Implementing ongoing verification and monitoring regimes including fissile material monitoring.
- Maintain readiness for on-site verification and monitoring of nuclear programs through enhanced training exercises.



### Policy

- Support the negotiation and conclusion of peaceful nuclear cooperation agreements (123 Agreements) and associated Administrative Arrangements.
- Conduct technical review of Nuclear Suppliers Group (NSG) guidelines and develop comprehensive updates to the NSG Trigger List & Dual Use List.
- Further strengthen Part 810 regulatory process through the development and implementation of the Part 810 Process Improvement Plan, including the e-licensing system, and the implementation of newly authorized Part 810 civil penalty enforcement functions.



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<https://www.energy.gov/nnsa/missions/nonproliferation>