



Strengthening Nuclear Nonproliferation

The DOE/NNSA Perspective

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Are We Making Progress?



- **Nuclear Nonproliferation Treaty**
 - 2015 Review Conference
 - Joint Comprehensive Plan of Action
- **Convention on Physical Protection of Nuclear Materials (and Amendment)**
 - Not yet ratified, BUT expected to come into force in about a year
- **IAEA**
 - Nuclear Security now a Division, on the same level as Safety
 - Commitment to hold a Ministerial level Conference on Nuclear Security every three years
 - December 6-9, 2016
 - Annual nuclear security-related conferences drawing very large participation
 - 2015 Conference on Computer Security
 - 2015 Conference on Nuclear Forensics
- **Other Actions**
 - U.S.-supported Nuclear Security Summit Series
 - Related activities under UN 1540 Committee, GICNT, Global Partnership, INTERPOL
 - US-EU-IAEA Border Monitoring Working Group



Nuclear Security Environment from the U.S. Perspective



- **Enduring Nonproliferation Mission, Evolving Nuclear Security Threats:**
 - Over half a century of upholding the Nuclear Non-Proliferation Treaty/nuclear nonproliferation regime/treaty monitoring
 - Post -Cold War development of **global nuclear security** cooperation
 - Post 9/11 mission focus on **countering terrorist access** to material, technology and expertise
 - Further evolution as we look “over the horizon” at emerging threats
- **U.S. Nuclear Security Policy Priorities:**
 - Support President Obama’s 2009 Prague vision and promote permanent threat reduction under Nuclear Security Summit process:
 - Seek permanent threat reduction by **minimizing civilian use of weapons-grade nuclear** materials and dangerous radioactive sources, and **disposing the excess of these materials**
 - **Strengthen security of remaining materials** through the effective, global implementation of physical protection, control, and accounting systems
 - **Combat illicit trafficking** of nuclear and radiological materials, and recover all such materials that are outside of regulatory control
 - Prevent the theft, diversion, or spread of sensitive nuclear materials, technology, information, and expertise
 - Strengthen and expand nonproliferation **detection and monitoring** efforts
 - Address proliferation/terrorism risk inherent in **expanding global use of nuclear energy**
 - **Sustain critical scientific and technical capabilities** to support nonproliferation efforts
 - Lead **vital nuclear security engagements** with key foreign partners (UK, China, Japan, EU, France, Central & South Asia, etc.)
 - Provide technical and negotiating support to existing and new arms control initiatives



From Priority to Implementation



- **2014 Nuclear Security Summit Gift Basket on Strengthening Nuclear Security (IAEA INFCIRC/869)**
 - 35 Countries Pledged to “Make Every Effort” to Meet the Essential Elements of a Nuclear Security Regime, and to commit to Effective and Sustainable Implementation of those Elements.
 - Subscribe to the Fundamental Principles of Nuclear Security in the IAEA Nuclear Security Series and to Meet the Intent of Recommendations Contained in that Series.
- **Convention on Physical Protection of Nuclear Material (2005 Amendment)**
 - Entry into Force of CPPNM (Amended) Appears Imminent: Ratification by 14 more States Parties needed for the Amendment to take effect.
 - 2005 Amendment Greatly Expands the Obligations on Protecting Nuclear Material in Domestic Use, Storage, and Transport, and on Protecting Nuclear Facilities Against Sabotage. It also Provides for More International Cooperation on Locating and Recovering Stolen or Smuggled Nuclear Material.
 - Time is Now to Begin Discussing How to Implement Measures to Meet Convention’s Obligations.
- **Both the U.S. Nuclear Regulatory Commission and the Department of Energy’s National Nuclear Security Administration Implement Physical Protection Regulations to Meet the Intent of the Recommendations of the Nuclear Security Series.**



Entering An Era of Dynamic, Global Nuclear Threat Trends



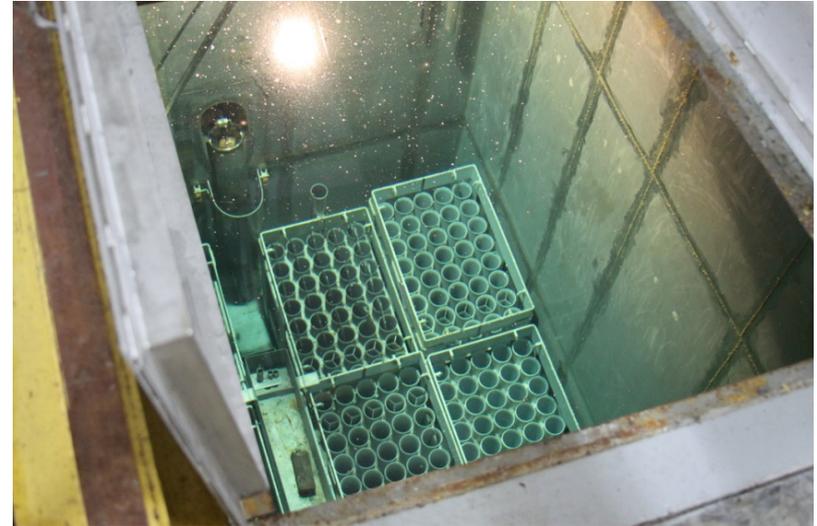
- **Securing/Managing Nuclear & Radiological Materials**
 - Challenged by significant amounts of these materials, including in unstable regions with limited ability to control facilities, borders, corruption
- **Possessing Nuclear Weapons Capabilities**
 - Still could be seen as salient and desirable for some state and non-state actors hostile to U.S. and allied interests
 - Strains on monitoring, verifying, and maintaining arms control and nonproliferation regimes
- **Global Expansion of Civil Nuclear Power and Wide Use of Radiological Sources**
 - May accelerate spread of dual-use technology & knowledge
 - Increase demands on safety, security, safeguards and emergency response systems
- **Expanding Global Trade Volumes and Sophistication of Illicit Procurement Networks**
 - Increase opportunities for state and non-state actors to acquire dual-use nuclear equipment and technology
- **Rapidly Changing Technologies and Greater Diffusion of Dual-use Knowledge**
 - More ways for terrorist to threaten nuclear security systems and easier acquisition pathways to nuclear weapons capabilities



Trend: Civil Nuclear Power Growth Will Increase Likelihood of Additional States with Nuclear Fuel Cycle Technologies



- **Nuclear “Newcomer” Countries Face Safety, Security, Safeguards, and Emergency Response Burdens in Managing Nuclear Facilities and Protecting Nuclear Materials (including Spent Nuclear Fuels).**
 - Nuclear Countries that Reprocess Fuel Will Continue to Produce Plutonium Beyond the Ability to Use It (and Other Countries May Consider Acquiring Reprocessing Capabilities as part of their Long-Term Energy Strategy).
 - Services Sector May Put Pressure on Export Control Regimes and Escalate the Diffusion of Dual-use Technology and Information.



Reactor Fuel Rods in Pool

Working with IAEA to Promote Development Safe, Secure, and Safeguarded Nuclear Infrastructures, with a Sustainable Nuclear Security Culture.



Trend: Increasing Capabilities of Cyber-Attack Tools Will Challenge Security and Safeguard Systems



- **Available Cyber-Attack Tools Can Potentially Affect Nuclear Facilities, and Their Associated Networks (Disabling Security Systems, Falsifying Material Accounting Balances, etc.)**
- **NSA Established a Joint HQ-National Lab Cyber Task Force to:**
 - (A) Study the Cyber Threat Relevant to Nuclear Nonproliferation,
 - (B) Evaluate the Implications of the Threat to the Nuclear Nonproliferation, and
 - (C) Develop a Prioritized Set of Recommendations for a Measured Response to the Cyber Threat.



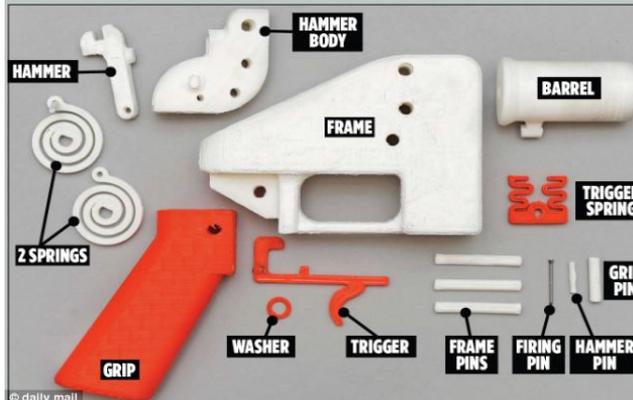
- **Emerging (Disruptive/Transformative) Technologies Becoming More Widely Available, Sometimes Without a Full Understanding of the Potential Security Risks They May Involve.**



1 THE £1,700 PLASTIC PRINTER
WE purchased a £1,700 printer from the internet. The gun's blueprint was downloaded on to a computer, and then a memory stick was inserted into the 3D printer. It built up the design from layers of quick-setting plastic.

3 THE SIMPLE ASSEMBLY
USING simple DIY tools, each piece was filed and sanded to remove excess plastic, then the pistol's parts were assembled in just a matter of minutes.

2 THE DEADLY, PRECISION-MADE PARTS
IN LESS than 36 hours we had printed 15 plastic components. The final piece – a common nail which acts as a firing pin – was bought from a hardware shop. It is the only metal part of the finished gun.



- Advances in Design, Analysis, and Manufacturing Technologies could Undermine Ability to Detect Hidden Nuclear Weapons Programs.
- Technology Evolving Faster than Traditional Export Control/Supplier Regimes Can Adapt.

A Joint DOE – National Lab Task Force is Studying the Emerging Technologies Challenges/Implications to the Nuclear Nonproliferation Mission.

Nuclear Supplier Regimes Must Also Adapt to Rapid Technology Advancement.



Regimes are Only Effective when Countries Make Sustained Effort



- **Broad International Recognition of Need to Strengthen Nuclear Security**
- **Complete and Sustained Implementation of Nuclear Security Regimes will be a Critical Step for Countries to Take—and the Time for that is Now.**
- **Nuclear Security Regimes will be Constantly Challenged to Adapt to the Evolving Nature of Nuclear Proliferation and Terrorist Threats.**