U.S. Department of Energy
National Nuclear Security Administration
Office of Defense Nuclear Nonproliferation

Overview of Nuclear Nonproliferation Programs: What Hasn't Changed, What Has Changed, and What Might Benefit from Change

December 3, 2013

National Nuclear Security Administration

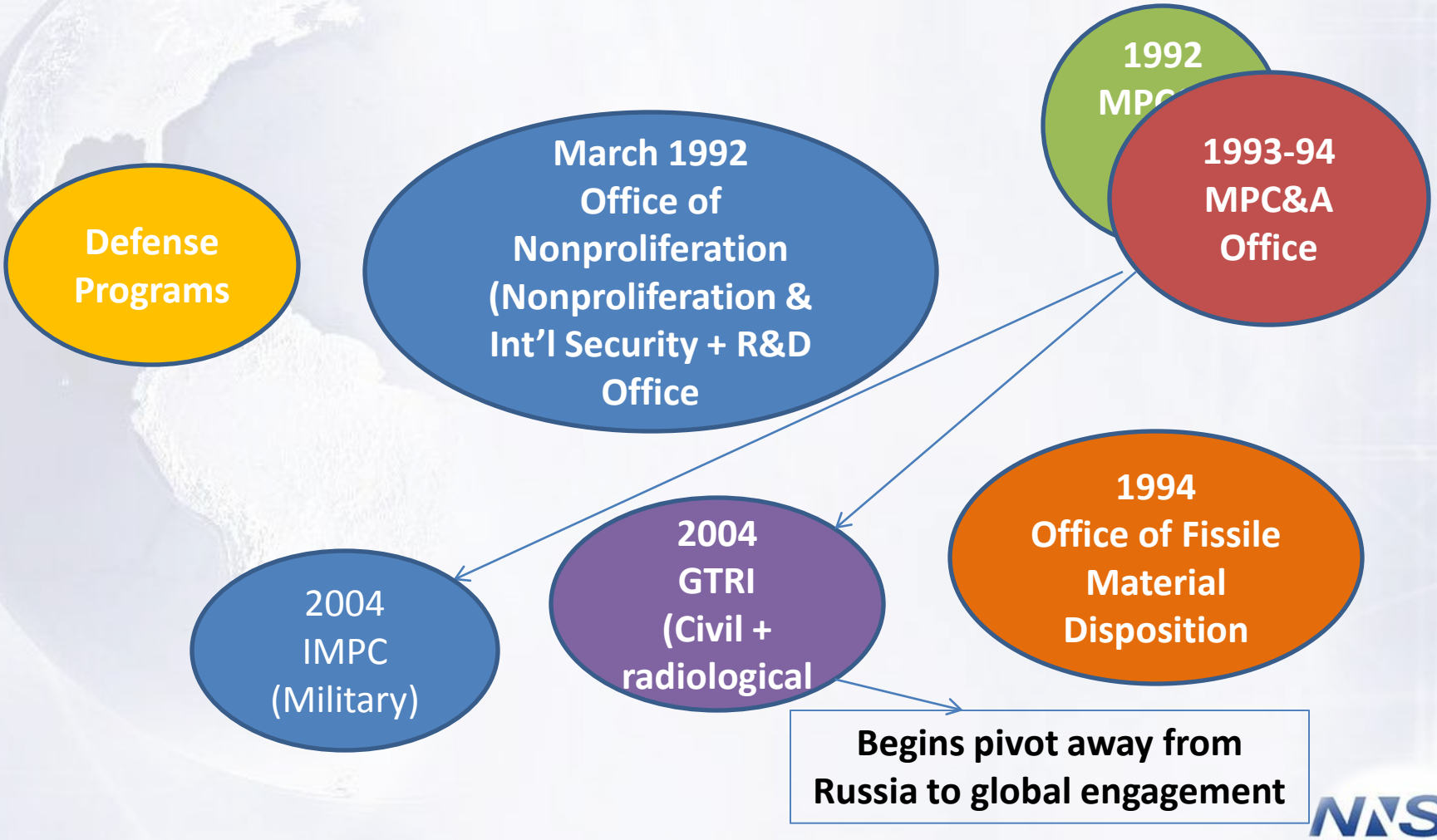
Briefing Outline

- Organizational Context
  - DNN Vision, Mission and Competencies
  - Organization
  - Global Reach
  - Partners
  - Prioritization Methodology

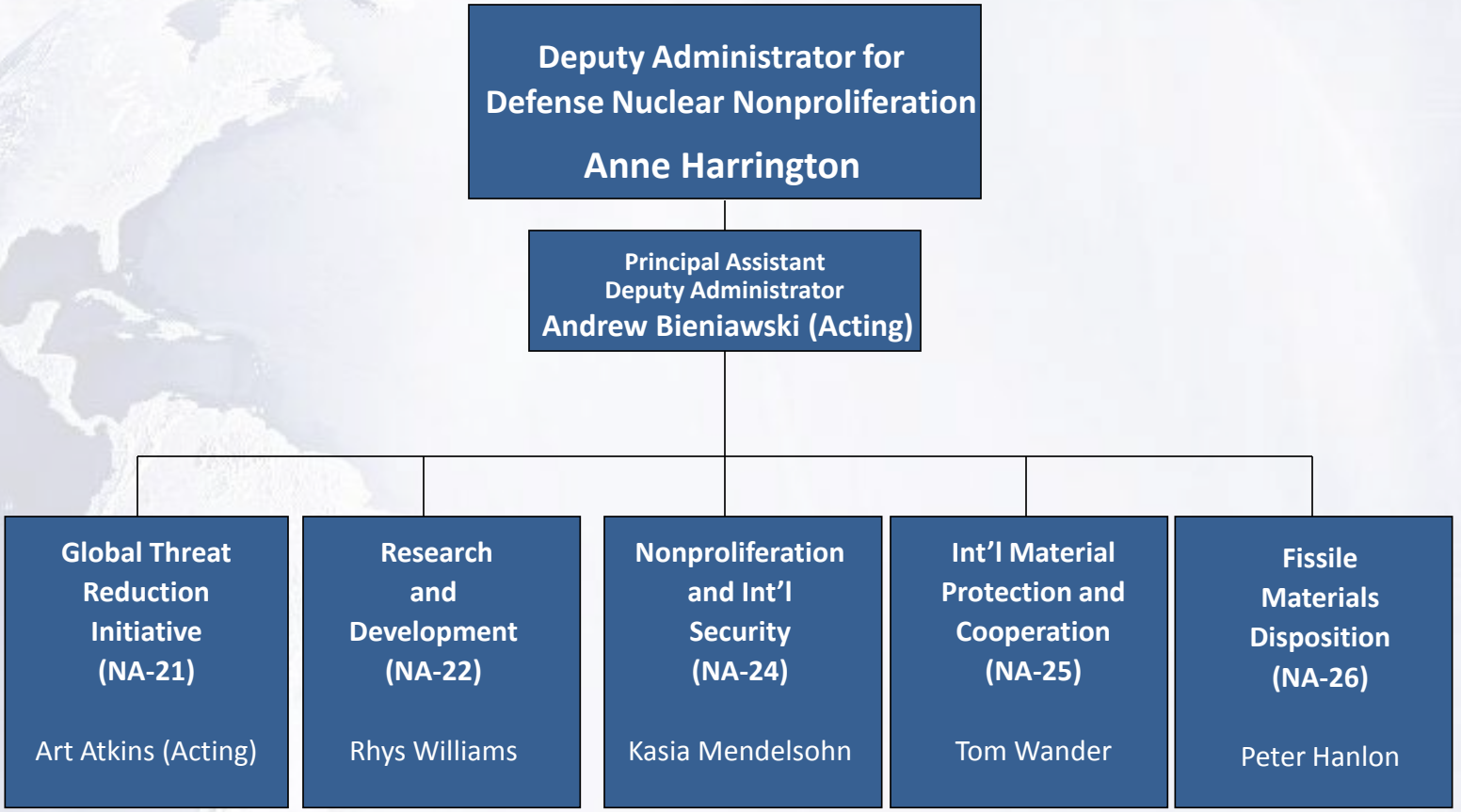
- DNN Programs – Opportunities and Challenges
  - GTRI, R&D, NIS, IMPC, FMD

- Looking Ahead: Over the Horizon (OTH) and Complementary Efforts
  - The OTH Process
  - Sources and Methods
  - Key Trends
  - Considerations
  - Next Steps

DNN: From Soviet Collapse to Global Engagement

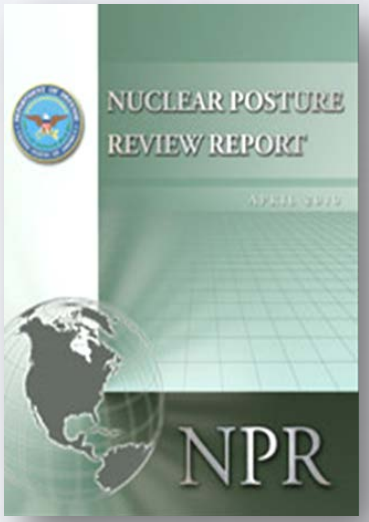


DNN Organization



Key Drivers and Requirements

- UN Security Council Resolution 1540 (2004)
- National Security Strategy (2010)
- Nuclear Security Summit (2010, 2012)
- Nuclear Posture Review (2010)
- Prague Speech (2009); Berlin Speech (2013)
- DOE and NNSA Strategic Plans (May 2011) – Five specific Targeted Initiatives with associated metrics.



- Public Law (NDAA for 2008, 2011) related to USNDS production

- Needs-driven research and requirements-driven production
  - •Planning in advance of formal requirements
  - •Engagement with user community
  - •Long-term outlook

Stakeholders

NNSA

- **NA-10:** Warhead measurement campaign, International scientific engagement, Nuclear detonation and detection R&D, treaty verification
- **NA-40:** Emergency operations guidelines and standards, transportation security
- **NA-70**: Participates in best practices exchanges
- **NA-80:** Counterproliferation technologies and international engagements

DOE

- **NE:** Nuclear security and safeguards culture, international engagement, new nuclear power countries
- **Science:** Conversion of DOE HEU reactors (HFIR, ATR), high-density LEU fuel development and Mo-99 production, continued receipt and storage of U.S.-origin HEU at INL, program engagement of PNNL, ORNL
- **EM:** Continued receipt and storage of U.S.-origin and Gap fuel at Savannah River Site and construction of Greater Than Class C facility for radioactive sources
- **DOE-IN:** Technical expertise and collaboration on intelligence products for DOE and the interagency

White House

- Four-year plan
- Reliable domestic Mo-99 (OSTP)
- U.S. HEU minimization policy

Congress

- U.S. radiological source recovery (FY2009 NDAA)
- Domestic radiological protection (FY2009 NDAA)

Interagency

- **DoD:** removal support, radiological sources
- State Department, NRC, DHS, FBI, NIST, USDA, VA, DOT, DOC, HHS/FDA

State, Local, and Private Sector

- Agreement states and local law enforcement
- Hospitals, universities, and industry
  - •well-logging (cost share best practices)

International Organizations

- **IAEA:** Joint efforts in convert,
  - •remove, and protect for access,
  - •liability, and global coordination
- Interpol, EURATOM, OECD/NEA
- **WINS:** Share best security practices
  - •with high income countries

Partner Countries

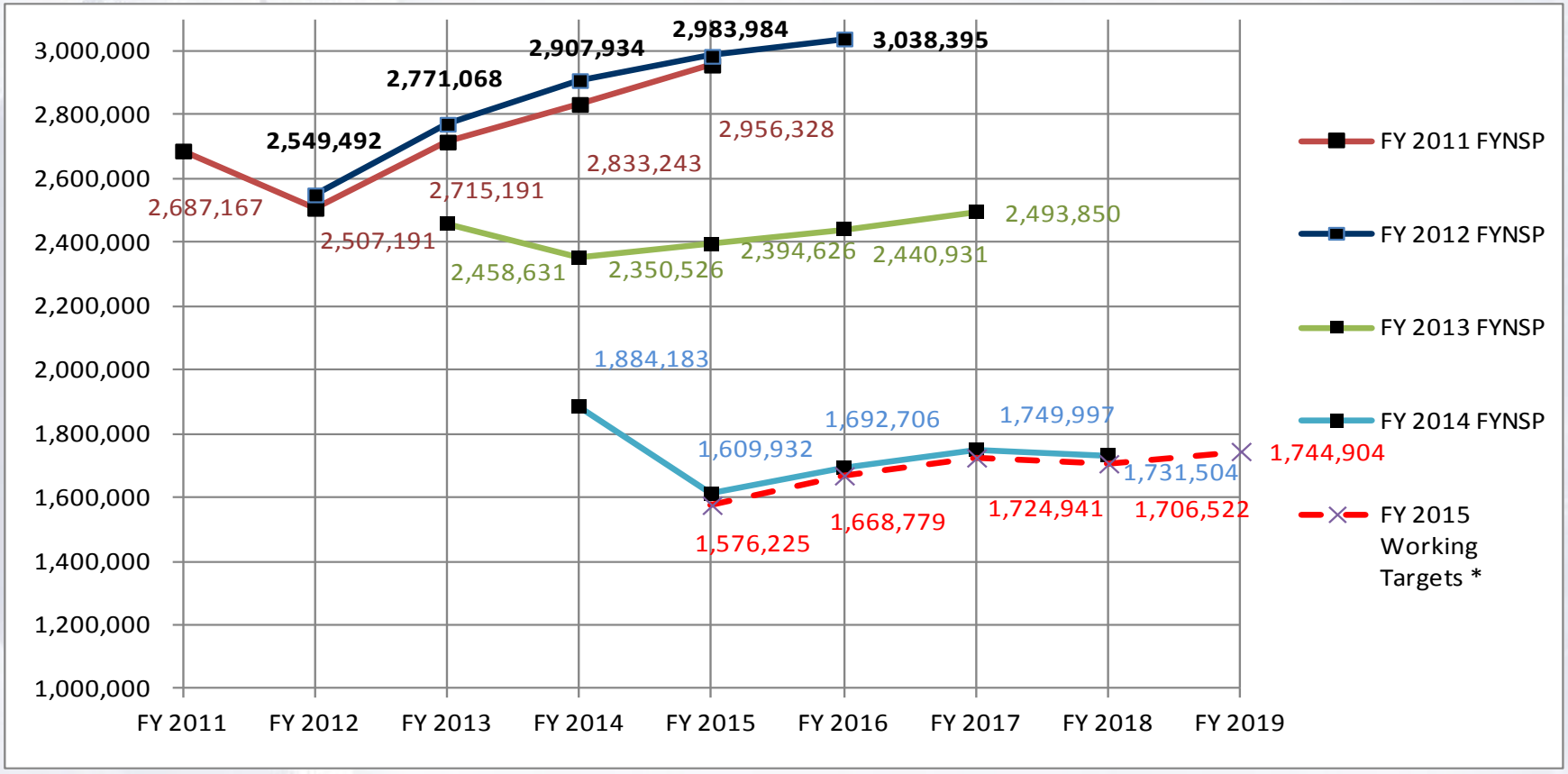
- Contributions to projects (Canada, UK, etc)
- Volunteer to convert, remove, protect

DNN's Global Reach

DNN Prioritization Methodology

- In Late 2012, the White House National Security Staff (NSS) developed key interagency nuclear nonproliferation priorities.
- DNN used these priorities as the basis for our FY2014 program planning and budget process:
  - **Removing and eliminating excess and surplus weapon-usable nuclear material** (Programs: Global Threat Reduction Initiative, Fissile Materials Disposition, International Material Protection & Control)
  - **Consolidating and securing vulnerable nuclear material** (Programs: International Material Protection & Control), Global Threat Reduction Initiative, Nonproliferation & International Security)
  - **Implementing a second line of defense using targeted fixed and mobile detection systems** (Program: International Material Protection & Control)
  - **Securing high priority radioactive materials both domestically and internationally** (Program: Global Threat Reduction Initiative)
  - **Developing advanced technologies to support US unilateral and multilateral nuclear security capabilities** (Program: Research &Development)
  - **Using multilateral tools to motivate international ratification and implementation of international conventions and other instruments and guidelines** (Program: Nonproliferation & International Security)

Budget Trends



*Plutonium disposition funding TBD during the FY 2015 process; currently insufficient funding for either the program of record (MOX) or any other alternative.

DNN Management Council

- In August 2012, DNN established a Management Council which is our corporate management mechanism
- We established a Vision and Guidance document
  - **Vision statement:** *We are committed to making the world a safer place by reducing nuclear and radiological dangers. We will execute our mission* ***as a team with respect, trust, integrity, and effective communication***
- The DNN Management Council has been a highly effective means to corporately and respectfully address:
  - Budget decisions for FY 13/FY14
  - Staffing decisions/priorities
- We meet regularly to discuss any issues that the ADAs would like to address

Defense Nuclear Nonproliferation

Vision: *We are committed to making the world a safer place by reducing nuclear and radiological dangers.*

Mission: *To develop and implement policy and technical solutions to eliminate proliferation-sensitive materials and limit or prevent the spread of materials, technology, and expertise related to nuclear and radiological weapons and programs around the world.*

Core Competencies:

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

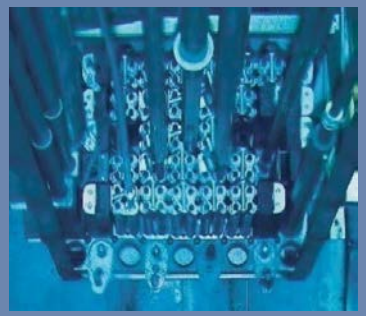
DNN Programs: Opportunities and Challenges

Global Threat Reduction Initiative Program

GTRI MISSION

Reduce and protect vulnerable nuclear and radiological material located at civilian sites worldwide.

Convert



Convert research reactors and isotope production facilities from the use of highly enriched uranium (HEU) to low enriched uranium (LEU)

Results in permanent threat reduction by minimizing and, when possible, eliminating the need for HEU in civilian applications – each reactor converted or shut down eliminates a source of bomb material.

Remove

Remove and dispose of excess nuclear and radiological materials;

Results in permanent threat reduction by eliminating bomb material at civilian sites – each kilogram or curie of this dangerous material that is removed reduces the risk of a terrorist bomb.

Protect

Protect high priority nuclear and radiological materials from theft

Results in threat reduction by improving security on the bomb material remaining at civilian sites – each vulnerable building that is protected reduces the risk until a permanent threat reduction solution can be implemented

GTRI Opportunities/Challenges

Opportunities

- Expand removal efforts to incorporate 3,000 kg of HEU and plutonium identified beyond the scope of the four-year effort
- Convert all international Mo-99 producers to non-HEU-based production; develop U.S. domestic, commercial, non-HEU-based production
- Leverage the momentum from the Nuclear Security Summits to further program efforts including reactor and isotope production facility conversion, HEU and plutonium removal and/or disposition, and radiological source security

Challenges

- Counter the impression that GTRI program efforts are complete and being phased out after the end of the four-year effort
- Obtain political commitments from potential partner countries on SNM elimination or consolidation
  - Political challenges in Belarus, South Africa
- Radiological threat/security viewed as a lower priority compared to nuclear, but has been highlighted in the Nuclear Security Summit process as an area deserving greater attention as well as in a recent GAO report

Research &Development Program

Reduce the threat to national security posed by the proliferation of nuclear weapons or materials by developing the U.S. capabilities to monitor nuclear treaties, weapons development activities, and detonations worldwide.

Nonproliferation

- SNM production capabilities
- Weapons development detection
- Operationally focused technical nuclear forensics

Verification and Monitoring

- SNM Movement Detection
- Warhead monitoring
- Nuclear Safeguards
- Warhead Chain-of-Custody

- Produce and improve U.S. operational satellite nuclear detonation sensors in support of both treaty monitoring and military missions.
- Advance US capability for seismic and radionuclide detection of nuclear tests.

R&D Opportunities/Challenges

Opportunities

- Advance U.S. unilateral and multilateral Nuclear Security capabilities for
  - Treaty Monitoring and Policy Support
  - Detonation Detection
  - Weapons and Material Production Detection & Security

Challenges

- Resolve space-based monitoring funding and architecture issues

- With NE, Complete American Centrifuge Program RD&D S-1 Test and program

Nonproliferation & International Security Program

NIS Mission

Prevent the proliferation of WMD by strengthening the nonproliferation, nuclear security, and arms control regime.

Safeguard and Secure nuclear material to prevent its diversion, theft, and sabotage.

Control the spread of WMD-related material, equipment, technology, and expertise.

Negotiate, Monitor and Verify compliance with international arms control and nonproliferation treaties and agreements.

Develop and implement DOE/NNSA **nonproliferation and arms control policy** to reduce the risk of weapons of mass destruction.

NIS Opportunities/Challenges

Opportunities

- Dynamic/evolving nonproliferation environment
  - Support resolution of threats, e.g. Iran, DPRK, Syria
  - Support IAEA mission and strengthen international nuclear safeguards and security systems, e.g. Burma
- Expansion of civil nuclear power
  - Develop new framework for civil nuclear cooperation
  - Facilitate legitimate nuclear cooperation by building global capacity to detect and prevent illicit trafficking and expertise proliferation

Challenges

- Sensitive Nuclear Technology regulations (10 CFR Part 810) not keeping up with commerce and technology
  - Revise Part 810 rule and application process
- End of 1993 U.S.-Russia HEU Purchase Agreement
  - Domenici Law certification requirements
- Secure appropriation for implementation of transformed scientist engagement activities

International Material Protection & Cooperation Program

IMPC Mission

IMPC seeks to enhance the security of vulnerable stockpiles of nuclear weapons and weapons-usable nuclear material in partner countries and improve the ability to detect the illicit trafficking of nuclear materials.

Material Protection, Control & Accounting

Assist countries to secure and reduce stocks of vulnerable nuclear weapons and weapons-usable material by:

- Enhancing Material Protection Control and Accounting (MPC&A) at nuclear sites
- Enhancing national level infrastructure (e.g., regulations, inspections, nuclear security culture) required to support an effective MPC&A Program
- Enhancing transportation security
- Supporting consolidation of material to fewer and more defensible locations
- Supporting conversion of excess HEU to LEU
- Supporting sustainability of MPC&A Programs
- Providing training in nuclear security best practices

Second Line of Defense

Strengthens capability of foreign governments to deter, detect, and interdict illicit trafficking in nuclear and other radioactive materials across international borders and through global maritime shipping system as well as at choke points throughout the country.

Implementation

- Equip points of entry: airports, border crossings, and seaports
- Provide mobile detection technology (vans) to law enforcement agencies for green/blue borders
- Install national communications network joining all detection equipment to central partner country location

Sustainability

- Ensure long-term operation of SLD systems by Partner Countries
- Build Partner Countries' indigenous capabilities to fully support SLD systems
- Provide transition support and services including help desk, data analysis, and other technical expertise

IMPC Opportunities/Challenges

Opportunities

- Continue the transition of our Russia relationship from assistance to partnership, focused on jointly-funded security improvements and nuclear material security best practices in Russia.
- Expand nuclear security best practices exchanges , e.g., Israel, France, and the U.K.
- Increase SLD mobile detection support for law enforcement along with an effort to provide technical advice to high income partner countries and industry, who will fund the installation and operation of radiation detection capabilities to counter illicit nuclear trafficking.

Challenges

- Replacement to the CTR Agreement recently negotiated (MNEPR Protocol) but access arrangements and contract modifications still need to be finalized.
- Persistent Russian security resource deficiencies limit cost sharing and prevent full Russian support for security enhancements and sustainability.
- Indian willingness to engage in bilateral nuclear security best practices exchanges.
- Willingness of some high-priority countries to engage with the U.S. in border detection cooperation, e.g., Pakistan, Turkey, India.

Fissile Materials Disposition Program

FMD Mission

Reduce inventories of surplus fissile materials including HEU and plutonium which are excess to U.S. national security needs, in a safe, secure, and irreversible manner.

U.S. Plutonium

- Current plans call for at least 34 MT of plutonium to be fabricated into MOX fuel and irradiated in existing commercial reactors
- Key infrastructure needs: MOX Fuel Fabrication Facility, Waste Solidification Building and pit disassembly capability
- Infrastructure projects far more costly than anticipated

U.S. HEU

- **~180MT Designated for Down- blending**
- 141 MT completed for peaceful use as nuclear reactor fuel.

MOX Fuel Fabrication Facility , Dec. 2012

U.S.-Russia Plutonium Management and Disposition Agreement (PMDA)

- Protocol Amending the PMDA signed at the 2010 Nuclear Security Summit
- Reaffirms commitment to dispose of at least 34 MT of plutonium in the U.S. and Russia and verification by the IAEA

Global Plutonium Management and Disposition

- Work with DOE/NE and other interagency and international partners

FMD Opportunities/Challenges

Opportunities

- Analyze current plutonium disposition approach to identify opportunities for efficiencies

Challenges

- The U.S. plutonium disposition program is under intense scrutiny
  - Contractor proposed baseline increase for MOX facility from $4.8 billion to $7.7 billion under review
  - Estimates for annual operations of MOX facility at more than $500 million annually
  - FY 2014 budget request stated that "…considering the preliminary cost increases and the current budget environment, the Administration is conducting an assessment of alternative disposition strategies in FY 2013, and identifying options for FY2014 and the outyears. As a result, NNSA will slow down the MOX project and other activities associated with the current plutonium disposition strategy during the assessment period."
  - S-1 directly involved in determining a path forward for the plutonium disposition program.

Looking Ahead

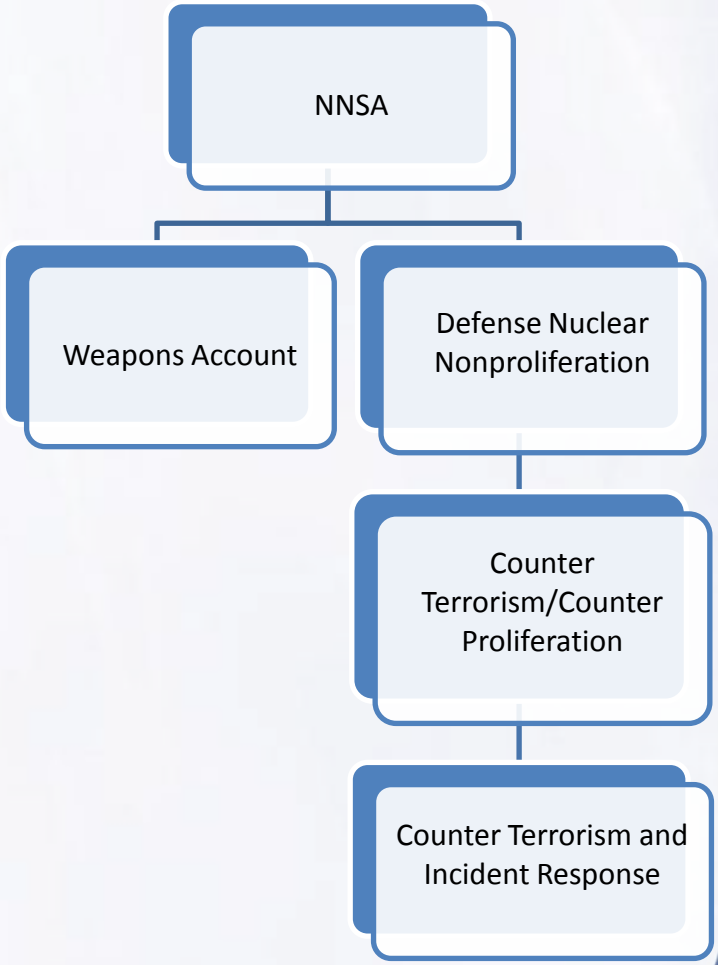
Key Challenges

- **Permanent Risk Reduction**
  - *Move efforts from prevention to permanent risk reduction*
    - Currently there is endless demand for security and disposition, but no strategic approach of how to permanently eliminate whole classes of high activity sources
- **Tailored Engagements**
  - *Move from assistance model to prioritized, tailored partnerships*
    - Currently DNN provides funds, project design and technical expertise with varying degrees of involvement of partners
- **Staying Ahead of Evolving Challenges**
  - *Ensuring the long-term strength of the DNN organization*
    - DNN has established an "Over The Horizon" process, discussed in the next few slides, to ensure that DNN's unique assets remain responsive to evolving challenges
- **Doing More with Less**
  - *Managing budget challenges and finding internal and external synergies*

Possible Synergies in New NNSA Budget Structure

Structure Pre-2013

Structure Post-2013



DNN Response to New Challenges

- Restructured the R&D program based on a 2011 review by an external panel
- Realigned the program strategy and implementation of the Second Line of Defense program following a 2012 review
- Adjusted funding for bilateral security engagement with the Russian Federation, continuing the trend of decreasing U.S. contributions due to the changing bilateral relationship
- Prioritized funding to address urgent emerging threats in unstable regions, particularly the Middle East
- Established the OTH Initiative to “institutionalize” long-term planning

DNN OTH Initiative: Background and Objectives

I. OTH Working Group (WG) established in March, 2012 by NA-20 (Harrington)

- *An opportunity to look beyond our in-boxes*

II. Staff-level WG consisting of representatives from all DNN offices

- Drew on broad range of sources and methods (as per next slide)

III. Mandate is to proactively examine:

- Evolution of threats and trends 2017-2021
  - »Focus on trends relevant to DNN mission
- Development of core competencies that define DNN as an organization
  - »Understanding the "gaps" between relevant trends and competencies
- Implications for DNN – gaps and opportunities
  - »Substantive – and organizational

DNN OTH Initiative: Sources & Methods

All-Source Literature Review

- 'think tank' reports
- USG nuclear strategies/plans
- DNI/NIC, DOS/INR, WINPAC, DOE/IN long-range analysis

Program & Issue Briefings

- NA-20 program plans
- Cyber threats
- China nuclear plans
- Global Trends
- Proliferation cascades & 'wild cards'
- Export Controls
- Other

Threats and Trends Workshop*

- NNSA staff
- DOE Lab staff (ANL, BNL, INEL, KCP, LLNL, LANL, ORNL, PNNL, Pantex, SNL, SRNL, Y-12)
- Matthew Burrows (NIC)
- Ray Juzaitis (TAMU)
- Lew Dunn (SAIC)
- G. Maukhatzhanova (MIIS)
- Dan Markey (CFR)
- Mike Yaffe (NDU)

Structured Interviews*

- NA-20 ADAs and staff
- DOE/IN, NE; NA-4
- Lab POCs, lab visits (5)
- Bonnie Jenkins
- Rose Gottemoeller
- Andy Weber
- John Harvey
- Michael Schiffer
- Jed Royal
- Brian Lessenberry
- Jason Rao
- Pat Falcone
- Adam Scheinman
- Laura Holgate
- Linton Brooks
- Susan Koch
- Will Tobey
- Roger Howsley
- Michael Krepon
- Lew Dunn
- Libby Turpen

Peer Review Meetings

- Linton Brooks*
- Joan Rolfing*
- Bonnie Jenkins*
- Brian Lessenberry*
- Lawrence Scheinman*
- Paul Longsworth*
- Andy Semmel*
- Susan Koch*

- Paul Longsworth
- Andy Semmel
- Susan Koch
- Ken Luongo
- Doug Shaw
- Page Stoutland
- Seth Carus

- DOE/IN staff

*NIS-level OTH 2016-2020 study → DNN-level OTH 2017-2021 → OTH II 2018-2022

DNN OTH Initiative: Vision

To respond to emerging threats and uncertainties, DNN will be a *proactive leader*, and will:

- Apply its unique competencies to address new as well as continuing challenges
- Create innovative partnerships to leverage and maximize investments
- Work in challenging regions, which may be where we're most needed
- Prepare for transformative events, keeping in mind emerging threats
- Provide the interagency with leadership and technical expertise on nuclear security and nonproliferation issues
- Be ready to respond to and address evolving threats and trends

DNN OTH Initiative: Trends

I. The OTH Effort built on prior study by DNN's Office of Nonproliferation and International Security, which developed initial, extensive set of 2017-2021 trends
   - Trends further developed through two workshops with experts, extensive interviews with subject matter experts, reliance on all-source methods

II. Trends then revised and revalidated over three month period
   - 54 Trends identified overall
   - A classified annex was also produced cross-referencing all available sources to ensure consistency with intel community

III. Trends recently re-validated and updated once again

IV. The trends are those that most immediately impact DNN planning
   - Trends are not prioritized– a basis for planning and prioritizing as we understand their impacts in key regions

DNN OTH Initiative: Threats & Trends - Summary

I. State-level Nuclear Proliferation Threat

- ***Increased SNM Production***
  - Increasing nuclear weapons and materials production and stockpiles of civil HEU and plutonium, including in regions of concern

- ***Civil Radiological/Nuclear Spread***
  - As economies continue to expand, growing reliance on civilian nuclear energy and radiological sources – increasingly via non-U.S. suppliers and leadership, and to new states/states of concern – is anticipated

- ***Globalized Sensitive Technology***
  - New technological advancements and pathways for information retrieval & transmission and greater nascent WMD program expertise in non-nuclear weapons states

- ***Nonproliferation Regime Strains***
  - States will continue to pursue nuclear weapons capabilities, resulting in continued and evolving strains on arms control and nonproliferation regimes

Threats & Trends - Summary

II. State/Non-State Actor Radiological/Nuclear Threat

- ***Sophisticated Trafficking Networks***
  - Increased sophistication of trafficking networks coupled with increased illegitimate and legitimate trade volumes, growth of customs unions and other "border blurs"
- ***Cyber-Nuclear Attack***
  - Increased sophistication and availability of cyber attack tools to state/non-state actors and their use against nuclear facilities and associated infrastructure
- ***Failed Radiological/Nuclear States***
  - Persistence of weak and failing states with access to radiological or nuclear materials
- ***Radiological/Nuclear Security Standards Lag***
  - Continued suboptimal implementation of nuclear/radiological security standards and lag in updating standards to keep pace with current and emerging threats

Threats & Trends - Summary

III. Non-State/Terrorist Radiological/Nuclear Threat

- ***Insider Threats***
  - Persistent insider threats with respect to nuclear or radiological material, technology, and knowledge theft and diversion
- ***WMD Terrorism Risks***
  - Terrorist networks, counter-government groups, and lone wolf actors with potential nuclear and/or radiological weapons aspirations and abilities

DNN OTH Initiative: Considerations (2017-2021)

Operational and Organizational Considerations
Strengthen DNN's role in the Nuclear Security Summit process, post-2014, to ensure working-level implementation
Address potential cyber threats to nuclear safeguards, nuclear security facilities, and critical equipment
Strengthen security of nuclear/radiological materials and programs in conflict-prone regions, states of concern, and regime "outliers"
Develop and implement a DNN-wide strategy for advancing materials disposition objectives – internationally and domestically
Strengthen resources, capabilities, and performance of the IAEA
Widen R&D focus to reflect broader range of current and emerging challenges
Implement creative partnership approaches that are responsive to partner needs, emphasize sustainability, and improve transparency
Develop integrated, cross-organizational solutions to emerging challenges
Strengthen the DNN foundation – be prepared to respond to unforeseen events

DNN OTH Initiative: Current and Next Steps

I. Objective (6-8 months): develop engagement strategies to help inform application of DNN resources within regions or with specific countries

II. Sub-tasks identified to generate data to inform these strategies (4-6 months)

  i. Further external validation of updated threats and trends (ongoing)

  ii. Development of cost-sharing and capability assessment tool (ongoing)

  iii. Opportunity analysis - identify emerging opportunities taking into account:

    - Threats and trends
    - DNN mission and core capacities
    - Partner programs and capacities

III. In parallel and under NA-20 direction, organizational analyses are underway

  i. Currently, WGs are focused on physical protection, and export control functions

  ii. Regular meetings between NA-20, 40, and 80 to strengthen understanding of organizational capacities

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Additional Slides

DNN OTH Initiative: Considerations (2017-2021)

Considerations (non-prioritized)	Initial Steps
Define a leadership role for DNN in Nuclear Security Summit (NSS) process	DNN leading participant in NSS process; DNN staffer detailed to White House
Define DNN role re: cyber concerns	Consultations with partner agencies, IAEA ONS; focus on SG and nuclear security facilities and equipment
Strengthen presence in challenging regions	WG is developing methodology leading to strategies for regional engagement, including in challenging areas
Develop and promote USG-wide strategy for materials disposition, both at home and internationally	MOX review underway, which could influence future steps domestically and abroad
Strengthen resources, capabilities, and performance of the IAEA	Providing extra-budgetary resources (PUI, NSF, Safeguards) and cost-free staff augmentation; Developing guidance, implementation, and best-practices documents.
Widen R&D focus to reflect broader range of current and emerging challenges	R&D Office has broadened focus to support range of DNN missions
Implement new partnership approaches to emphasize transparency, sustainability	Looking at potential "tailored partnerships" models; new S&T agreement with Russia a new approach; DNN prioritization of "permanent" threat reduction
Develop integrated, cross-organizational solutions to emerging challenges	Working Groups looking at physical protection, export controls, other cross-cutting issues
Strengthen the DNN foundation – be prepared to respond to unforeseen events	Working closer with NA-40 and NA-80, as well as NE, IN, etc; "institutionalizing" forward leaning processes

Over the Horizon I Terms of Reference

Objective: Produce a cross-cutting analysis to produce a study to help DNN position itself to best meet nuclear and radiological security and nonproliferation challenges over the next five to ten years.

Approach: DNN will establish a working group with representation from all DNN offices with the Office of Nonproliferation and International Security (NIS) as the chair. The working group will provide regular updates to the DNN ADA/AADAs. Work will begin immediately.

Methodology:

Define the threat environment and its trends as insight to how the threats may evolve over the next five to ten years, focusing on aspects of the threat most relevant to DNN. This would be informed by the already completed NIS effort.

1. Identify core strengths of the DNN functional bureaus. What do we do best? What are our strongest assets? What do we bring to the table that is unique, particularly with respect to the interagency process?
2. On the basis of the above, identify prospective and emerging nuclear proliferation and nuclear/radiological security challenges, gaps, needs, and opportunities that will require greater attention by the USG and its allies, and where it makes sense for DNN to take a proactive role in meeting these challenges.
3. Based on these challenges, and the status of programmatic efforts, identify gaps, needs, and opportunities. Taking into account that unanticipated events may occur between now and 2021 that could involve a DNN response.
4. Develop a set of recommendations for DNN offices to factor into their future programs and activities consistent with the analysis above. Recommendations will consider scope of programs, resources and organizational structure.

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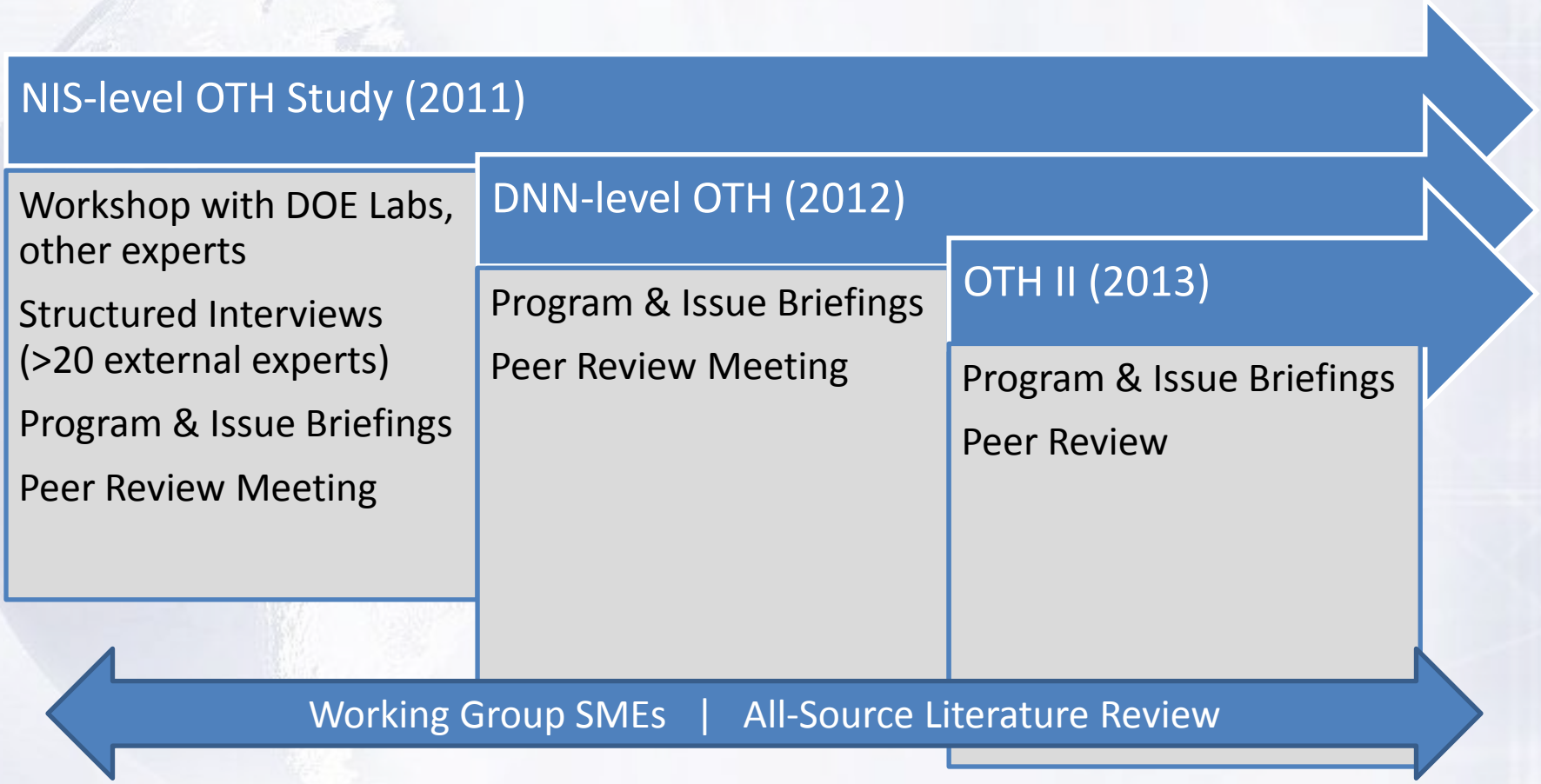
DNN OTH Initiative: Study Timeline and Process



DNN OTH Initiative: Summary of Trends (Non-prioritized)

I. Increasing nuclear weapons and materials production and stockpiles of civil HEU and plutonium, including in regions of concern
II. Growing reliance on civilian nuclear energy and radiological sources – increasingly via non-U.S. suppliers and leadership, and to new states/states of concern
III. Increased sophistication of trafficking networks coupled with increased illegitimate and legitimate trade volumes, growth of customs unions, and other "border blurs"
IV. Increased sophistication and availability of cyber attack tools to state/non-state actors and their use against nuclear facilities and associated infrastructure
V. New technological advancements and pathways for information retrieval and transmission and greater nascent WMD programs expertise in non-nuclear weapons states
VI. Persistent insider threats with respect to nuclear or radiological material, technology and knowledge theft and diversion
VII. Terrorist networks, counter-government groups, and lone wolf actors with potential nuclear and/or radiological weapons aspirations and abilities remain major concerns
VIII. Persistence of weak and failing states with access to radiological or nuclear materials
IX. States will continue to pursue nuclear weapons capabilities, resulting in continued and evolving strains on arms control and nonproliferation regimes
X. Continued sub-optimal implementation of nuclear/radiological security standards and lag in updating standards to keep pace with current and emerging threats

DNN OTH Initiative – Mission and Core Competencies

"To provide policy and technical leadership to limit or prevent the spread of materials, technology, and expertise related to nuclear and radiological weapons and programs; advance technologies to detect foreign nuclear proliferation and detonation; and eliminate, secure, and safeguard inventories of materials and infrastructure usable for nuclear weapons programs."

Remove, elliminate, and minimize the use of proliferation-sensitive materials

Detect and prevent the illicit trafficking of nuclear/radiololgical materials, technologies, information, and expertise

Safeguard and secure materials, technologies, and facilities

Provide R&D technology solutions for treaty monitoring, minimization of the use of proliferation-sensitive mateirials, and the application of safeguards and security

Provide unique technical/policy solutions and develop programs/strategies to reduce nuclear/radiological dangers

Technical Implementation of a Policy Priority: The Four-Year Effort

President Obama Speech in Prague – April 5, 2009

*"Today, I am announcing a new international effort to **secure all vulnerable nuclear material around the world within four years.** We will set new standards, expand our cooperation with Russia, and pursue new partnerships to lock down these sensitive materials."*

DOE's National Nuclear Security Administration, through the Global Threat Reduction Initiative (GTRI) and Office of International Nuclear Material Protection Cooperation (IMPC), have worked with nations around the world to meet this unique challenge. By December 31, 2013, the two programs pledged to:

- **Remove or confirm disposition of a cumulative total of 4,353 kg of vulnerable nuclear material (highly-enriched uranium or plutonium) [GTRI]**

- **Secure 229 buildings that store vulnerable nuclear material [IMPC]**

The Four-Year Effort Overview

- To date, GTRI has exceeded the cumulative target of 4,353 kilograms by removing and/or confirming the disposition of 5,066 kilograms **of highly enriched uranium (HEU) and plutonium** (2,943 kilograms since the announcement of the President's Four Year Effort
  - GTRI has added 12 countries to a total of 27 from which all HEU has been removed - **Austria**, Brazil, Bulgaria, **Chile**, Columbia, **Czech Republic**, Denmark, Georgia, Greece, **Hungary,** Iraq, Latvia, **Libya**, **Mexico**, Philippines, Portugal, **Romania**, **Serbia**, Slovenia, South Korea, Spain, Sweden, **Taiwan**, Thailand, **Turkey**, **Ukraine, and Vietnam.**
  - Political issues primary roadblock to removals in Belarus, South Africa, and Pakistan, but working with IAEA and others on creative solutions
  - The recently completed HEU Reconciliation Study identified significant additional U.S.-origin HEU overseas that could be incorporated

- Under the 4-year effort, the International Material Protection and Cooperation (IMPC) Program has completed **physical security upgrades** at 32 buildings containing weapons-usable nuclear material (cumulatively 218 of 229 buildings identified for completion in the Russian Federation and the FSU).
  - The remaining 11 buildings are at Plant 20 of the Mayak Production Association, a large SNM facility in the Rosatom Weapons Complex.
  - Although all equipment for the remaining buildings has been procured and delivered to Mayak, the U.S.-approved contract for labor and materials was held up on the Russian-side due to uncertainties surrounding expiration of the Cooperative Threat Reduction umbrella agreement in June 2013.
  - Although the CTR-successor agreement (the MNEPR Protocol) was signed in June, this contract still has not been approved on the Russian side pending completion of the subsidiary access arrangement, so the security improvements to these remaining 8 buildings will not be completed in 2013.