SANDIA NATIONAL LABORATORIES

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Nuclear Nonproliferation and Arms Control
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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Nuclear Proliferation Threats

- State-sanctioned acquisition of weapons-useable material **(Plutonium (Pu) and Highly Enriched Uranium (HEU))**
  - by diversion or misuse of declared fuel cycle facilities and supporting activities.
  - in undeclared enrichment or reprocessing capabilities.
- State-sanctioned export **of weapons, weapons-useable material, technology or expertise to rogue states or terrorists.**

- Theft or diversion **of weapons, weapons-useable material, or technology by sub-national actors or terrorists.**

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Global Security Programs (GSP)

Reducing WMD and terrorism threats to U.S. national security through international technical cooperation

Reduce Nuclear & Radiological Threats

- Secure Weapons and Material
- Reduce Fissile Material Inventories
- Detect Undeclared State Activities
- Detect/Interdict Nuclear Smuggling
- Prevent Malevolent Radiological Dispersal
- Enable Global Reductions in NW and Supporting Infrastructure

Reduce Biological & Chemical Threats

- Secure High-Risk Pathogens, Chemicals, and Facilities
- Analyze/Respond to Infectious Disease Outbreaks
- Enhance Adoption of Safety and Security Practices

Multi-Threat Risk Reduction

- Secure Borders and Ports
- Secure Critical Assets
- Reduce Motivation to Acquire/Use WMD
- Impede Access by Proliferators to WMD expertise

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Sustainable Technical Solutions: Nuclear Nonproliferation and Arms Control

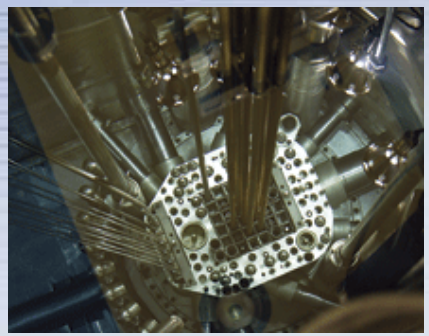
Secure
Weapons and Material

Russian Material Protection, Control & Accounting (MPC&A)

Reduce
Fissile Material Inventories

HEU Conversion Transparency

Detect
Undeclared State Activities



International Safeguards

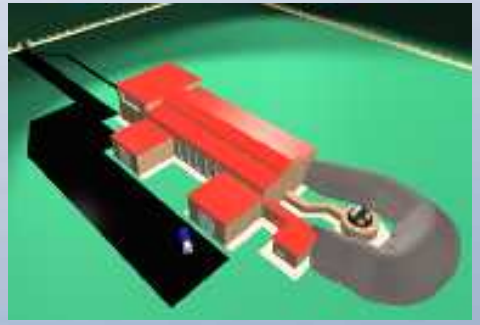
Detect/Interdict
Nuclear Smuggling

Second Line of Defense

Impede
Access to WMD expertise

Global Initiatives for Proliferation Prevention

Enable
Global Reductions in Nuclear weapons



Dismantlement Transparency

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Nuclear Nonproliferation
GSP Key Areas of Contribution (1)

- **Physical Protection (PP) Systems**
  - Vulnerability analyses and system designs for nuclear weapons/material in storage and in transport
  - Testing and evaluation of PP technologies/systems
  - International and regional PP training courses/workshops
  - Assistance/review physical protection missions
- **IAEA Safeguards and Weapons/Material/Process Monitoring Technologies**
  - Tamper resistant tags and seals
  - Radiation detectors and other sensors
  - Information barriers
  - Data security and authentication
- **Export Control/ Interdiction Support**
  - Detection of nuclear smuggling at borders
  - Export Control/Licensing guides and reviews
  - International Export Control training
  - Interdiction Technical Assistance

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Nuclear Nonproliferation
GSP Key Areas of Contribution (2)

- **Scientist Engagement/Redirection**
  - Russia, Iraq, Libya
- **Cooperative monitoring/ confidence-building** measures for verification of agreements and transparency
- **Nonproliferation Studies/Technical Collaborations** enabled by the Cooperative Monitoring Centers (CMC)

Complemented by non-GSP capabilities:

- Proliferation Detection (Remote Monitoring)
- Proliferation Assessments (Intelligence)

Cooperative Monitoring Centers (CMC) Albuquerque, NM and Amman, Jordan

Enabling International Technical Cooperation on Critical Security Issues

Technology testing and demonstration

Technology integration and operation

Albuquerque, NM

Amman, Jordan

Technology training courses and workshops

Visiting scholars program, research, and analysis

Technical collaborations and experiments

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Nuclear Arms Control - Enabling Global Reductions in Nuclear Weapons and Supporting Infrastructure

- **Two key elements of the Obama Administration's comprehensive strategy for nuclear security**
  - "Set the Goal of a Nuclear-Free World"
  - "Seek Real, Verifiable Reductions in Nuclear Stockpiles"

- **Building on extensive experience in development and application of concepts, technologies and systems for verification/transparency to**
  - Provide assurance that warheads are dismantled
  - Provide assurance that all Special Nuclear Materials (SNM) from dismantled warheads are placed in secure storage
  - Monitor containers of SNM from warheads during storage prior to further disposition
  - Provide assurance of disposition

- **Joint US/Russian Federation development/test and evaluation of weapon monitoring for security and transparency**

Nuclear Arms Control
GSP Key Areas of Contribution

- **Technical input to policy discussions on the future of Arms Control – focus on security, verification and transparency**
- **Technical support for treaty negotiations, e.g., START Follow-on Treaty**
- **Monitoring technologies/systems for verification and transparency**
  - Tamper-resistant seals and tags
  - Radiation detectors and other sensors
  - Information barriers
  - Data security and authentication
- **Extensive experience**
  - US Departments of Energy and Defense
  - Russian Federation Ministries of Energy and Defense

Nonproliferation and Arms Control - Technical Challenges

- **Verification of adherence to treaties**
  - Nuclear Nonproliferation Treaty (NPT) and associated protocols
  - Comprehensive Test Ban Treaty (CTBT)
  - Fissile Material Cut-off Treaty (FMCT)
  - Strategic Arms Reduction Treaty (START)-Follow-on and subsequent treaties
- **Development of verification/transparency approaches that are acceptable to bilateral and multi-lateral treaty parties**
- **Identification and mitigation of potential treaty impacts on USG facilities, operations and information**