

# NUCLEAR ENERGY & GLOBAL SECURITY



T E C H N O L O G I E S

## Warhead Monitoring and Verification

30 March 2009

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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.





# Outline

- **Confidence Building**
  - Transparency and Verification
  - Relationships and Collaborations
  - Technologies and Processes
- **Issue**
  - Balance of elements, including Confidence Level
  - How is Confidence measured, and who decides the target level?
- **Experiences**



# Confidence Building A Matter of Degree

A vertical bar on the left side of the slide, transitioning from red at the top to green at the bottom, with a thin white border.

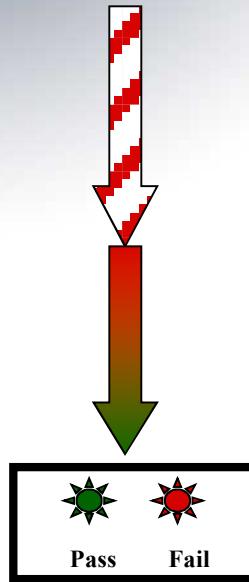
- **Face Value**
  - Acceptance of a declaration without confidence building measures. (e.g. Strategic Offensive Reductions Treaty/Moscow)
- **Transparency**
  - Largely voluntary measures to facilitate mutual understanding, easing tensions and reducing misperceptions.
- **Verification**
  - Measures with the purpose of establishing the degree of compliance with, or the violation of, the specific terms of an agreement.



# Confidence Building Relationships and Collaborations

- **UK-US**
  - Mutual Defense Agreement of 1958, as amended
  - EIVR-58 Authentication Workshop, 9-12 March 2009
  - Tamper Indicating Devices Workshop, 13-17 March 2009
  - Joint exercises
- **Russia-US**
  - Warhead Safety and Security Exchange (WSSX) engagement
  - Science and Technology collaborations

# Confidence Building Technologies



- **Sensing and Identification**
  - Warhead and material characteristics measurement
    - Radiation, explosives, weight, size, shape
    - Identification of materials or warhead
- **Information Barriers**
  - Protection of classified information
- **Authentication**
  - Hardware/Software methods and tools
  - Tamper Indicating Devices/Enclosures
  - Data Communications and Cryptography
  - Systems
- **Integrated processes**
  - Design through disposition
  - Certification, Authentication, Item Custody



# Issue Measuring Confidence

- **Measures taken will balance between**
  - confidence
  - financial resources
  - time
- **How is confidence defined?**
  - Political viewpoint
  - Technical viewpoint
  - Others?

There is a need for effective political – technical interpretation and feedback capabilities in preparation for and during negotiations.



## Up Next

- **Verification of Disarmament**
  - Dr. Kevin Seager
- **Warhead Monitoring**
  - Robert (Dusty) Rhoades, Col USAF, Ret