

# **International Nuclear and Radiological Threat Reduction**

## ***role of radiation measurements***

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# Presentation Outline

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- **National Security Issues: What is the problem?**
- **Strategies to Combat WMD Proliferation**
- **Demand Reduction Strategies – New Initiatives**
- **Sandia's Global Security Programs**
- **Update on RMCC Project**



# What's the Problem? What's the Solution?



- “. . .by developing atomic energy for peaceful uses, you reach the nuclear weapon option. There are not two atomic energies.”

David Bergman, former Chair, Israeli Atomic Energy Commission

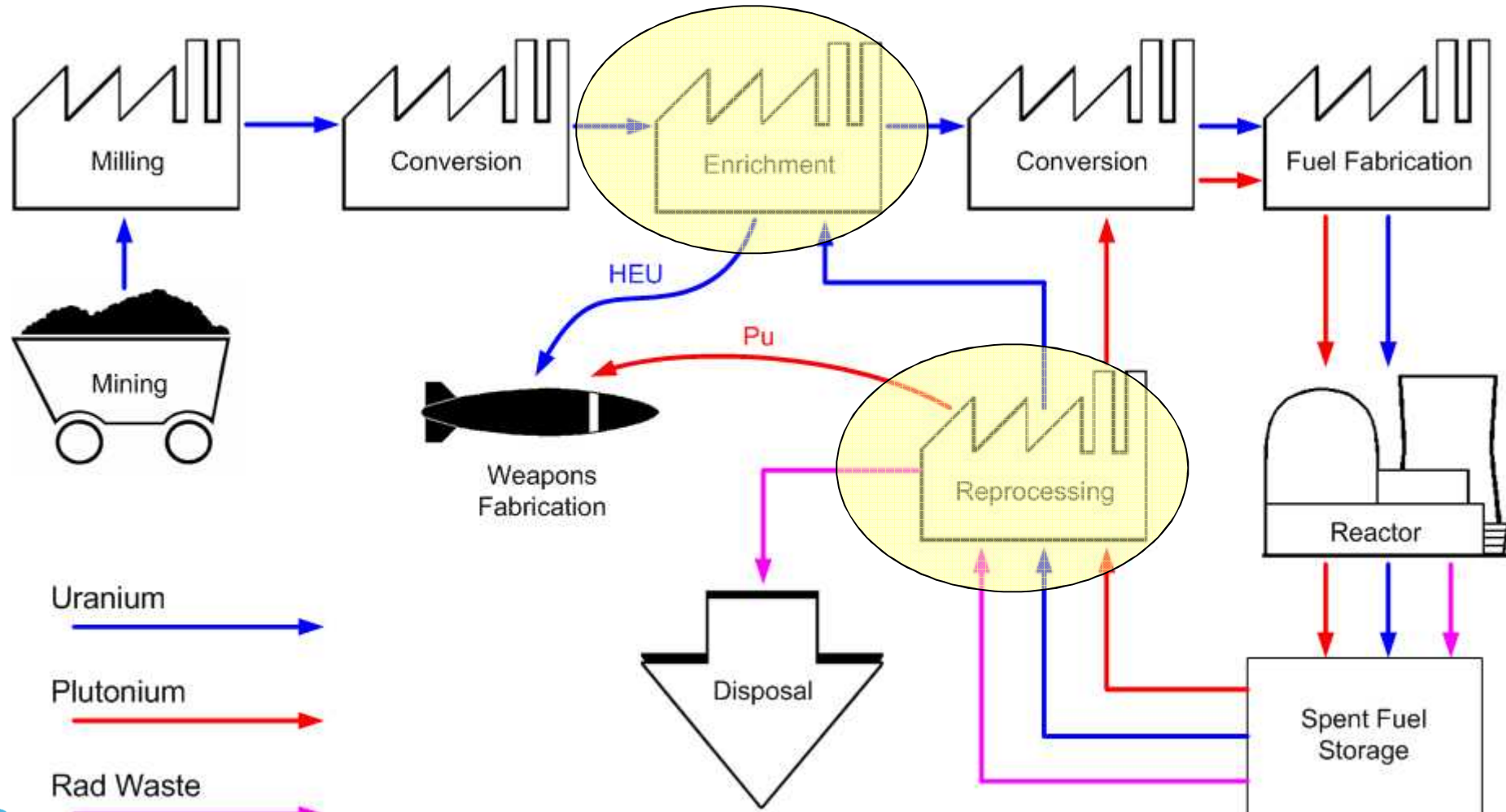
- Goal: Reduce the risk that states can acquire the capabilities to develop nuclear weapons; Maintain a separation between peaceful and non-peaceful uses of nuclear energy
  - Reduce the risk that states might believe that their neighbors were acquiring the capabilities to develop nuclear weapons
- Elements of a nuclear weapons capability
  - Material
  - Technology
  - Expertise
  - Motivation
- Solutions
  - Restrict access to key elements
  - Monitor the use of key elements
  - Reduce the motivation

*Restricting the  
dispersion of sensitive  
materials and  
technologies can limit  
opportunities and  
reduce misperceptions*

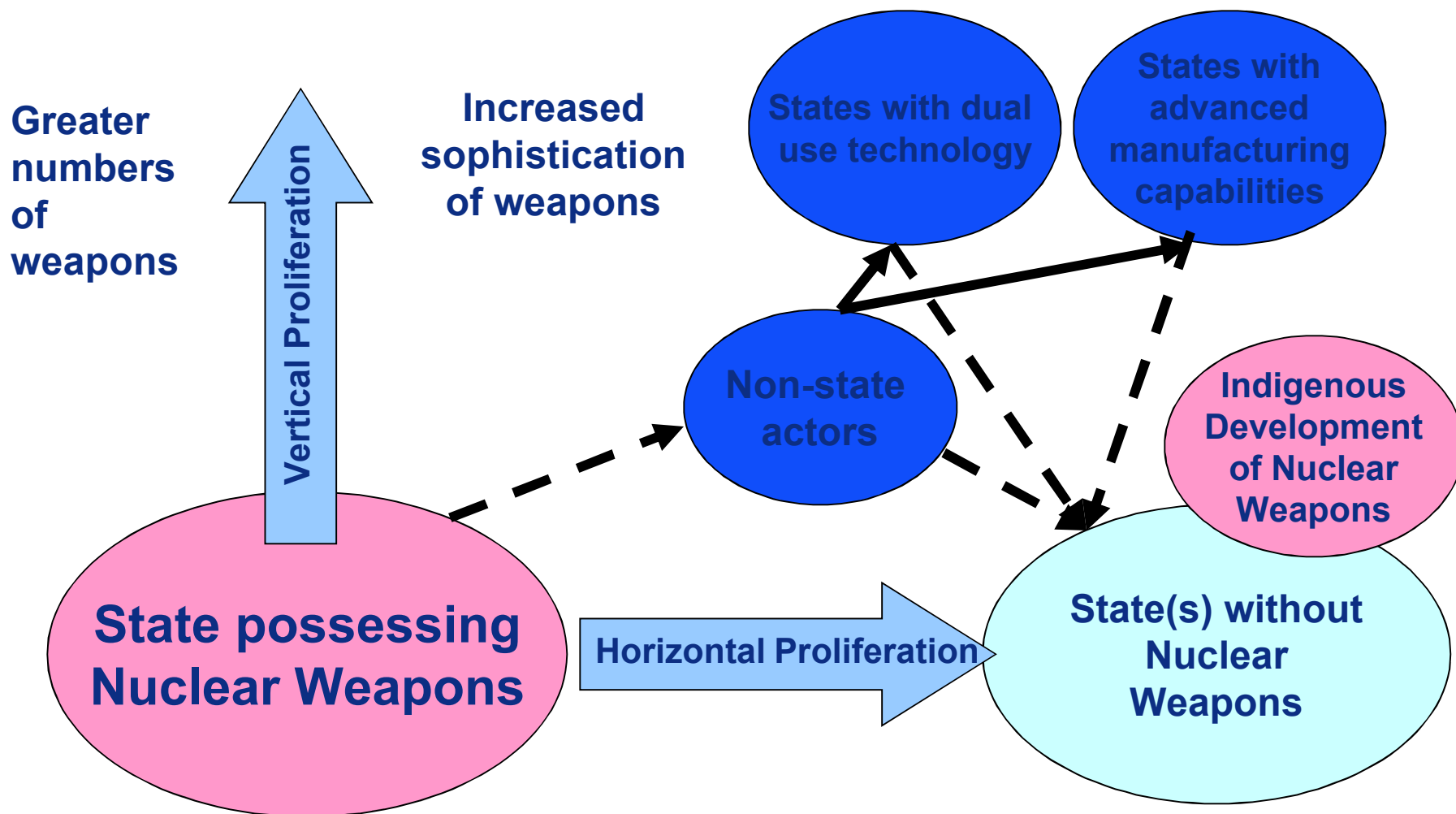


# The Civilian Nuclear Fuel Cycle: A Review

Plutonium and high-enriched uranium might be used to produce nuclear weapons.



# A New Kind of Proliferation (?)





# Middle East Geo-Political Background



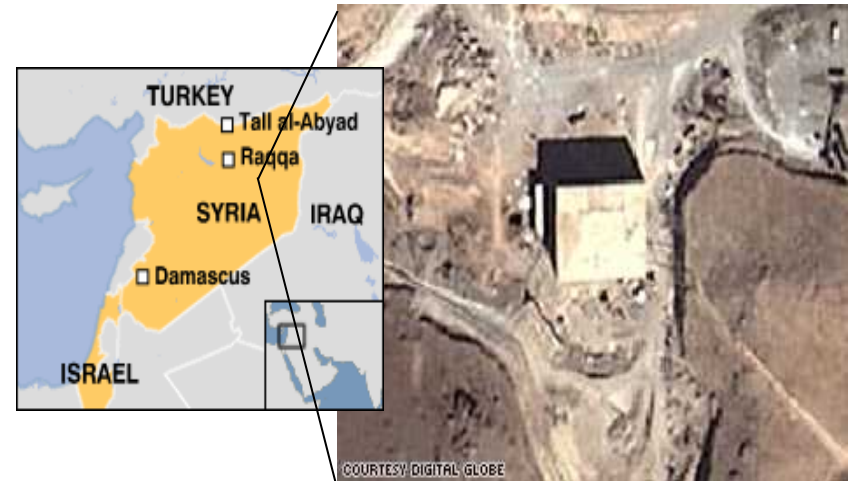
# National Security Issues in the Middle East

## **Robert Gates on Iraq**

*Developments in Iraq over the next year or two will, I believe, shape the entire Middle East and greatly influence global geopolitics for many years to come.*  
December, 2006

### ● Issues:

- Stabilization of Iraq and Afghanistan
- Israeli Arab Conflict
- WMD Proliferation
- Terrorism and Failed States
- Energy Security
  - ◆ Fossil fuels
  - ◆ Nuclear energy
  - ◆ Renewable energy
- Resource Management (e.g. water)



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# General Strategies for Dealing with CBRN Threat

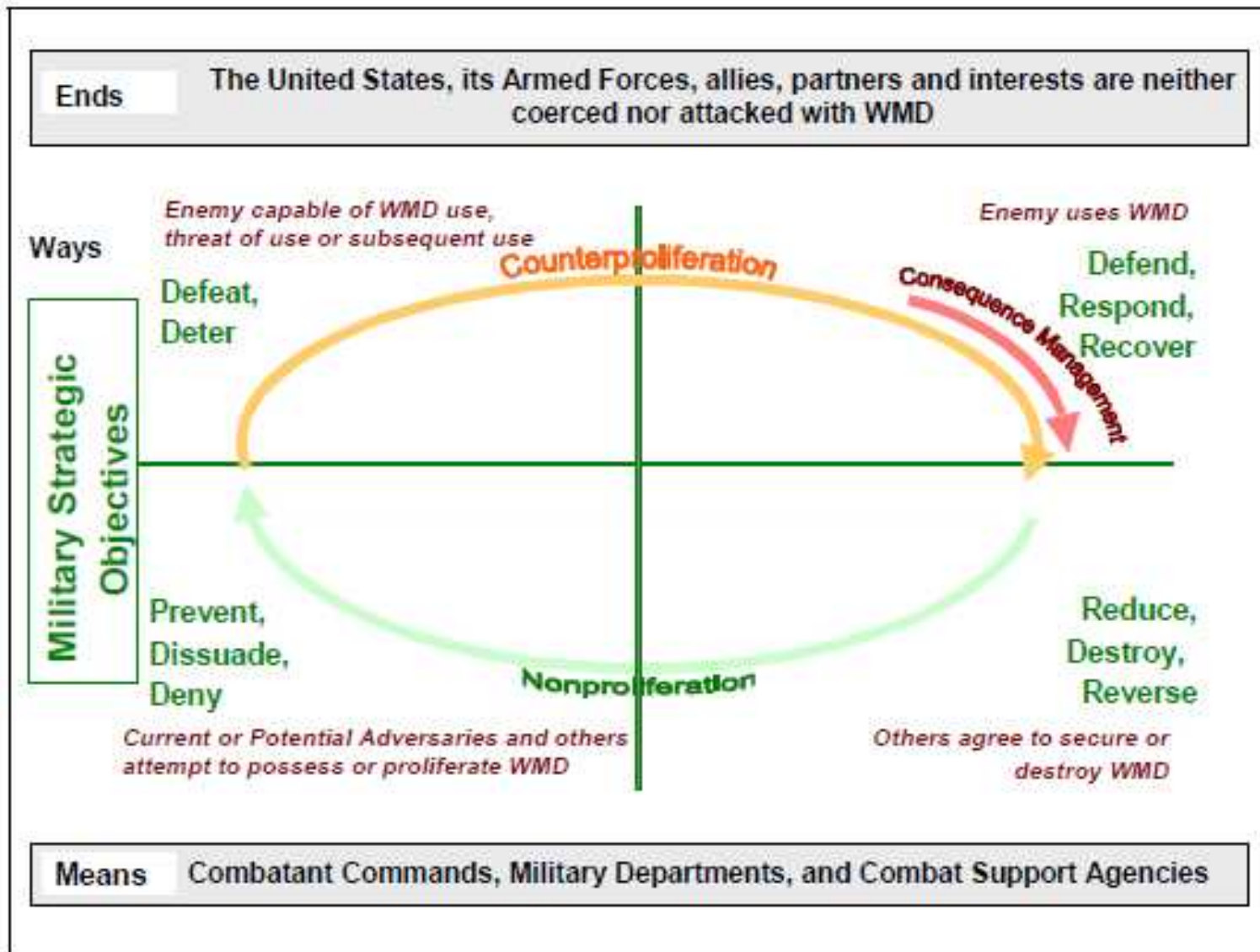


**Workshops, Analytical Studies, Visiting Scholars, Capacity Building, and Technical Projects are tools that can be deployed to implement these strategies**



# Strategic Military Framework

## National Military Strategy for Combating WMD



# Presentation Outline

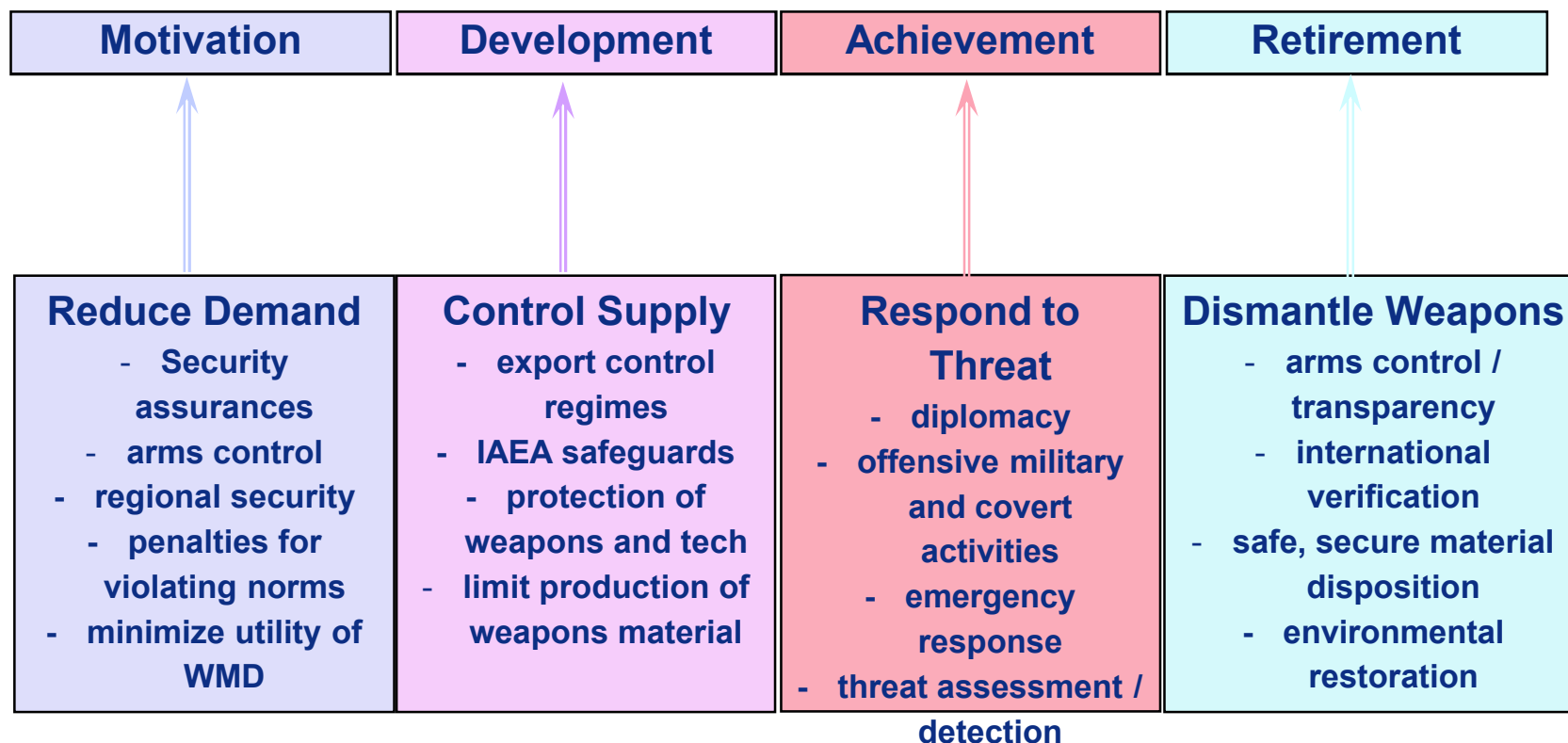
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# Different strategies for dealing with proliferation

## Stages in Proliferation



Strategies to **prevent**, **rollback**, or **mitigate** consequences of proliferation

# What motivates countries to develop nuclear weapons?



- **Security**

- Nuclear weapons are considered to be an effective deterrent against nuclear and non-nuclear enemies.

- **Prestige**

- States that possess nuclear weapons have greater influence across a range of forums (e.g., permanent membership in UNSC)

- **Power**

- Nuclear weapons confer inordinate destructive and political power and can give weak states global influence.



# Can approaches to reducing demand be tailored according to the “connectivity” of states to global systems and institutions?

Connected	Marginally Connected		Disconnected	
Japan South Korea Germany Sweden Canada Italy Australia New Zealand .....	Argentina Brazil South Africa Egypt Jordan Bangladesh	Indonesia Vietnam Thailand Malaysia Saudi Arabia Qatar Kenya Nigeria .....	Libya Columbia Algeria Iran Iraq	Somalia Sudan Syria Afghanistan DPRK

Possible “connectivity” categorization scheme

# Connected States: Assuring Continued Commitment to Nonproliferation Norms

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- **Address regional security concerns**
  - **Resolve DPRK nuclear standoff**
  - **Reinvigorate US security alliances in East Asia**
  
- **Refrain from further restrictions on nuclear fuel cycle technology**
  - **High dependence on nuclear energy**
  - **Outstanding record on compliance with nonproliferation norms**

## **Marginally Connected States: Strengthen commitments to nonproliferation norms and accelerate global connectivity**



- **Nuclear weapon states act to decrease the perceived value of nuclear weapons**
- **Nuclear weapon states act to increase prestige of “connected” non-nuclear weapon states**
- **All “connected” states act to raise status of non-nuclear, non-weapons technology as symbol of technological excellence**
- **“Connected” states developed nonproliferation partnerships with “marginally connected” states**
- **Assist “marginally connected” states acquire nuclear power in ways that reduce proliferation risk**
- **Consider providing security assurances in key regions**

## Disconnected States: Decreasing support (tacit or explicit) for terrorist organizations or black-market networks

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- **Build capacity of legitimate governments**
  - Governance
  - Public health
  - Security for citizens
  - Border control
  
- **Accelerate global connectivity**
  - Military to military partnerships
  - Educational partnerships
  - Economic partnerships

# Four Mission Areas

- Nuclear Weapons
- Defense Systems and Assessments
- Energy, Resources, and Nonproliferation
- Homeland Security and Defense



*Helping our nation  
secure a peaceful  
and free world  
through technology*



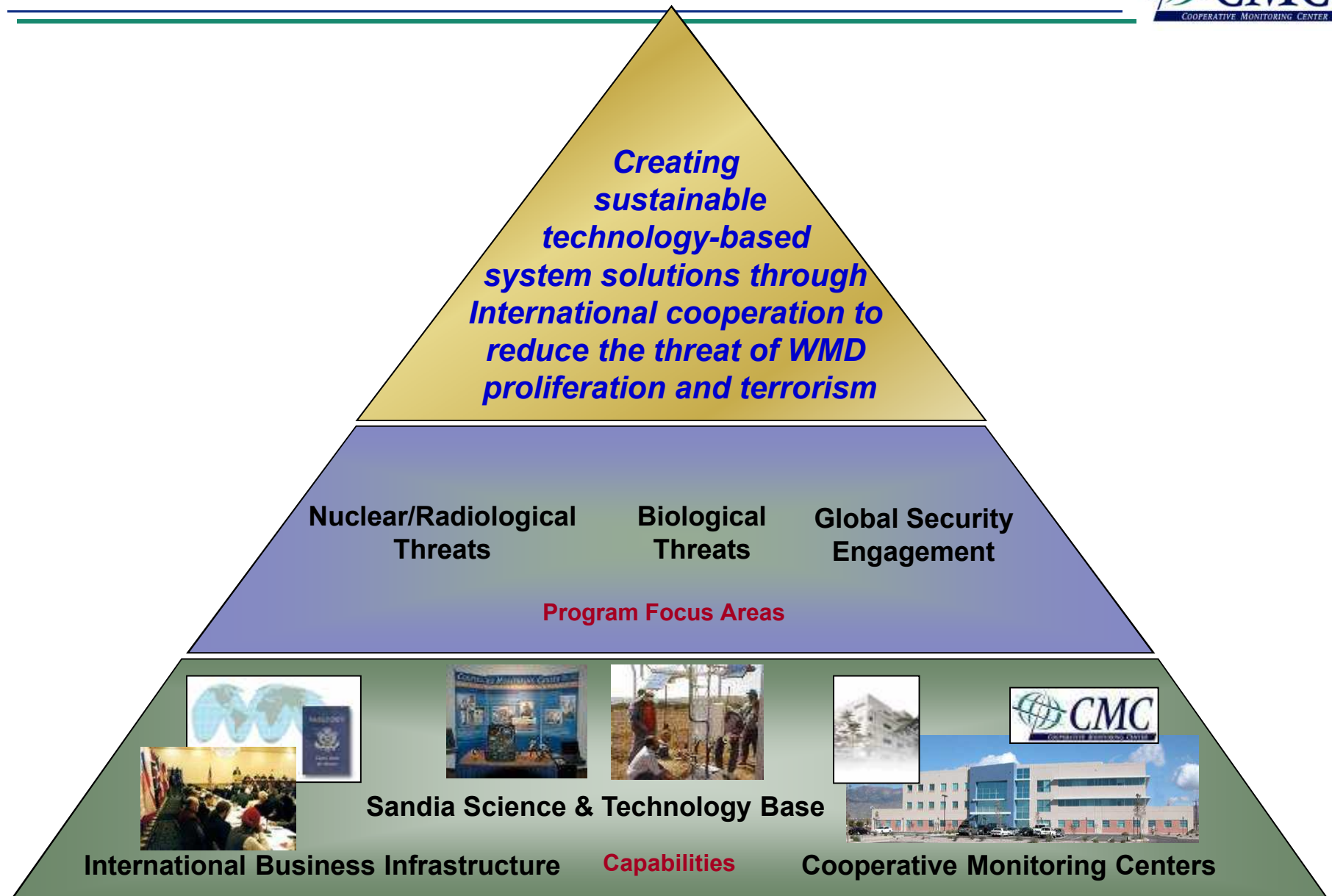
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# Global Security Programs



# Cooperative Monitoring Centers (CMC)



*Enabling International Technical Cooperation on Critical Security Issues*

**Technology integration  
and operation**

**Technology testing  
and demonstration**

**Technology training  
courses and workshops**



**Technical collaborations  
and experiments**

**Visiting scholars program,  
research, and analysis**



- CMC in Amman

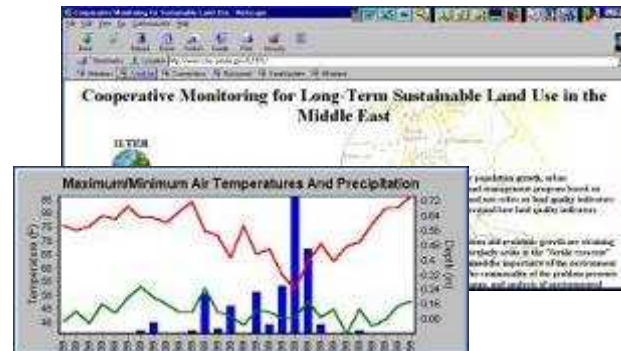
- Sister center to CMC in Albuquerque: *Providing indigenous solutions to local problems*

- Technical Collaborations

- Middle East Disease Surveillance
- Radiological Source Security
- Natural Resources Studies
- Water Security
- Border Cooperation
- Radiation Measurements Standards
- Energy Security and the Role of Nuclear Energy



Director Maj. Gen. (ret) Mohammad Shiyyab and Prince Rashed at CMC-Amman Grand Opening October 16, 2003



Sustainable Land Use Project



Explosives detection portal



# Confidence Building and Engagement in the Middle East



- **Radiation Measurements Cross Calibration (RMCC) Project**

- Develop a network of scientists and labs that can devise indigenous solutions to issues such as proliferation monitoring, environmental assessments, emergency response, and radioactive materials smuggling
- Partnered with the IAEA, CTBTO, DOE/MAPEP
- Workshops in Kuwait, Qatar, and Oman
- Next workshop planned for April/May in Bahrain or Kuwait – Self supported, Professional Society, Early Warning System

- **Middle East Track II Policy Dialogue**

- Participate in the UCLA track II meetings on the ME regional security (technical cooperation working group)
- NDU Regional Network of Strategic Studies Centers in the Middle East and South Asia – Border Security and WMD, and Non Traditional Security working groups
- Conduct Studies (NA24 Policy Office)



First RMCC Workshop, Kuwait, October 2004



Second RMCC Workshop, Doha, Qatar, November 2005



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# Radiation Measurements Cross Calibration (RMCC) Project

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- **All countries in the Middle East have radiation measurement capabilities associated with:**
  - **Power and research reactors**
  - **Radioactive sources in medicine, commerce, industry**
  - **Responding to accidental or intentional radiation releases**
  - **Environment, health and safety**
  - **Detecting the presence of radioactive sources**
  - **Preventing the illicit use of radiological materials**
  - **Disposing of radioactive sources**
- **Improving and standardizing nuclear monitoring and measurement capabilities in the Middle East are essential elements of developing an approach to such concerns**

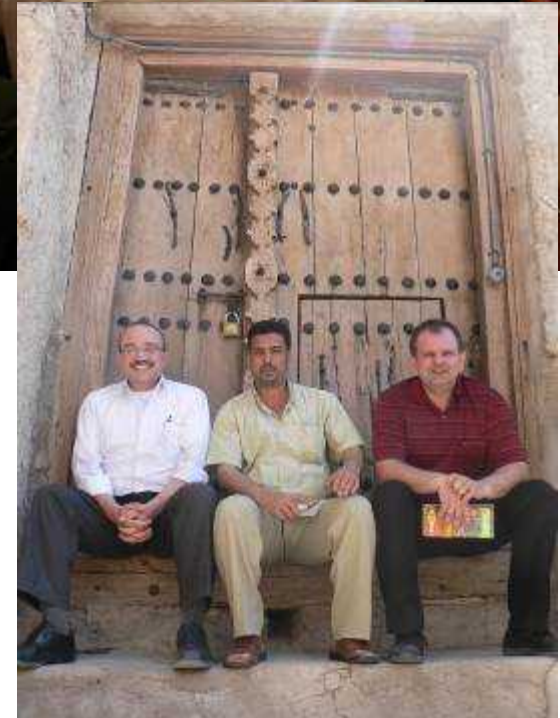
- **As a first step, develop a set of internationally recognized standards for laboratory radiation measurements in the Middle East**
- **The project consists of**
  - **Signup for the DOE proficiency testing program (MAPEP)**
  - **Receive test samples**
  - **Analyze and report**
  - **Follow-up with regional workshops to discuss the results and identify technical assistance needs**
  - **Participate in targeted studies by the IAEA labs in Seibersdorf**
  - **Annual workshops**

- Co-hosted by the Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR), Muscat, Oman, April 2007
- Participation from Kuwait, Bahrain, Iraq, Qatar, Oman, Jordan, and Yemen



# 2007 RMCC Workshop Results

- Discussed MAPEP Results
- Presented IAEA proficiency testing in sea water
- Discussed a network of Air Monitoring stations
- Reviewed Radiological Threats, Laboratory Quality Assurance and Quality Control
- Improved communications: email server and web site
- Discussed regional ownership (GCC / ALAEA)



# 2008 RMCC Workshop

- Co-hosted by University of Bahrain, March 2008
- Participation from Kuwait, Bahrain, Iraq, Qatar, Oman, Jordan, and Saudi Arabia



# 2008 RMCC Workshop Results

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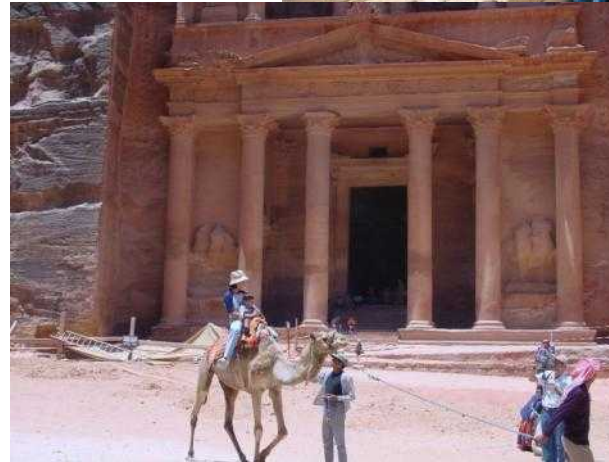


- Discussed MAPEP Results
- Discussed Methods for U Measurements
- Reviewed Radiological Threats, Laboratory Quality Assurance and Quality Control
- Improved communications: email server and web site
- Discussed regional ownership (GCC / AAEA)



# The RMCC Future?

- **Next Annual Workshop Organizer?**
  - IAEA/ALMERA Meeting, Budapest, Nov 2009
  - Regional Meeting, UAE or Jordan, Spring 2010
- **Regional Ownership**
  - GCC
  - Arab Atomic Energy Agency
- **A Professional Society**
  - Middle East Radiological Society?



# Thank You