



Homeland
Security

Nuclear Security Overview

Module A

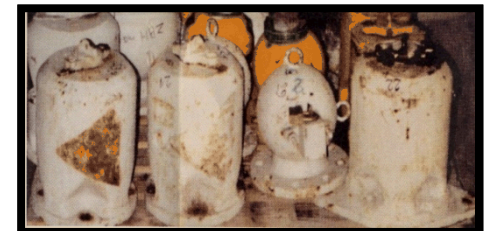
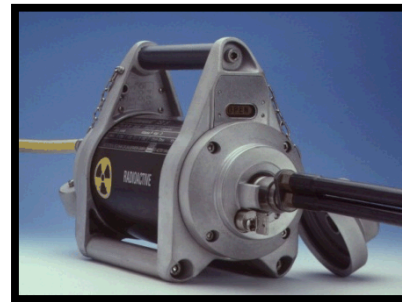
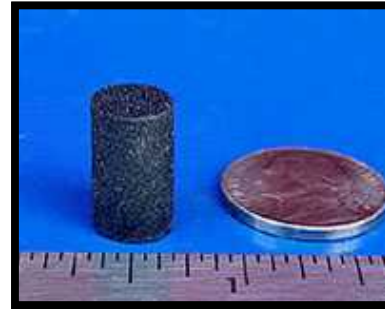
Module Objectives

Participants will become familiar with nuclear security fundamentals, including:

- Nuclear and other radioactive materials
- Nuclear security threats and consequences
- Components of an effective national nuclear security regime
- IAEA Nuclear Security Series

What Are the Materials?

- Nuclear materials (uranium, plutonium and thorium in different forms)
- Radioactive sources
- Radioactively contaminated materials



Common Legal Uses

Medicine



Industry



Nuclear Energy



Research



Research reactors



Storage & disposal

Threat

- Threats can be internal or external
- Person or group of persons with motivation, capability, and intent to:
 - Steal nuclear or other radioactive materials
 - Sabotage nuclear facilities or radioactive material facilities
 - Use nuclear or other radioactive materials in attacks against populations or strategic locations

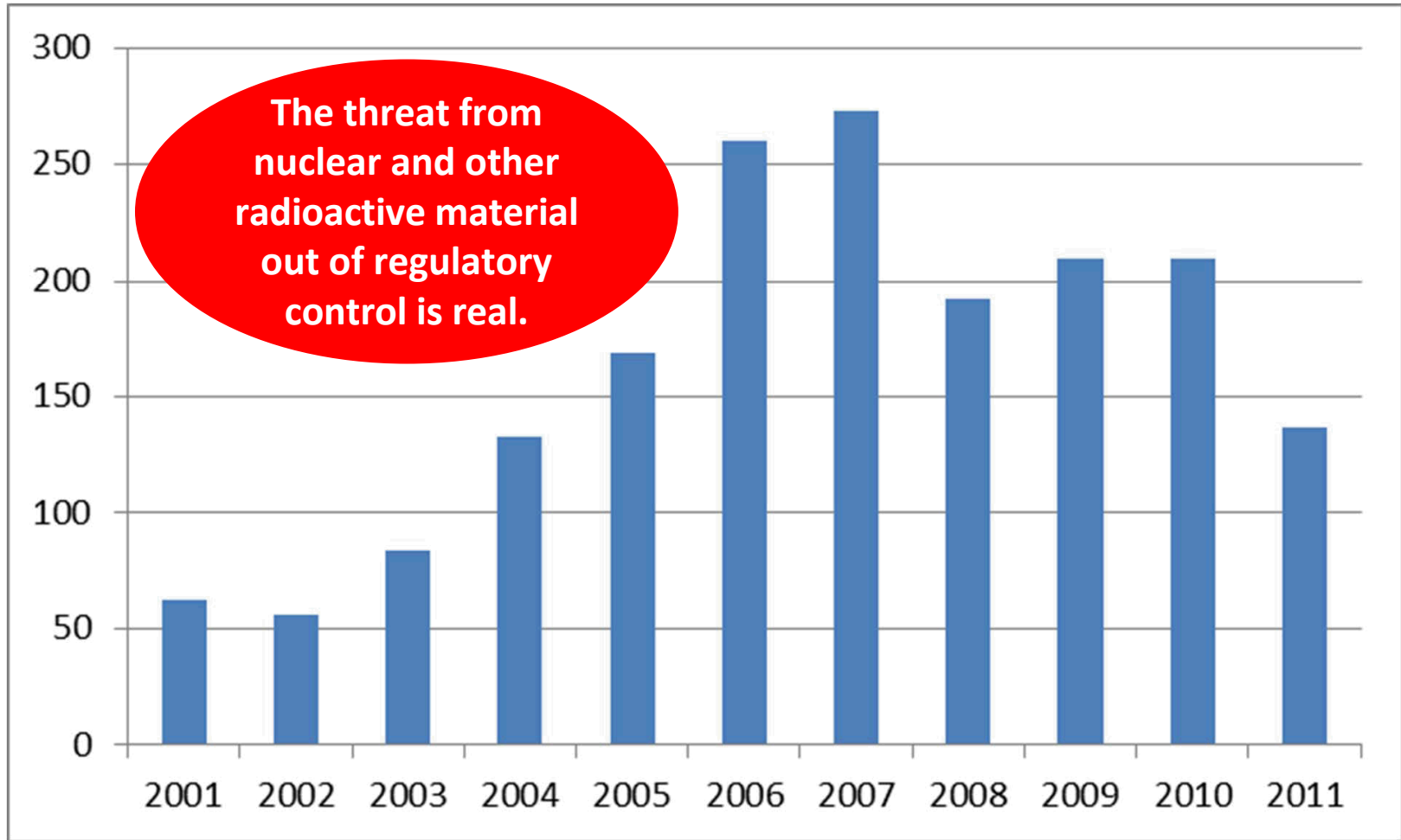


Potential Nuclear Security Threats

- Use of nuclear or other radioactive material in an explosive device
 - Nuclear explosive device
 - Radiological dispersal device (RDD)
- Use of material to cause damage, injury, or death through exposure to radioactivity
 - Radiological exposure device (RED)
 - Contamination of food, water or air
 - Sabotage of a facility or material in transport to cause dispersal of radioactivity

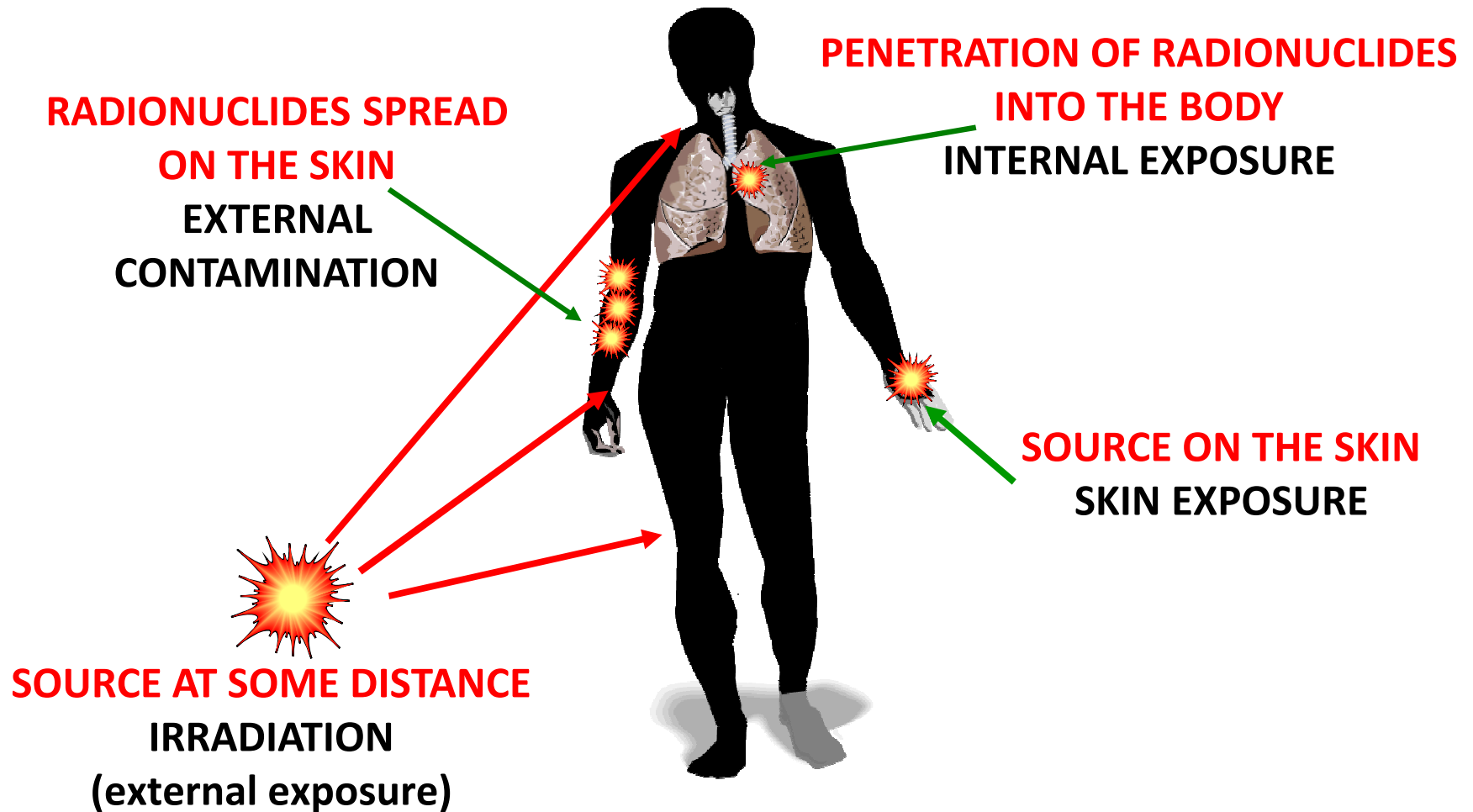


Illicit Trafficking Database



Incidents Reported Per Year

Health Effects of Radioactive Materials



Health Effects (cont.)

- Deterministic, short term effects appear within days to weeks of exposure to very high dose rates and might include:
 - Burns
 - Organ/tissue damage
 - Radiation sickness
- Stochastic, long term effects take months or years to appear and might include:
 - Cancer
 - Genetic effects



Other Consequences

- Psychological
- Environmental
- Economic
- Social
- Political



Nuclear Security



Prevention



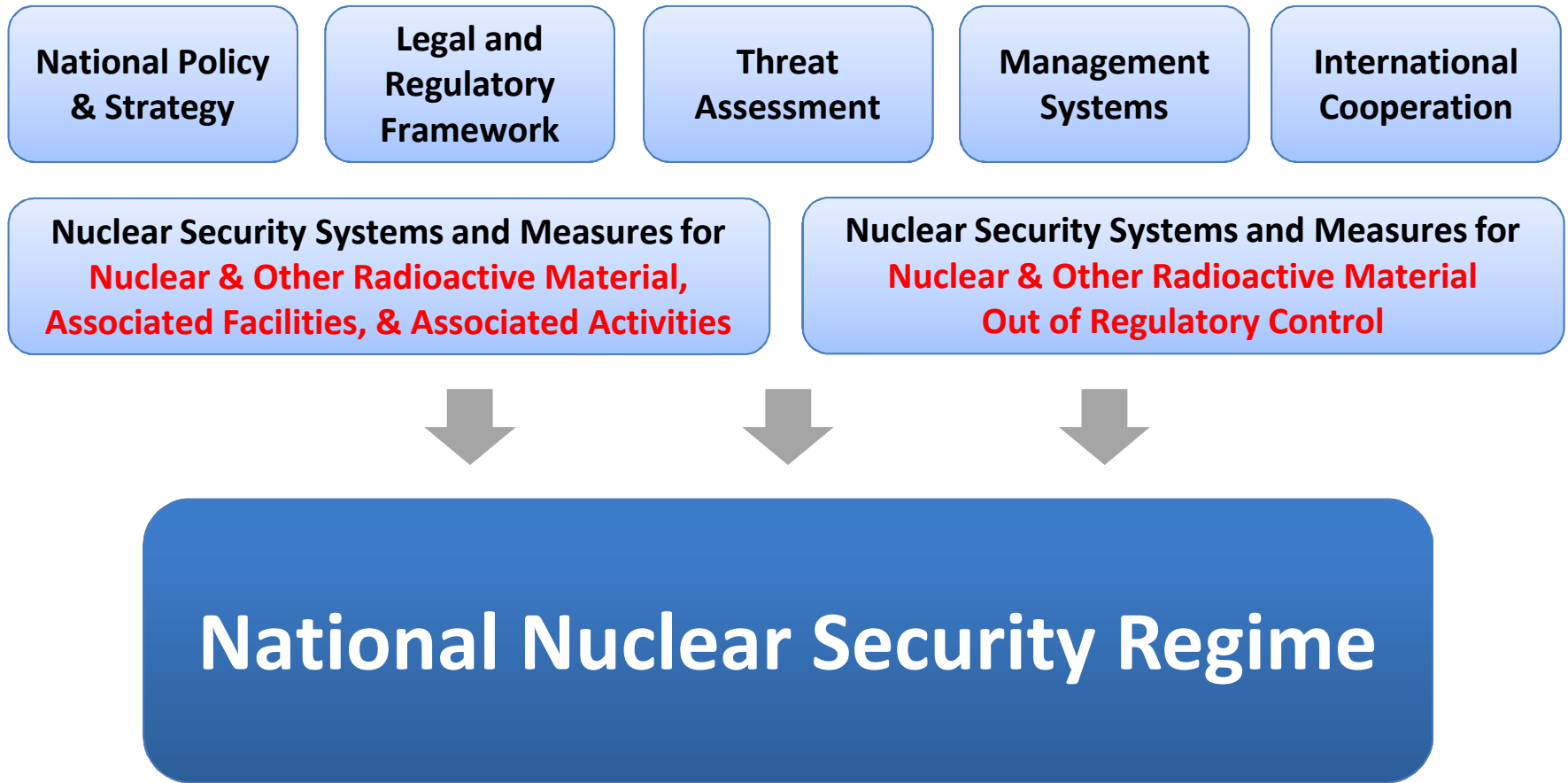
Detection



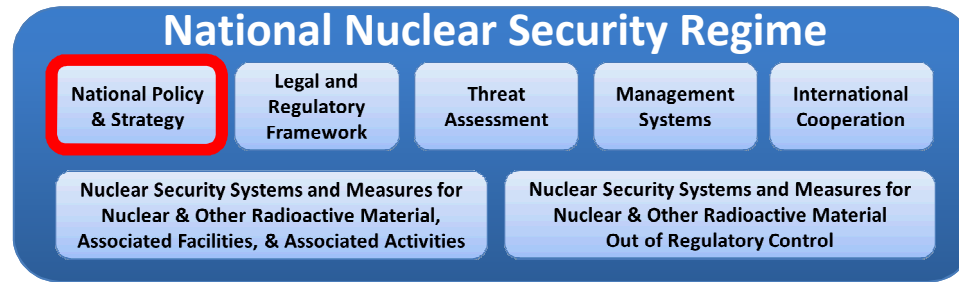
Response

...of theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.

Components of an Effective National Nuclear Security Regime

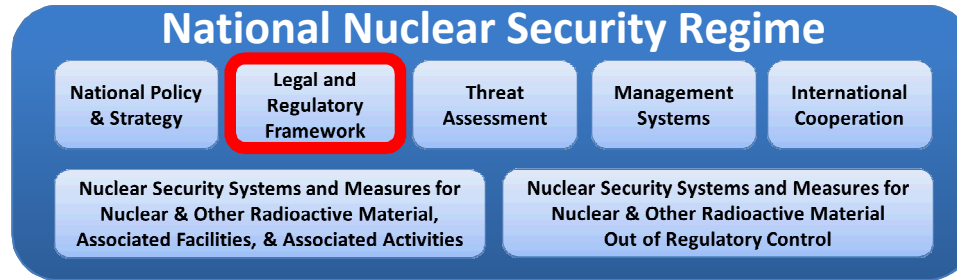


National Policy & Strategy for Nuclear Security



- The national strategy for nuclear security should:
 - Be based on the State’s overarching national security strategy
 - Identify all competent authorities that have a role in nuclear security infrastructure
 - Establish a coordinating mechanism among competent authorities
 - Establish the policy for bilateral, regional and international cooperation and assistance.

Legal and Regulatory Framework for Nuclear Security

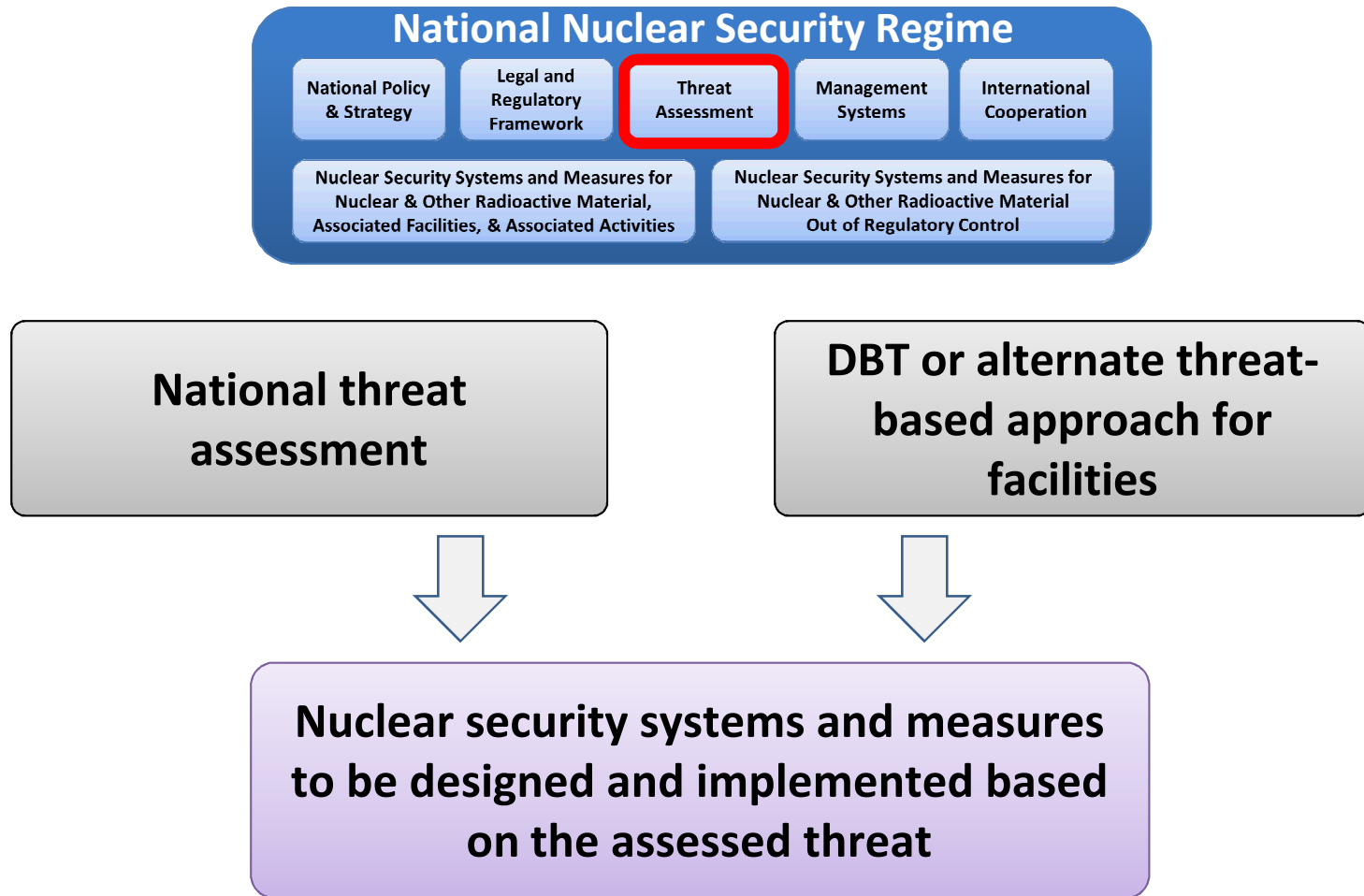


- States should become parties to relevant international legal instruments and be aware of obligations imposed by binding UN resolutions
- Legal framework should establish the functions and powers of all competent authorities, including regulatory body
- The regulatory framework should include:
 - Regulatory body with adequate legal authority and appropriate functional and financial independence
 - Established nuclear security regulations, requirements, and associated procedures for evaluating applications and granting authorizations or licenses
 - Established systems to account for or register and effectively control and protect nuclear and other radioactive material
 - Established regulations and requirements for protecting sensitive information and sensitive information assets

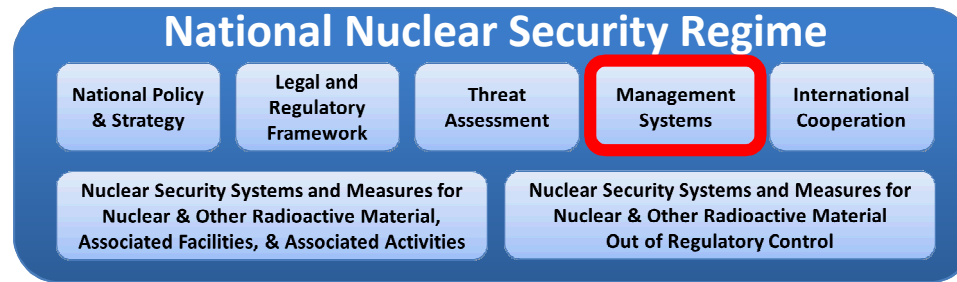
Legal and Regulatory Hierarchy



Threat Assessment for Nuclear Security

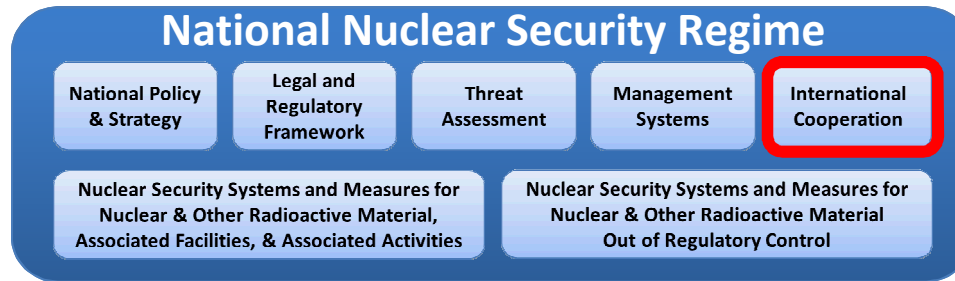


Management Systems for Nuclear Security



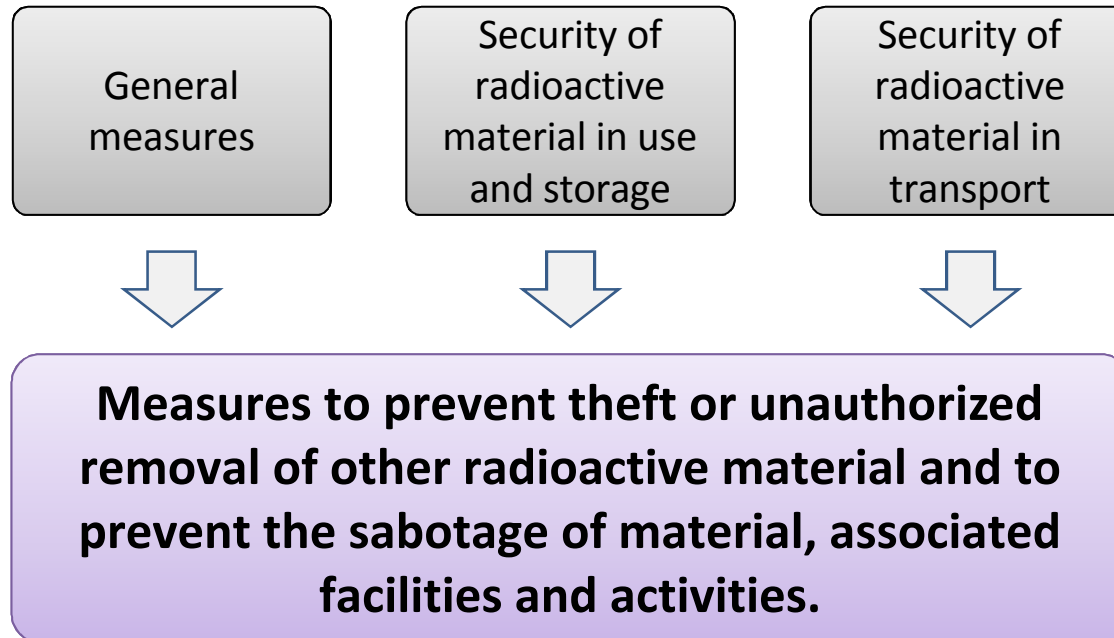
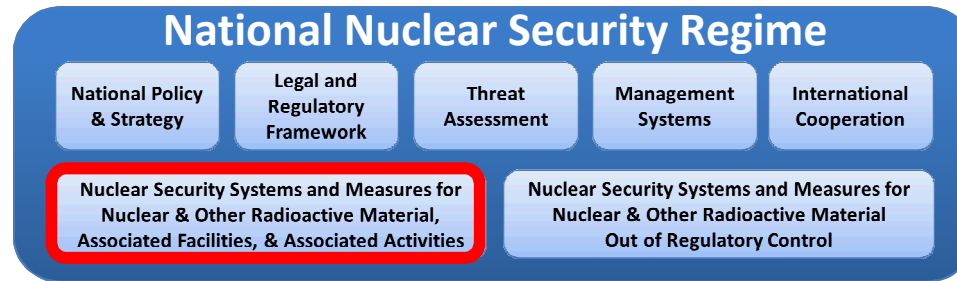
- Integrated Management System
- Protection of Sensitive Information
- Trustworthiness of Personnel
- Human Resources for Nuclear Security
- Promotion of Nuclear Security Culture
- Sustaining the Nuclear Security Infrastructure

International Cooperation

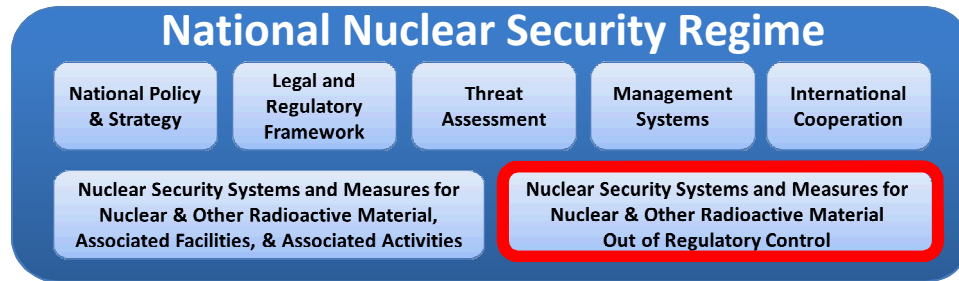


- The global implications of a nuclear security event underlines the importance of international cooperation and assistance
- Cooperation and assistance includes:
 - Notification of nuclear security events
 - Exchange of information
 - Recovery and return of seized items
 - Technical cooperation and assistance

Nuclear Security Systems & Measures for Nuclear & other Radioactive Material, Facilities, & Associated Activities



Nuclear Security Systems & Measures for Nuclear & other Radioactive Material Out of Regulatory Control



Prevention:

- Deterrence
- Information security
- Trustworthiness

Detection: (Course Material)

- Detection by instrument alarms
- Detection by information alert
- Initial assessment of alarms/alerts

Response:

- Assessment of alarms/alerts
- Crime scene management
- Nuclear Forensics
- National response plan
- Preparedness
- Notification

Deterrence

Preventative Measures

- Criminalization of acts with appropriate punishment (consistent with international instruments)
- Nuclear forensics to determine origin and history of material and link samples to people, places and events
- Public dissemination of appropriate information
 - Detection capability
 - Threat environment
 - Punishment

Information Security

Preventative Measures

- Define national policy and legal framework for protecting sensitive information
- Define information and assets that should be protected
- Implementation of a policy by all competent authorities
- Establish rules for communication and dissemination of information

Should ensure that law enforcement, responders and other authorities have access to sufficient information to perform their duties



Trustworthiness

Preventative Measures

- Ensure trustworthiness of personnel through a formal process
- Revalidate regularly
- Implement nuclear security culture

Will assist in reducing the risk of authorized personnel engaging in illegal activities



Assessment of Instrument Alarms and Information Alerts

Response Measures

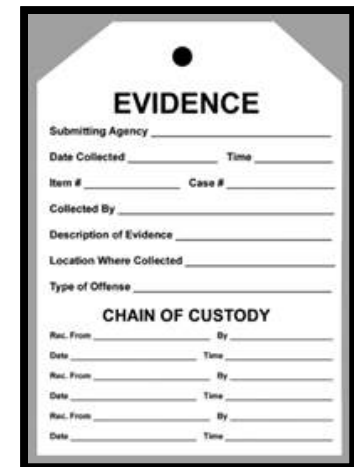
- Define roles and responsibilities of experts and support organizations for assessment
- Establish procedures and protocols for final resolution of alarms/alerts
- Activation of national response plan if determined that a nuclear security event has occurred



Crime Scene Management

Response Measures

- Manage the location of a nuclear security event as a potential crime scene
- Ensure coordination of those:
 - Recovering control over the material
 - Concerned with safety and treating victims
 - Gathering evidence
- Persons involved should be suitably qualified and trained
- Ensure plans for proper and timely dissemination of information to the media



EVIDENCE

Submitting Agency _____

Date Collected _____ Time _____

Item # _____ Case # _____

Collected By _____

Description of Evidence _____

Location Where Collected _____

Type of Offense _____

CHAIN OF CUSTODY

Ret. From _____ By _____

Date _____ Time _____

Ret. From _____ By _____

Date _____ Time _____

Ret. From _____ By _____

Date _____ Time _____



Nuclear Forensics

Response Measures

- Nuclear forensic techniques should be applied for the purpose of identifying the source, history and the route of transfer
- Categorize seized material on-site
- Characterize material in a designated laboratory
- Traditional forensics on contaminated evidence should also be applied in designated laboratories
- Nuclear forensics requires taking into account the preservation of evidence



National Response Plan

Response Measures

National response plan for nuclear security events should:

- Describe roles and responsibilities of competent authorities and processes for each competent authority to fulfill them
- Contain an appropriate command structure
- Have provisions for coordination among authorities
- Have arrangements for informing the media
- Have provisions for transport of recovered material
- Identify the standard operating procedures at the local level
- Take into consideration existing radiological emergency plans
- Incorporate the possibility of multiple events
- Incorporate mechanisms for requesting assistance domestically and internationally

Preparedness

Response Measures

- Periodically review, exercise and revise the national response plan
- Perform exercises and drills at regular intervals
- Consider participating in regional and international exercises and drills
- Ensure the availability of trained human resources
- Ensure the availability of sufficient resources to respond to multiple simultaneous nuclear security events

Notification of a Nuclear Security Event

Response Measures

- Notify the relevant competent authority as soon as a nuclear security event is determined
- Competent authorities should notify other relevant competent authorities, taking into account the graded approach
- Notify relevant international organizations and other States, in accordance with international agreements and/or national policy



IAEA Nuclear Security Series



Fundamentals (PRINCIPLES)

- Objectives and principles
- Basis for Nuclear Security Recommendations
- Essentials from international instruments

Recommendations (WHAT)

- General approaches, actions, concepts and strategies
- Applications of Fundamentals

Implementing Guides (HOW)

- Broad guides on how Recommendations to be applied
- Ways and means for how Recommendations implemented at systems level

Technical Guidance (DETAILS)

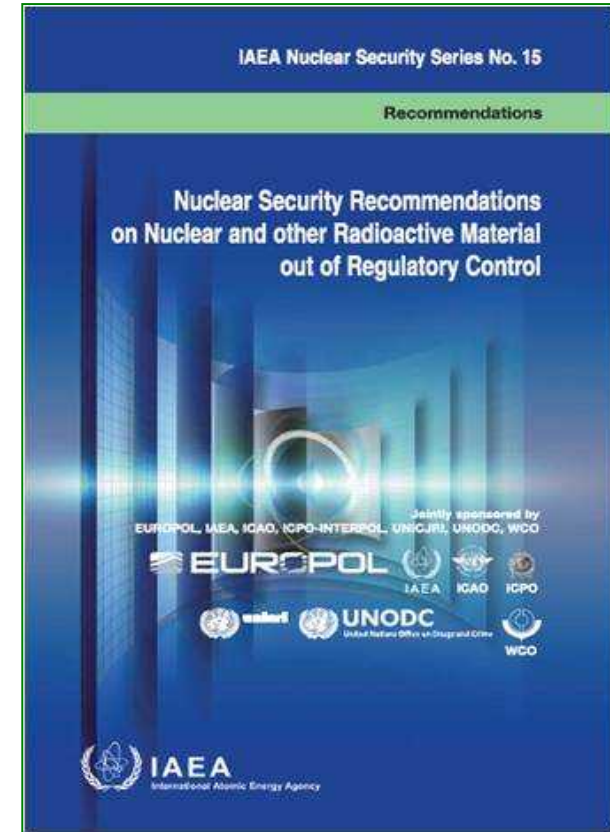
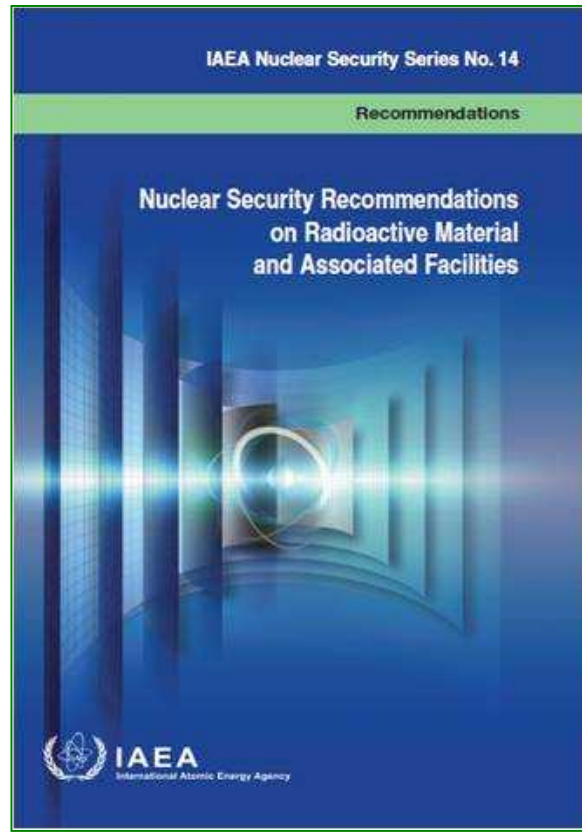
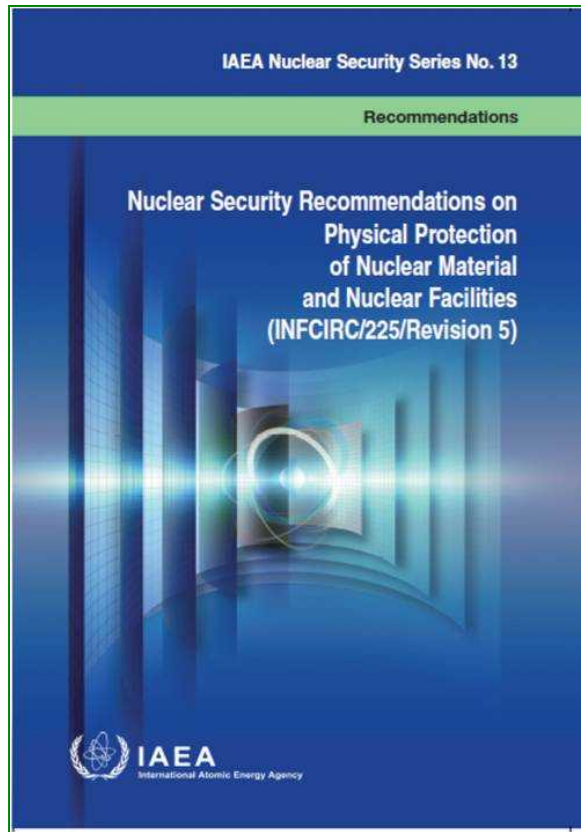
- Reference Manuals, Training Guides, Service Guides

Assists in the implementation of obligations contained in international legal instruments relevant to nuclear security

IAEA Nuclear Security Recommendations



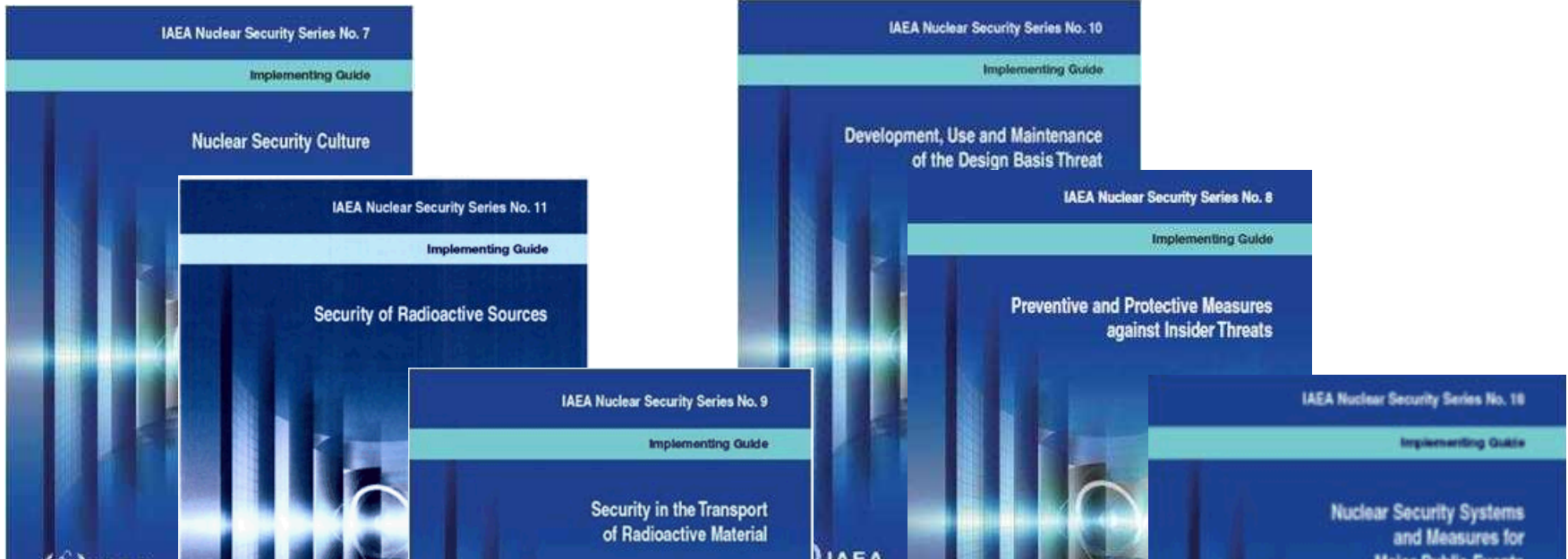
Recommendations



IAEA NSS: Implementing Guides



Implementing Guides



IAEA NSS: Technical Guidance



Technical Guidance

