Security of Radioactive Material

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Contents

- Overview of IAEA International Conference on the Security of Radioactive Material: December 3-7, 2018
- International Instrument, Cooperation & Assistance
- IAEA Code of Conduct
- IAEA Nuclear Security Series
- Nuclear Security Systems

Overview of CN-269

- Over 550 participants from more than 100 countries and 15 organizations (GICNT, World Institute for Nuclear Security (WINS))
- Six panel sessions and 25 technical sessions in five days conference.
- Sessions focused on:
  - International Instruments/Guidance- IAEA Code of Conduct and NSS
  - Securing Radioactive Material from Cradle to Grave
  - Security Systems and Measures: Physical Protection
  - Regulatory Requirements
  - Nuclear Security Culture

Important terms

- “security” means measures to prevent unauthorized access or damage to, and loss, theft or unauthorized transfer of, radioactive sources.

- “security culture” means characteristics and attitudes in organizations and of individuals which establish that security issues receive the attention warranted by their significance.

Associated Facilities and Associated Activities

Associated facility

A facility (including associated buildings and equipment) in which *nuclear material* or *other radioactive material* is produced, processed, used, handled, stored or disposed of and for which an *authorization* is required.

Associated activity

The possession, production, processing, use, handling, storage, disposal or transport of nuclear material or other radioactive material.

International Instruments

- The G-8 annual summit held in Evian, France, in June 2003 issued a statement on “non-proliferation of weapons of mass destruction — securing radioactive sources” in which it encouraged all countries to strengthen controls on radioactive sources and observe the Code of Conduct.

- IAEA Code of Conduct on Safety and Security of Radioactive Sources (2004)

Key provisions of IAEA CoC

- Every State should, in order to protect individuals, society and the environment, take the appropriate measures necessary to ensure:

(a) that the radioactive sources within its territory, or under its jurisdiction or control, are safely managed and **securely protected** during their useful lives and at the end of their useful lives; and

(b) the promotion of safety culture and of **security culture** with respect to radioactive sources.

CoC contd….

- Every State should have in place an effective national legislative and regulatory system of control over the management and protection of radioactive sources. Such a system should:

(a) place the prime responsibility for the safe management of, and the security of, radioactive sources on the persons being granted the relevant authorizations;
(b) minimize the likelihood of a loss of control;
(c) include national strategies **for gaining or regaining control over orphan sources;**

CoC contd……

(d) provide for rapid response for the purpose of regaining control over

orphan sources;

(e) foster ongoing communication between the regulatory body and users;

(f) provide for measures to reduce the likelihood of malicious acts, including sabotage, consistent with the threat defined by the State;

(g) mitigate or minimize the radiological consequences of accidents or malicious acts involving radioactive sources; and.

(h) provide for its own continuous improvement.

CoC contd…..

- Every State should establish a national register of radioactive sources. This register should, as a minimum, include Category 1 and 2 radioactive sources.
- Every State should ensure that information concerning any loss of control over radioactive sources, or any incidents, with potential trans boundary effects involving radioactive sources, is provided promptly to potentially affected States through established IAEA or other mechanisms.
- Every State should have in place legislation and regulations that:

(a) prescribe and assign governmental responsibilities to **assure** the safety and **security** of radioactive sources;

Commitment (legally non-binding)

- that have a made a political commitment with regard to the Code of Conduct on the Safety and Security of Radioactive Sources,
- that have notified IAEA of their intention to act in accordance with the Guidance on the Import and Export of Radioactive Sources,
- that have nominated a Point of Contact for the purpose of facilitating the export and/or import of radioactive sources,
- that have made available their responses to the Importing and Exporting states Questionnaire.
- that have notified IAEA of their commitment to implement the Guidance on the Management of Disused Radioactive Sources.

Nuclear Security Series

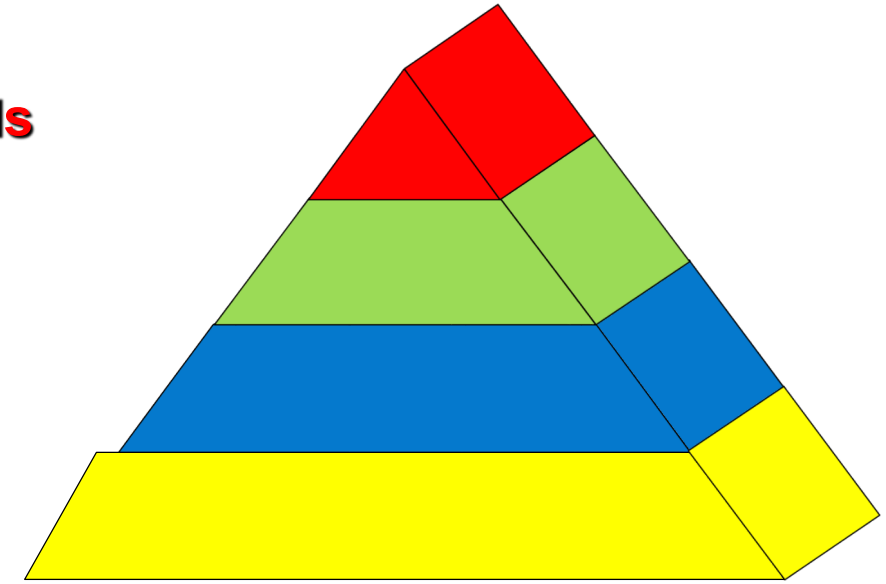
Based on the International instruments for nuclear security

Security Fundamentals

Recommendations

Implementing Guides

Technical Guides



The Nuclear Security Series, developed in close consultation with Member States' experts, are consistent with and complement international nuclear security instruments, and bring together best practices acceptable to the international community for broad implementation.

The Nuclear Security Guidance Committee, open to all Member States, makes recommendations on the development and review of the Nuclear Security Series.

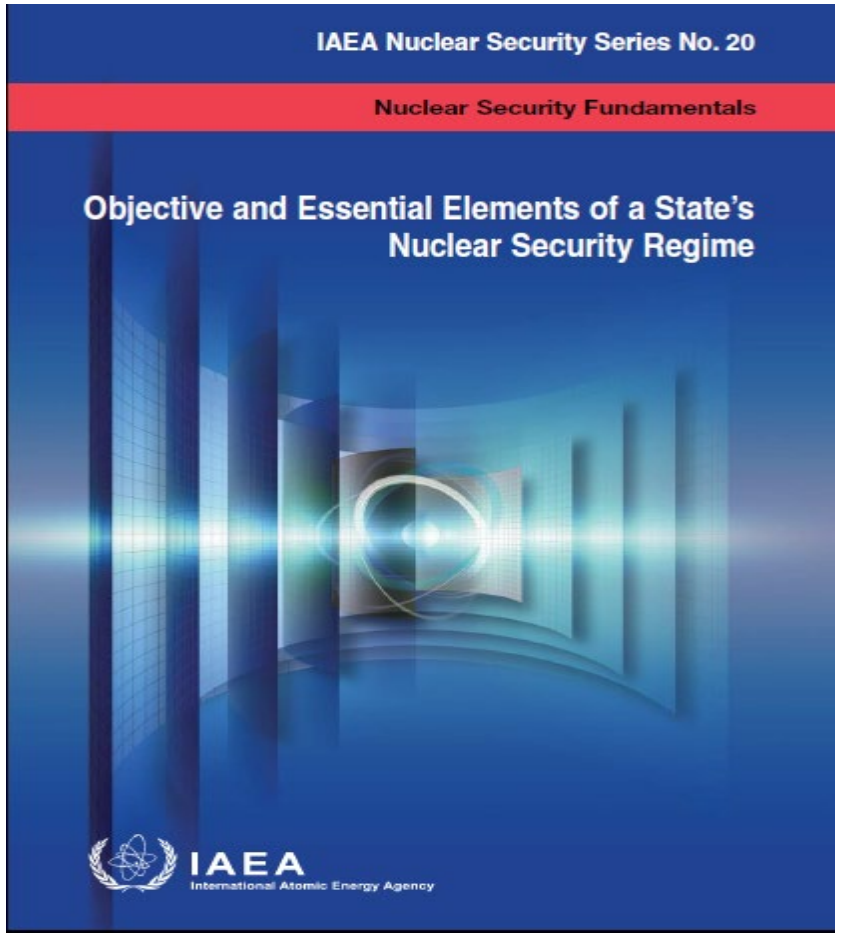
26 Documents published.

http://www-pub.iaea.org/MTCD/publications

Nuclear Security Series

- **Fundamentals** (**PRINCIPLES**)
  - Objectives and principles
  - Essentials from international instruments
- **Recommendations** (**WHAT**)
  - General approaches, actions, concepts and strategies
  - Applications of Fundamentals
- **Implementing Guides** (**HOW**)
  - Ways and means on how Recommendations are to be applied and implemented at systems level
- **Technical Guidance** (**GUIDANCE**)
  - Reference Manuals, Training Guides, Service Guides

NUCLEAR SECURITY FUNDAMENTALS: NSS-20



- Purpose - overall objectives and essential elements
- Intended for a broad audience - national policy makers, legislative, competent authorities, institutions, and individuals
- Applies to all radioactive material
- Aims to prevent criminal and intentional unauthorized acts involving radioactive material

IAEA Nuclear Security Series

1- Responsibility rests with the State by establishing, implementing, maintaining and sustaining a nuclear security regime applicable to nuclear material, **other radioactive material, associated facilities, and associated activities** under a State's jurisdiction.

2-Identification and definition of nuclear security responsibilities

3-Legislative and regulatory framework

4-International transport of nuclear material and other radioactive material

Fundamentals contd….

5- Offences and penalties including criminalization

6-International cooperation and assistance

7-Identification and assessment of nuclear security threats

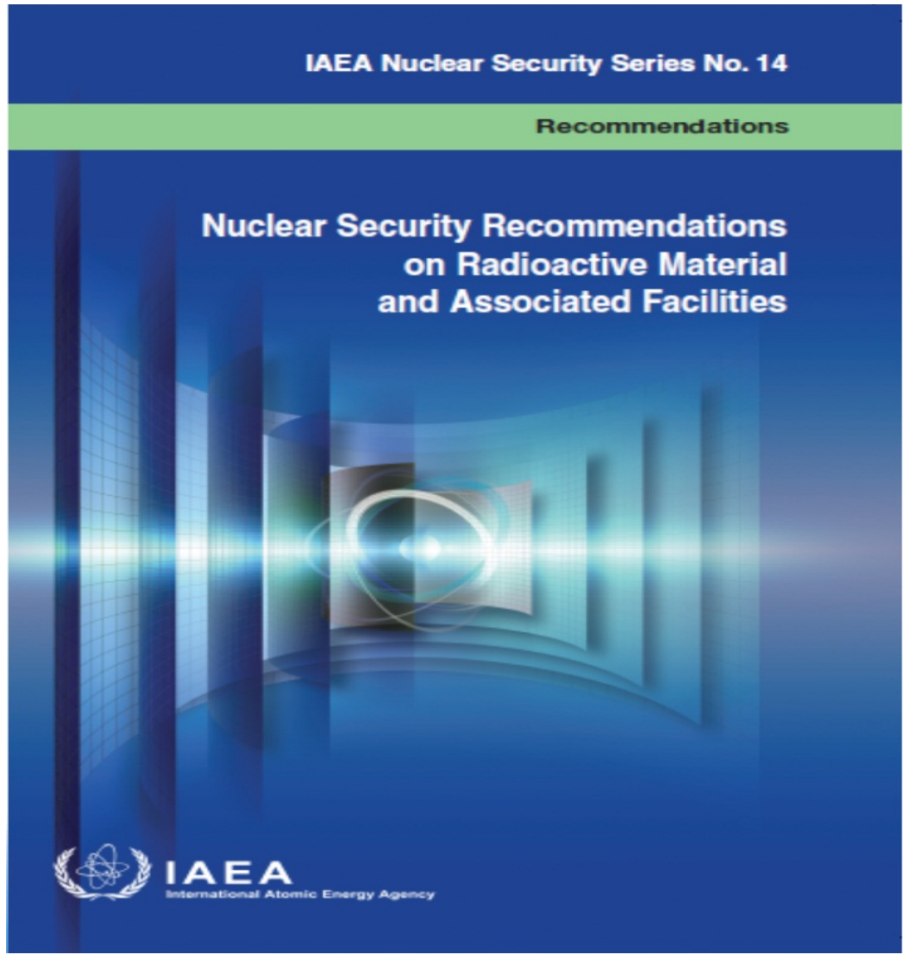
8-Identification and assessment of targets and potential consequences

9-Use of risk informed approaches

10-Detection of nuclear security events

Nuclear Security Series No. 14 2011-Nuclear Security Recommendations on Radioactive Material and Associated Facilities

- Provides guidance to States and competent authorities on establishing a nuclear security regime for radioactive material, including radioactive sources
- Complements NSS 20 and Code of Conduct

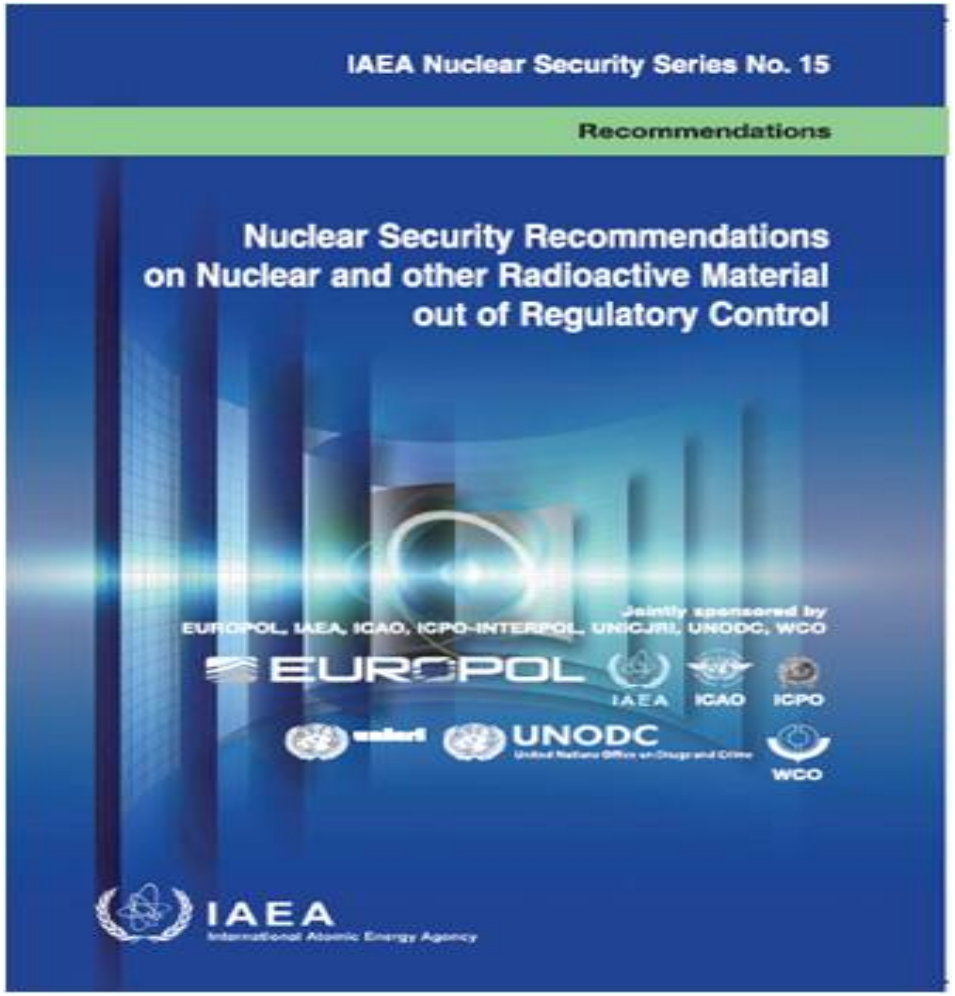


NSS-14, 2011

For the purpose of reporting nuclear security events, States should consider establishing suitable arrangements to enable them to participate in relevant regional and international databases and international activities in accordance with their national legislation. One example is the IAEA's Illicit Trafficking Database (ITDB).

Nuclear Security Series No. 15

NSS No. 15, 2011 provides recommendations to a State for the detection and assessment of alarms and alerts and for a graded response to criminal or unauthorized acts with nuclear security implications involving nuclear or other radioactive material out of regulatory control



NSS-15 contd…

- The State, through its coordinating body or mechanism, should inter alia:
- ensure the development of a comprehensive national detection strategy based on a multilayered defence in depth approach within available resources;
- ensure development of a national response plan for any nuclear security event using a graded approach commensurate with the threat and based on available resources.

NSS-15 contd…

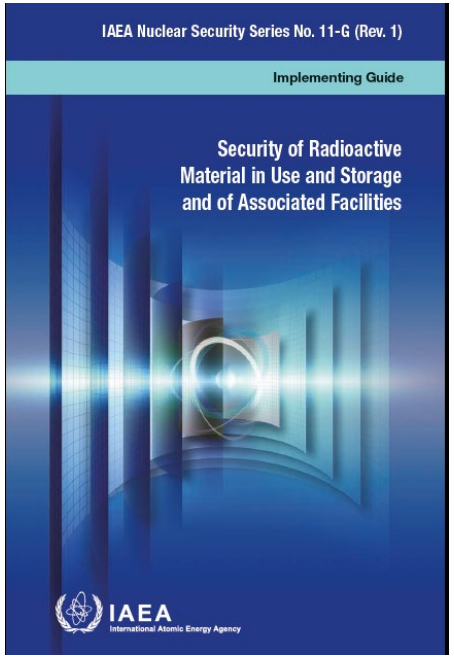
- In establishing legislative and regulatory frameworks to govern nuclear security, the State should define the conduct which it considers to be a criminal act, or an unauthorized act, with nuclear security implications.

- The State should establish criminal offences under domestic law which should include the wilful, unauthorized acquisition, possession, use, transfer or transport of nuclear or other radioactive material consistent with international treaties, conventions and legally binding United Nations Security Council resolutions.

IAEA NSS-11-G, 2019

IAEA NSS-11-G, 2019- Security of radioactive material in use and storage and of associated facilities

Type- Implementing Guide



NSS-11-G contd….

- ASSIGNMENT OF NUCLEAR SECURITY RESPONSIBILITIES

“The State should clearly define and assign nuclear security responsibilities to competent authorities, noting that they may include regulatory bodies, law enforcement, customs and border control, intelligence and security agencies, health agencies, etc.”

NSS-11-G- Responsibilities-Regulatory Body

- Establish a system of regulatory control over radioactive material, associated facilities and associated activities that places the primary responsibility for nuclear security on authorized persons (licensees)
- Establish a system of security based categorization
- Develop and maintain a national register of radioactive material over activity thresholds defined by the State
- Participate in national threat assessment
- Develop and apply the design basis threat, representative threat statement or other defined threat for purposes of regulation for security
- Implement the authorization (licensing) process, including review and assessment of security systems and security management measures
- Establish regulatory requirements and provide guidelines for security, including requirements for information protection

NSS-11-G contd….

- Manage the safety–security interface
- Conduct security inspections
- Take enforcement action for non-compliance
- Participate in regional and international databases and other cooperative activities
- Encourage and promote a robust nuclear security culture
- Participate in planning efforts for preparedness for and response to nuclear security events, including exercises
- Administer procedures for authorizing and controlling the import and export of radioactive material
- Notify operators concerning specific or increased threat
- Review and assess the design of security systems (in the authorization process)

NSS-11-G Responsibilities -Law enforcement

- Provide response to interrupt malicious acts (e.g. unauthorized access, unauthorized removal, sabotage)
- Participate in planning efforts for preparedness for and response to nuclear security events, including exercises
- Participate in national threat assessment
- Identify facility or activity specific threats, or new or increased threat capabilities
- Conduct background checks for purposes of trustworthiness verification
- Detect and investigate nuclear security events

NSS-11-G Responsibilities -Customs and border control

- Participate in national threat assessment
- Identify facility or activity specific threats, or new or increased threat capabilities
- Control and detect non-compliance with respect to imports or exports
- Communicate with regulatory body with respect to national inventory of radioactive material

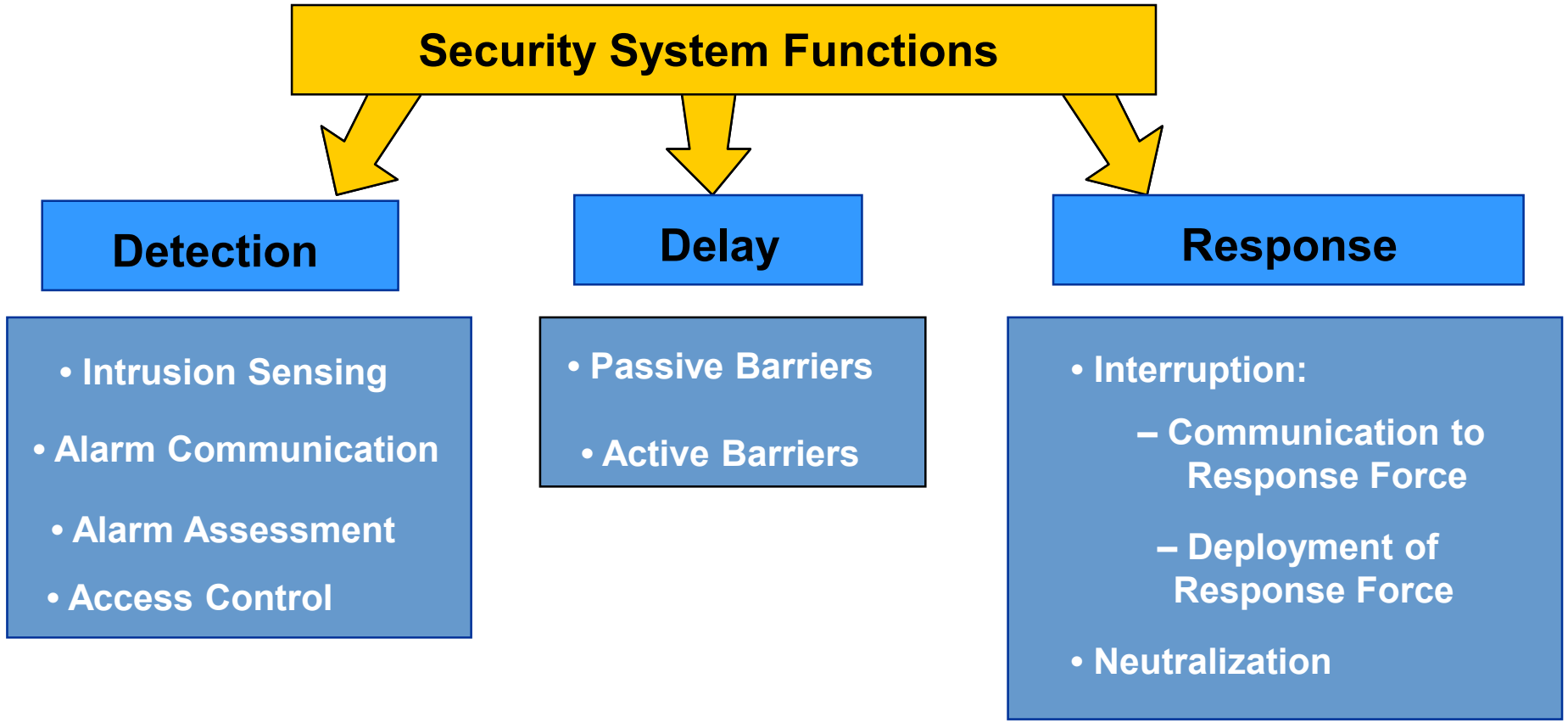
Graded Security Levels

NSS No. 11 recommends the following security levels and associated Goals:

- Security Level A: **prevent** unauthorized removal of a source (timely detection and response)
- Security Level B: **minimize the likelihood** of unauthorized removal of a source (immediate detection of the unauthorized removal, but not requiring a response to interrupt the act)
- Security Level C: **reduce the likelihood** of unauthorized removal of a source

NSS documents are available in AERB Intranet also

Security System Functions



Detection

Detection can be typically achieved by one of the following means:

- Electronic Sensors
- Continuous Surveillance (human or electronic)
- Video motion detection via a Closed Circuit Television system (CCTV)

Magnetic switches

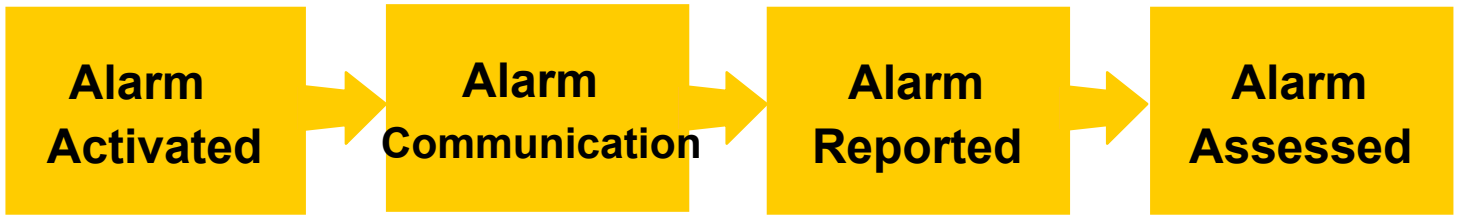
Examples of Intrusion detection devices

Motion sensor

Motion activated cameras

Glass breakor sensor

Detection



Performance Measures:

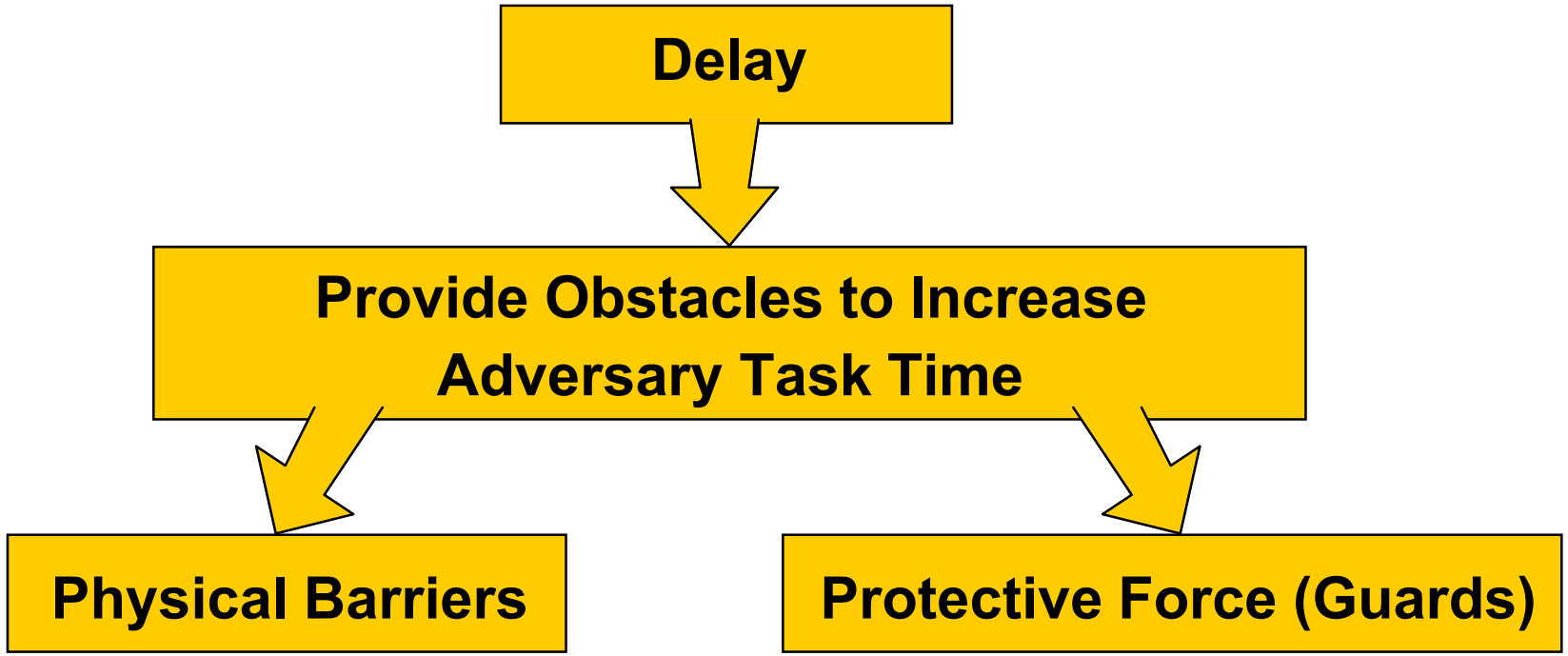
- Probability of Detection
- Time for Communication and Assessment
- Frequency of Nuisance Alarms
- Probability of Assessment

Assessment

Assessment can be typically achieved by one of the following means:

- Response Force (roving guard patrols, emergency services)
- Technological means such as an Closed Circuit Television system (CCTV)
- Human Surveillance

Delay



Performance Measure:

Time to Defeat Obstacles

Delay

Example Security Measures:

- Fences
- Cages and walls,
- Security containers,
- Strong rooms with three dimensional containment (floor, walls and ceiling)
- immobilisation of equipment
  - ✓Securely anchoring the equipment to nearby building structures such as walls, and floors
  - ✓Installing obstacles prohibiting the equipment from being wheeled away

Examples of Barriers

Response

Performance measures

- Effective and timely communication to response force
- Effective deployment of response force to adversary location (in a timely manner)
- Adequate response to defeat adversary

Response Practical Implementation

- The response time should be less than the time and tasks required by the adversary.
- The response team should be of sufficient size and capability to defeat the adversary.
- Plan and response procedures should include the involvement of local law enforcement, and emergency services.
- The adequacy of the procedures should be defined in consultation with the regulatory authority.
- Exercised and tested (threat level based).

*** Don't forget training!***

Effective response

Interaction with Outside Agencies

- Written agreement or understanding
- Key issues for consideration
  - ✓Role of support agencies
  - ✓Communication with support agencies
  - ✓Off-site response
- Joint training exercises
- The winning combination:
  - ✓Right people and planning
  - ✓Right equipment
  - ✓Right training

Take away

Cooperation, coordination and communication among stakeholders is key to success for achieving goal of nuclear security.

Thank You