

Session 2.2

Basic Physical Protection at a Facility

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Session 2.2 Outline

- Learning objectives
- Physical security definitions
- Physical protection system (PPS) objectives
- PPS protective measures
- Nuclear Material Accounting & Control (NMA&C) and the PPS

Session 2.2 Learning Objectives

- Understand *target, threat (insider and outsider), and security system* within the context of physical security.
- Understand objectives of a State's physical protection system as stated in IAEA INFCIRC/225/Rev. 4.
- Understand the general design strategies and typical design elements of a physical protection system.
- Understand the relationship between physical protection system and nuclear material accounting and control system.

Target

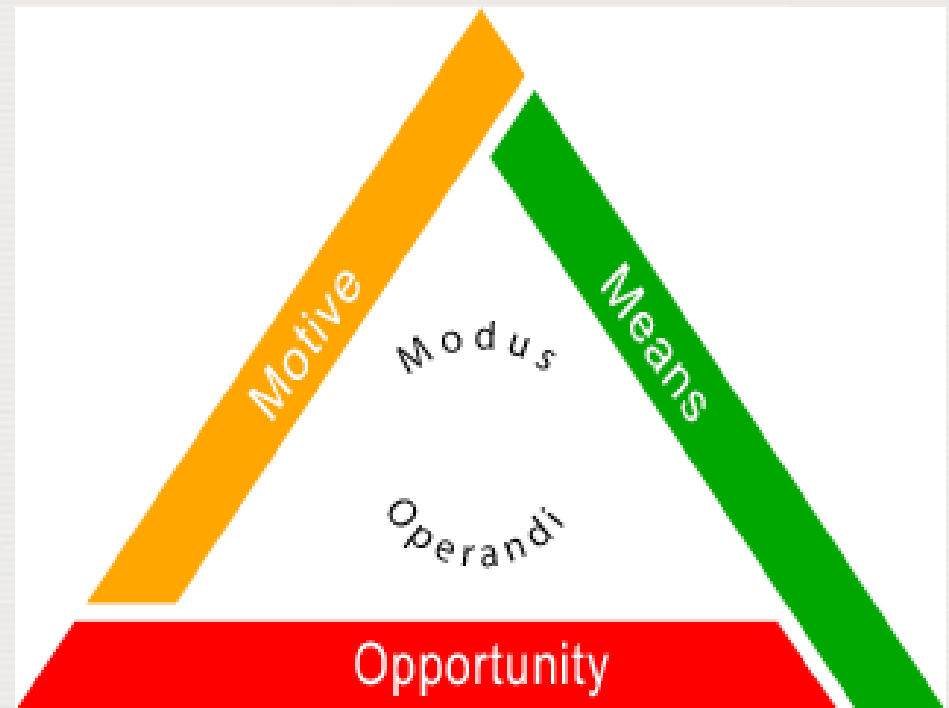
SECURITY TARGET—something subject to danger of harm or loss from malevolent acts.

- Example: a facility or a facility's personnel, material assets, or information.
- Actual harm or loss to a target is referred to as an undesirable event.
- For this workshop, *target* refers to nuclear material.
 - Both theft and sabotage are of concern.
 - Consequences of an undesirable event are established by State authority.

Threat Definition

SECURITY THREAT—person(s) perceived or known to have the capability and malevolent intention or potential to inflict harm or loss to a target

- Characterized by motive, means, and opportunity (MMO)
- How an attack is planned and executed is a function of MMO
- May include protestors, criminals, and/or terrorists
- Design Basis Threats should be established by State authority



Threats, Objectives, and Means

- Facilities must consider different types of *threats*
 - *Outsider Threat*
 - *Insider Threat*
- Different threats may have different target *objectives*
 - *Destruction, damage or disruption of facility operations*
 - *Death or injury of personnel*
 - *Theft, sabotage, damage, or destruction of facility assets*
 - *Facility information compromise*
- Means Examples:
 - *Bombs*
 - *External (standoff) attacks*
 - *Penetration attacks*
 - *Surveillance and eavesdropping*

Outsider Threats

- Outsider: Any individual (or group of individuals) without authorized access to *nuclear facilities* or *transport* who might attempt unauthorized removal or sabotage, or who might assist insiders to do so.
- Outsiders might include:
 - Terrorists
 - Criminals
 - Disgruntled citizens (Protesters)
 - Others

Outsider Threat Characteristics

- **Motivation**
 - Ideological, Personal, Economic, Psychotic, or Other
- **Intention**
 - Theft or Sabotage
- **Capabilities**
 - Group Size
 - Weapons
 - Explosives
 - Tools
 - Transportation
 - Skills
 - Funding
 - Collusion w/ Insider
 - Support Structure

Insider Threat

- Insider: Any individual (or group of individuals) with authorized access to *nuclear facilities* or *transport* who might attempt unauthorized removal or sabotage, or who could aid *outsiders* to do so.
- Insiders might include:
 - Management
 - Regular employees
 - Security personnel
 - Service providers
 - Visitors
 - Inspectors
 - Past employees

Insider Threat Characteristics

- Insider Attributes
 - Authorized access to *nuclear facilities or transport* (from definition)
 - Knowledge
 - Authority
- Insider Advantages
 - Time
 - Tools
 - Tests
 - Collusion

Physical Protection System

PHYSICAL PROTECTION SYSTEM — measures to protect targets from threats.

- Security systems include personnel, administrative measures, and technical means.
- Effective security designs consider the threat, the target and the installation location.
- State authorities are responsible for establishing the level of protection to be afforded to nuclear theft and sabotage targets

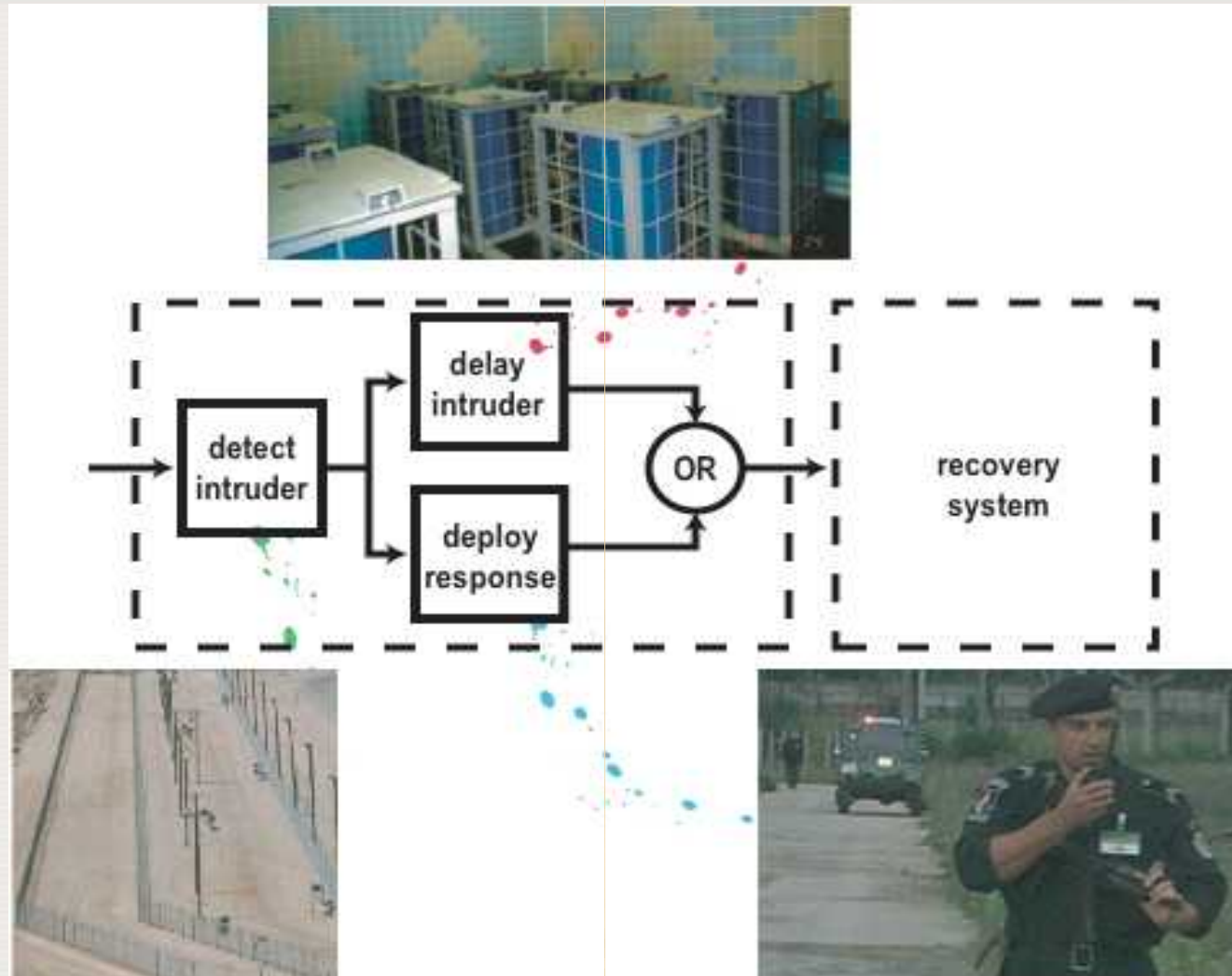
Physical Protection System Objectives

- A State's physical protection system [**PPS**] objective should be:
 - To establish conditions which would minimize the possibilities for *unauthorized removal* of nuclear material and/or for *sabotage*; and
 - To provide information and technical assistance in support of...[locating and recovering] missing nuclear material and...minimizing the radiological consequences of *sabotage*.
- Ref: *Physical Protection of Nuclear Material and Nuclear Facilities*, IAEA, INFCIRC/225/Rev. 4, §3.1:

Protective Measures against Forced Entry

- General design strategy:
 - *Detect* threat early in the forced entry attempt
 - *Delay* the threat so a *response* force may intercept and neutralize them.
- Design element examples:
 - Clear areas with delineated boundaries
 - Intrusion detection and assessment sensor systems
 - Building and structural elements which resist forced entry
 - Response forces capable of defeating a design basis threat

PPS Design Elements

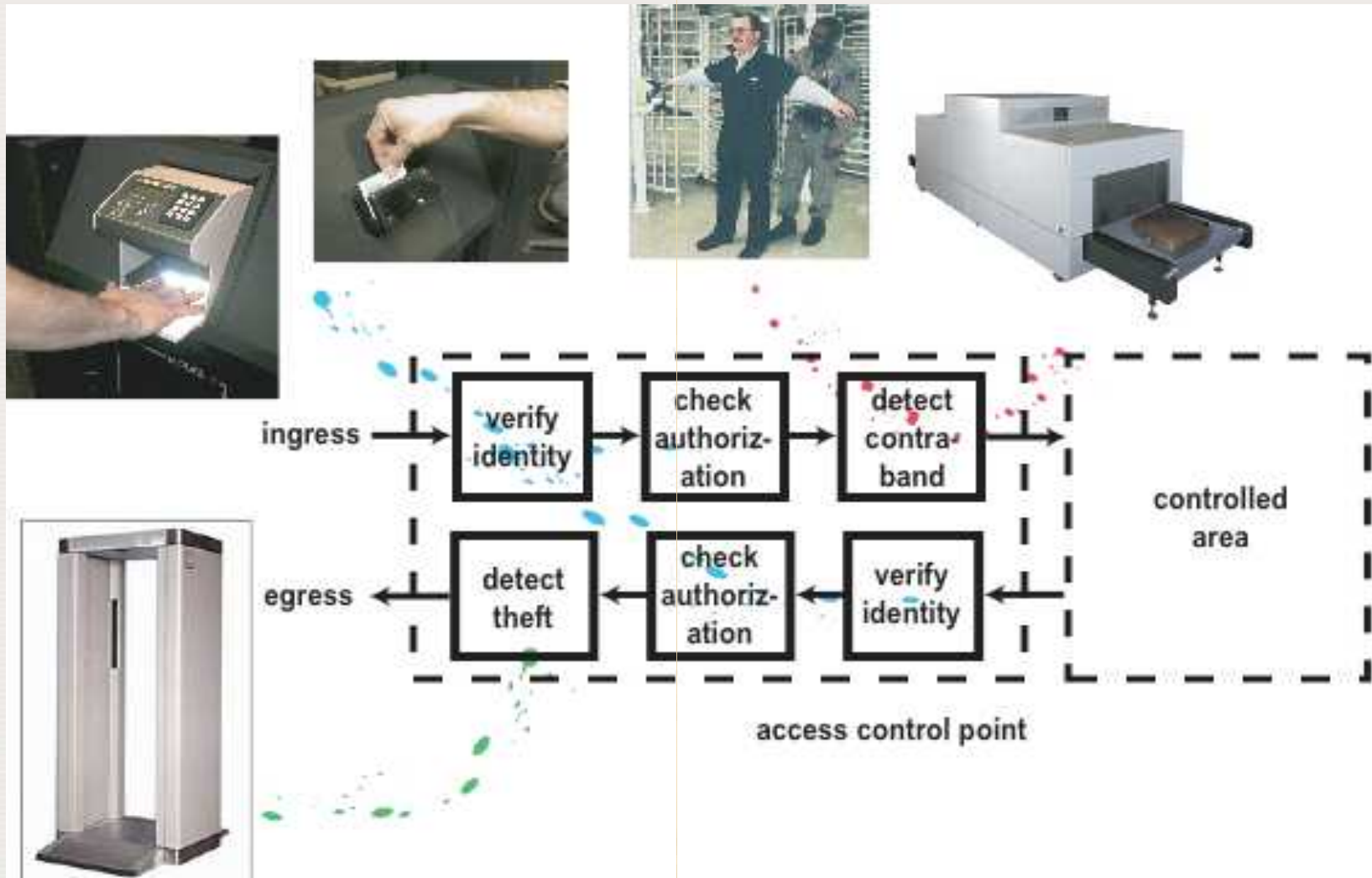


Covert Entry and Insider Compromise

Protective Measures

- General design strategy:
 - Compartmentalized controlled areas with separate access requirements
 - Contraband detection capabilities
 - sensors and personnel to detect tools, weapons and explosives entering sensitive areas or assets being removed from area
- Design elements examples:
 - Entry and Exit access control points
 - Physical protection system controlled-area boundary elements

Access Control Design Elements



NMA&C and Physical Protection

- NMA&C objectives:
 - Assure all nuclear materials are present in the correct amount
 - Provide timely detection of a material loss
 - Determine amount and location of loss
- If “material loss” is understood to include theft, the NMA&C system may help a PPS achieve its objectives.

PPS Objectives and NMA&C

- *Recall that the objectives of the State's physical protection system should be:*
 - To establish conditions which would minimize the possibilities for *unauthorized removal* of nuclear material and/or for sabotage; and
 - To provide information and technical assistance in support of...[locating and recovering] missing nuclear material and...minimizing the radiological consequences of sabotage.
- Ref: *The Physical Protection of Nuclear Material and Nuclear Facilities*, IAEA, INFCIRC/225/Rev. 4, §3.1

PPS Objectives and NMA&C (cont.)

- INFCIRC/225/Rev. 4 and NMA&C Interactions
 - §6.2.5 *Whenever persons are present in inner areas, those areas should be under constant surveillance. The surveillance can be effected by mutual observation between two or more co-workers (e.g. two-man rule).*
 - §6.2.7 *Every nuclear material handler should be required to conform to procedures for transferring custody of the nuclear material ...[and] should endeavor to ascertain on reporting for duty that no interference with or unauthorized removal of nuclear material has taken place...*
- NMA&C-specific controls which may impact and interact with a facility's physical protection system include the use of tamper indicating devices (TIDs) and the use of nuclear material monitors.
- Ref: *The Physical Protection of Nuclear Material and Nuclear Facilities*, IAEA, INFCIRC/225/Rev. 4, §6.2.5, 6.2.7

Summary (1)

- Key definitions:
 - *Target – something subject to danger of harm or loss*
 - *Threat (insider and outsider) – person or group with capability and motivation to inflict harm or loss on a target*
 - *Physical protection system – measures used to protect targets from threats*
- State physical protection system objectives
 - Prevent unauthorized removal (theft) of nuclear material
 - Prevent sabotage of nuclear material or nuclear facilities
 - Support recovery of lost or stolen material
 - Support consequence mitigation for successful sabotage

Summary (2)

- Facility physical protection system objectives
 - Deter and defeat threats
 - Insider
 - outsider
 - Use detection, delay and response elements for protection of compartmentalized controlled areas
 - Use access-control points to
 - Restrict entry to authorized personnel
 - Detect introduction of contraband
 - Detect unauthorized removal of material
- Facility NMA&C systems controls at the material location, including surveillance, material monitors, and procedural elements can assist PPS