

## **Session 2.2**

# **Basic Physical Protection at a Facility**

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Sandia National Laboratories is a multi-program laboratory operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation,

for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.



*Atoms for Peace: The First Half Century*  
1957–2007

# 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

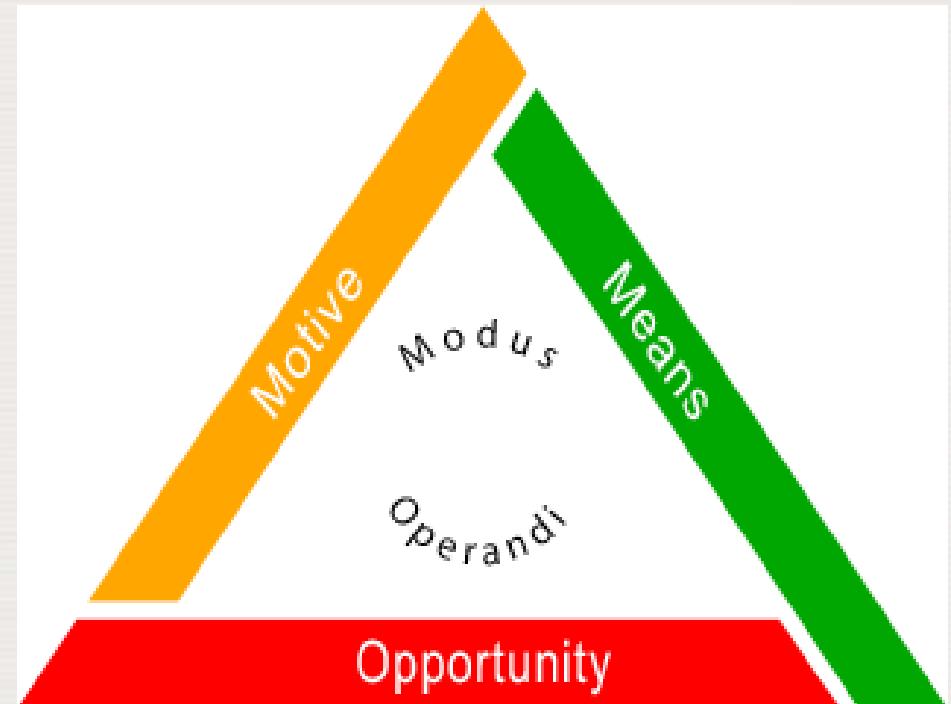
**SECURITY TARGET**—something subject to danger of harm or loss from malevolent acts.

- 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

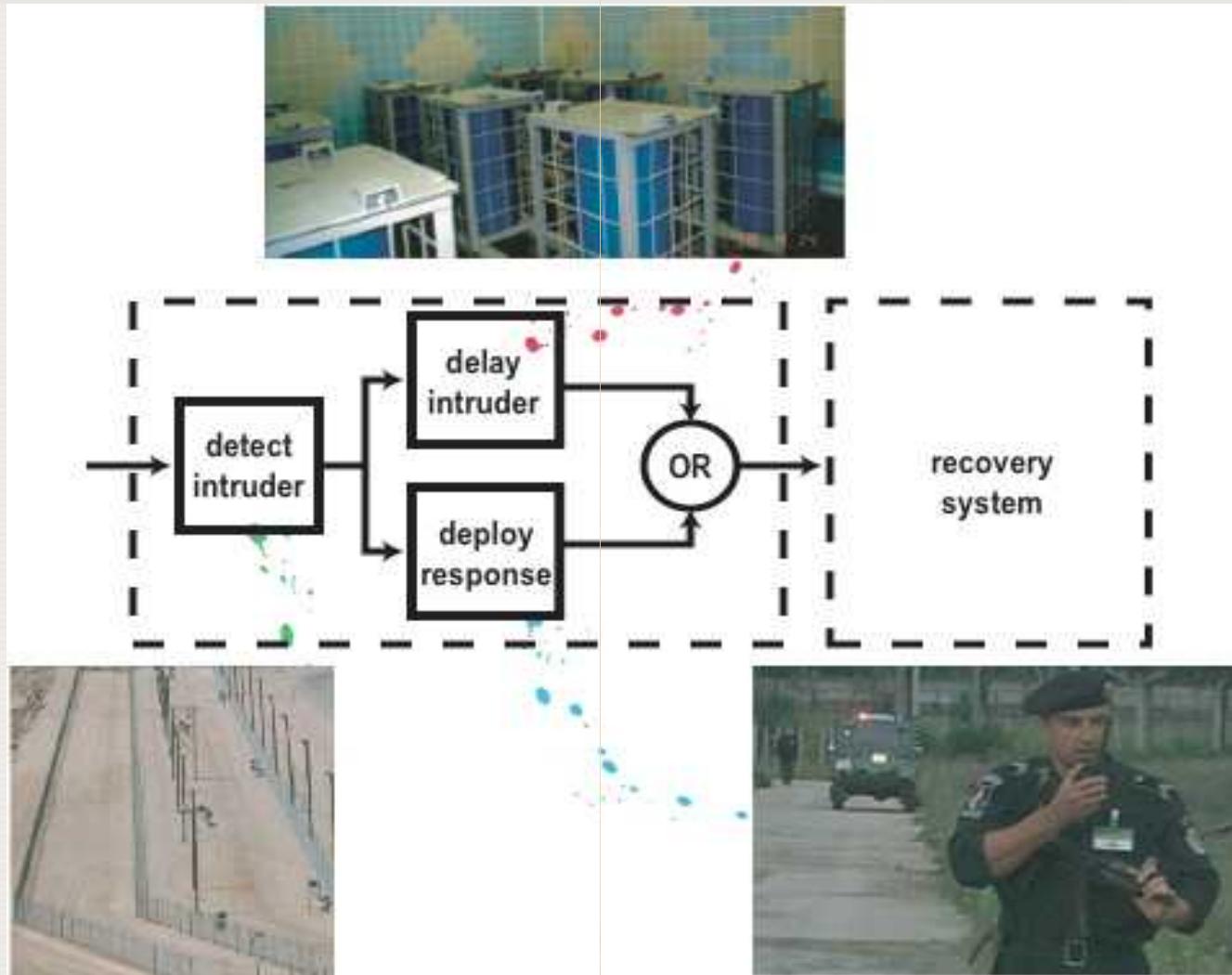
# Physical Protection System Objectives

- 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

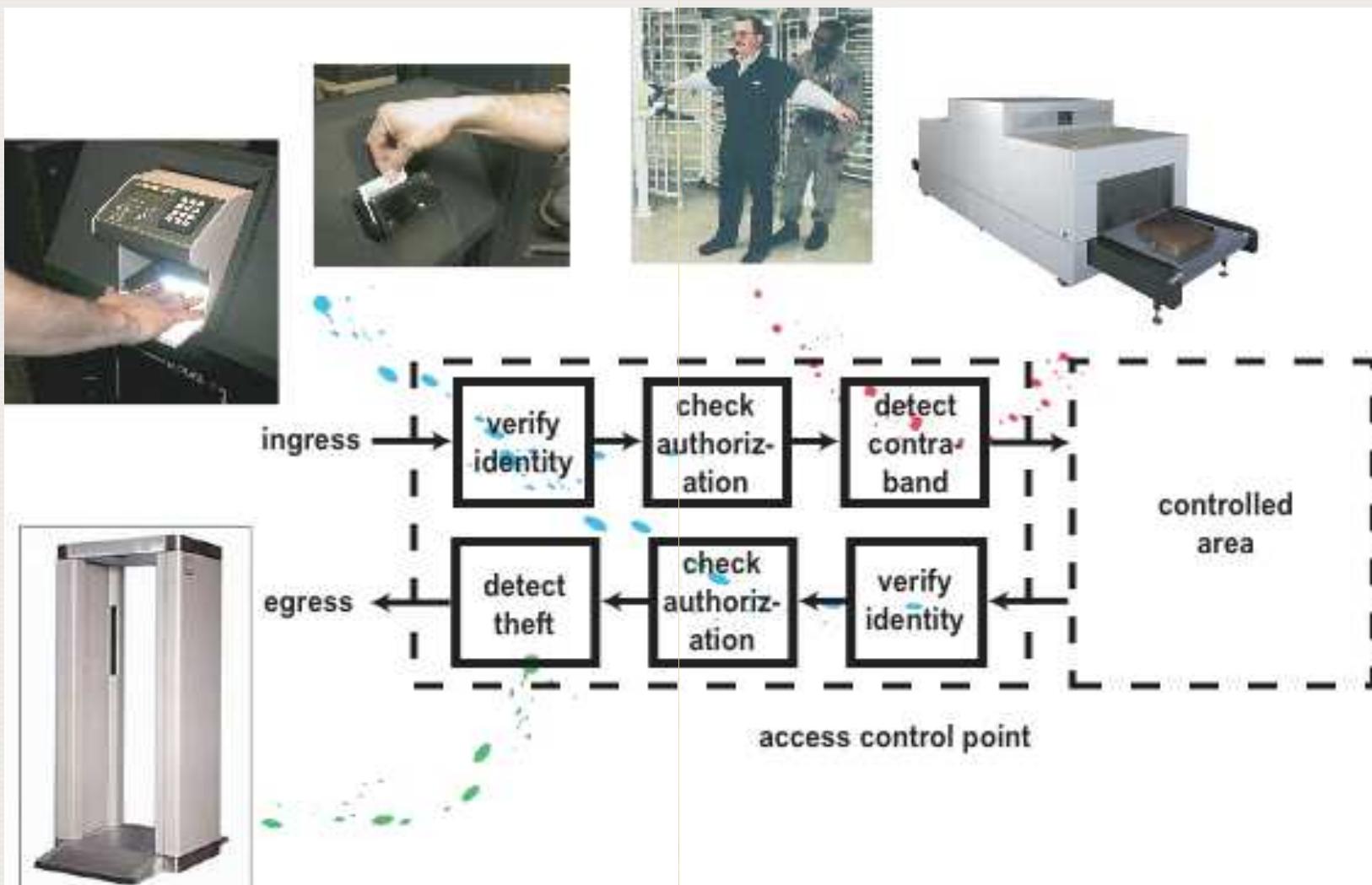


# Covert Entry and Insider Compromise

## 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, INF/CIRC/225/Rev. 4, §3.1

# PPS Objectives and NMA&C (cont.)

- INFIRC/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, INFIRC/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