National Nuclear Security Administration

United States
Department of Energy
National Nuclear Security Administration

International Nuclear Security

M5-A: PPS Design and Security Areas

Research Reactor Sabotage Protection Workshop

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Reducing Risk of Nuclear Terrorism

Learning Objectives

Objectives:

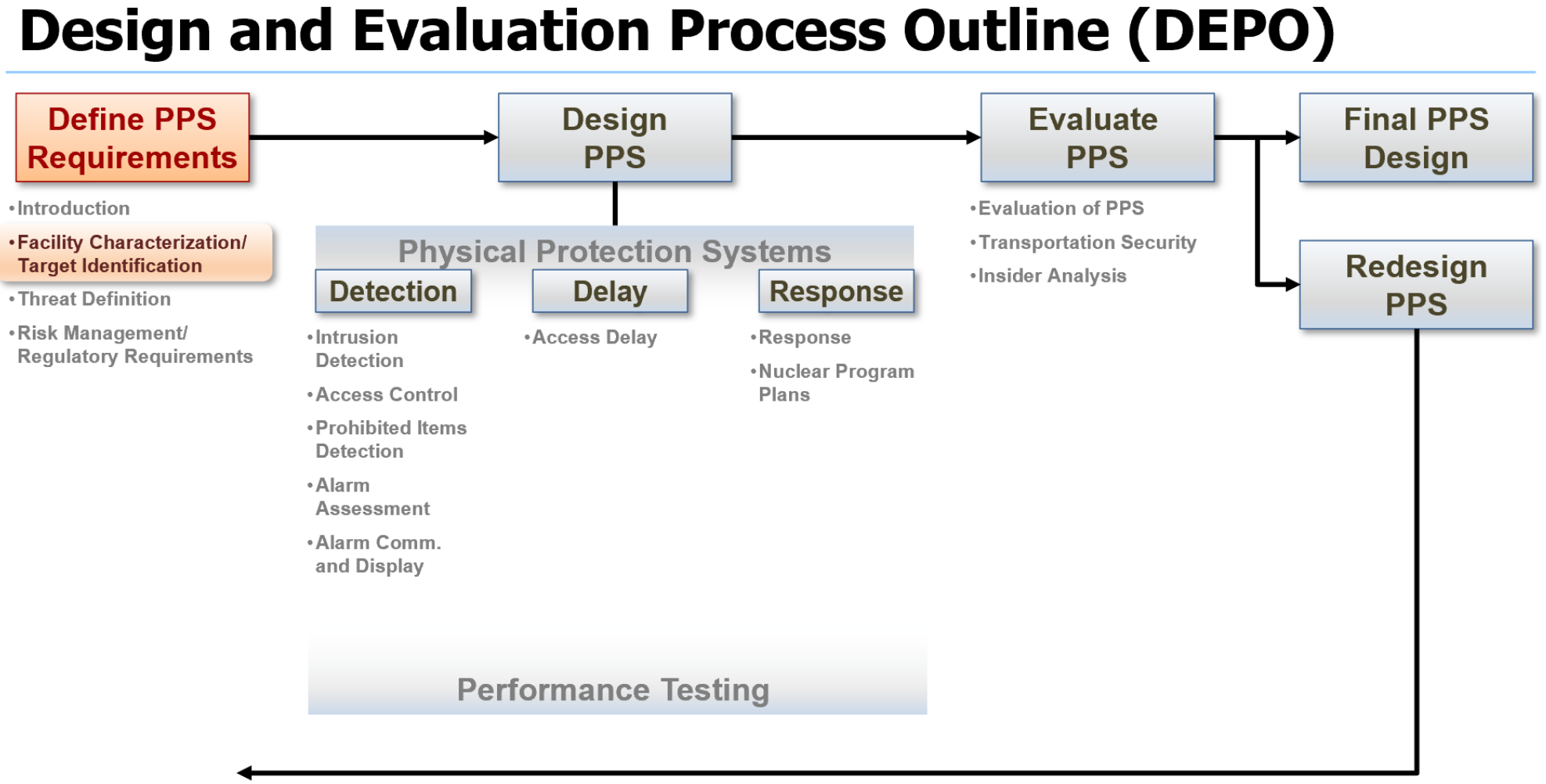
- Describe the fundamental principles of a PPS and the DEPO process
- Describe the purpose and PPS elements of LAA, PA, and vital areas and strong rooms
- Understand the role of PPS support elements and infrastructure

Physical Protection System

- PPS - An integrated set of physical protection measures intended to prevent the completion of a malicious act (NSS 13)
- PPS primary functions: Detect – Delay - Respond
- PPS is designed and implemented with consideration of
  - Protection of targets for theft and radiological sabotage
  - DBT/RTS
  - Regulatory requirements
  - Defense in depth (security zones, etc)
  - Balanced protection
  - Integration of functions and components

PPS Design and Evaluation Process

- A systematic engineering process is beneficial



IAEA Recommendations for Security Areas at Research Reactors

- IAEA NSS 13 recommendation

Category II nuclear material facilities	HRC facilities
Limited Access Area (LAA) Protected Area (PA)	LAA PA Vital areas

- Good practice for a large research reactor: LAA + PA + vital areas and strong rooms
  - Vital areas contain sabotage protection equipment
  - Strong rooms are used to store unirradiated nuclear fuel
- Additional security barriers can be utilized to further support protective strategy (e.g., to delay and channelize adversary)

Limited Access Area

Purpose

- Minimize the possibility of unauthorized action and presence of unauthorized personnel
- Prevent entry of a threat vehicle (possibly)

PPS Elements

- Security barrier (e.g., a fence)
- Possible vehicle barrier system (VBS)
- Limited access control system
- Surveillance systems

Protected Area

Purpose

- Ensure only authorized personnel, vehicles and materials enter
- Provide for assured detection at PA boundary
  - A basis for developing and implementing a protective strategy
- Provide a layer of delay

PPS Elements

- Vehicle and personnel security barriers
- Intrusion detection (with assessment)
- Access control and contraband detection
- Surveillance systems

Vital Areas and Strong Rooms

Purpose

- Limit access to a small number of authorized personnel
- Provide an additional layer of detection and assessment at the boundary and, possibly, for point targets
- Provide an additional layer of delay to support protective strategy

PPS Elements

- Intrusion detection and assessment
  - BMS and/or PIR with a camera
- Access control and provisions for search
- Delay

PPS Support Elements

- Central Alarm Station
  - Directly supports detection, assessment, and communication functions by implementing an alarm communication and display system
    - Pre- and post alarm recording is a good practice
  - Is a hardened structure with access control
  - Is normally located inside a secure area
  - A back-up alarms station is recommended for HRC facilities
  - Cyber security is an important consideration
- Communication systems
- PPS infrastructure (cabling, field distribution boxes, etc)
- Back-up power

In Conclusion

- DEPO is a systematic engineering process used to design and evaluate a PPS
- IAEA recommends a set of concentric security areas to provide defense in depth
- A large research reactor is expected to feature an LAA, PA and vital areas and strong rooms
- There are specific PPS recommendations for each security area

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Questions, Comments, Concerns?

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