SAND2011-5169P

Nuclear Security Recommendations on the Physical Protection of Nuclear Materials and Nuclear Facilities (INFCIRC 225/Rev5)

Requirements for a State's Physical Protection Regime

Participant Workbook
September 2011

SAND2011-5169P

Workshop Overview

Course Outline

- Introductions
- Background on INFCIRC/225/Revision 5
- Objectives of a State's Physical Protection Regime
- Elements of a States Physical Protection Regime
- Summary

Format of the Workshop

- Presentation on INFCIRC/225/Revision 5 Objectives and Elements
- Discussion on presented topics

Session 1
INFCIRC/225/Revision 5 - BACKGROUND

History of INFCIRC/225

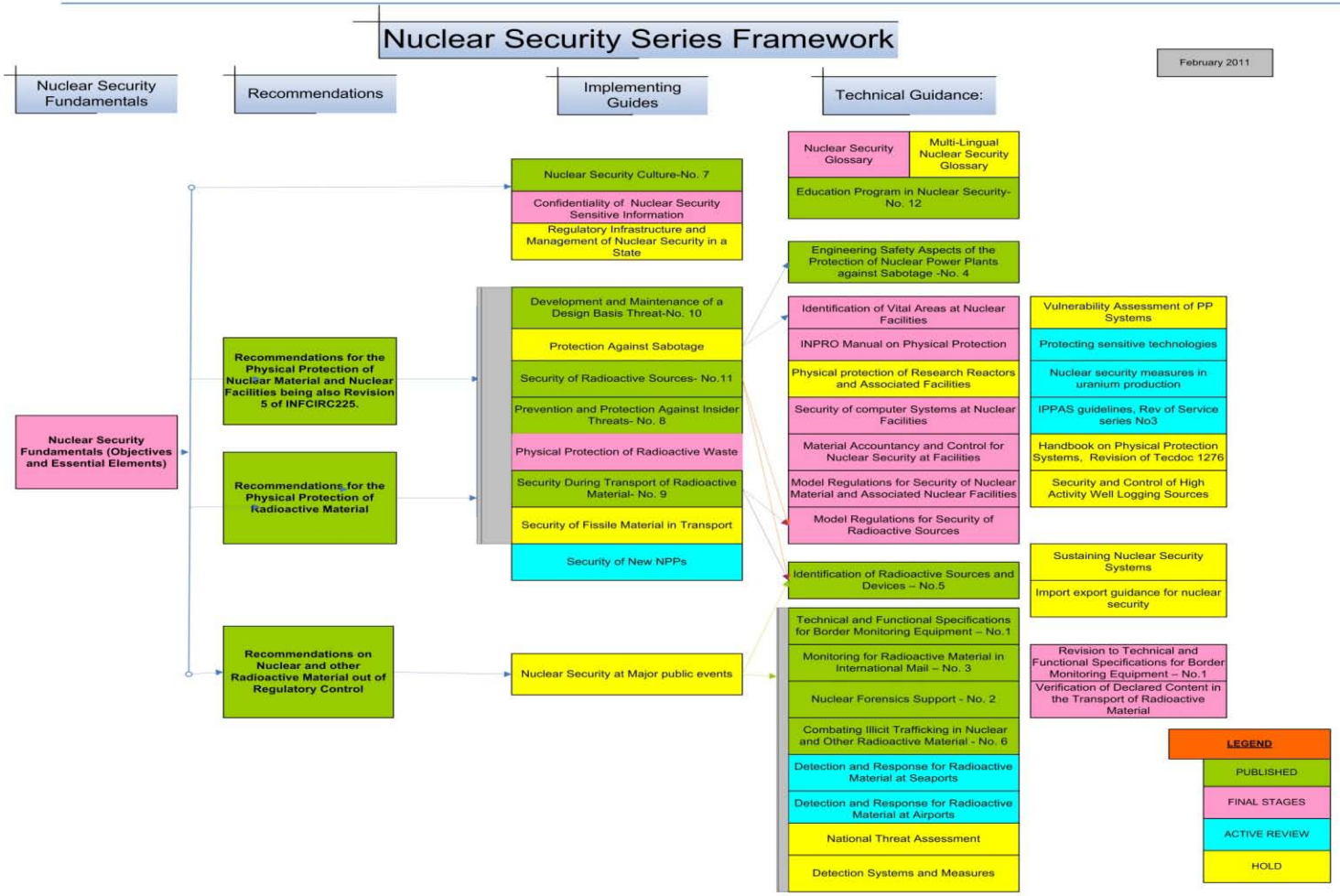
- INFCIRC/225 has been the de facto international standard for the physical protection of nuclear material for decades
- Originally prepared by a panel of experts convened by the IAEA Director General in 1972
- First published in the INFCIRC series in 1975
- Subsequently revised by member-state experts in
    - 1977 (Rev.1)
    - 1989 (Rev.2)
    - 1993 (Rev.3)
    - 1999 (Rev.4)
    - 2011(Rev.5)
- Revision 5 is also IAEA Nuclear Security Series No. 13

Why Revision 5?

- The 9/11/2001 attack resulted in greater recognition of the risk nuclear terrorism
- The IAEA Board of Governors (BOG) and General Conference GC(45)/INF/14, 14 September, 2001
    - Published new Physical Protection Regime Objectives
    - Published the Fundamental Principles of Physical Protection
- The IAEA Convention on the Physical Protection of Nuclear Material, INFCIRC/274/Rev.1 (CPPNM)
    - First published in 1980 (primarily addressed international transport)
    - Amended in 2005 (Amendment to the CPPNM, GOV/INF/10-GC(49)INF/6, IAEA, Vienna [2005])
        - Adopted BOG Physical Protection Regime Objectives
        - Adopted BOG Fundamental Principles of Physical Protection

General Approach to Revision 5

- Achieve consistency with endorsement by the IAEA BOG (September 2001) and the CPPNM (Amended, July 2005)
    - The concept of four Physical Protection Objectives
    - The concept of a State's *Physical Protection Regime*, comprised of the Twelve Fundamental Principles of Physical Protection
- Introduce the risk management approach and the tie to the graded approach, defence in depth, nuclear material categorization, and radiological consequence categorization
- Forge a stronger connection between security, safety, and nuclear material accountancy and control measures


Nuclear Security Series Framework
February 2011
Nuclear Security Fundamentals
Recommendations
Implementing Guides
Technical Guidance:
Nuclear Security Fundamentals (Objectives and Essential Elements)
Recommendations for the Physical Protection of Nuclear Material and Nuclear Facilities being also Revision 5 of INFCIRC225.
Recommendations for the Physical Protection of Radioactive Material
Recommendations on Nuclear and other Radioactive Material out of Regulatory Control
Nuclear Security Culture-No. 7
Confidentiality of Nuclear Security Sensitive Information
Regulatory Infrastructure and Management of Nuclear Security in a State
Development and Maintenance of a Design Basis Threat-No. 10
Protection Against Sabotage
Security of Radioactive Sources- No.11
Prevention and Protection Against Insider Threats- No. 8
Physical Protection of Radioactive Waste
Security During Transport of Radioactive Material- No. 9
Security of Fissile Material in Transport
Security of New NPPs
Nuclear Security at Major public events
Nuclear Security Glossary
Multi-Lingual Nuclear Security Glossary
Education Program in Nuclear Security- No. 12
Engineering Safety Aspects of the Protection of Nuclear Power Plants against Sabotage -No. 4
Identification of Vital Areas at Nuclear Facilities
INPRO Manual on Physical Protection
Physical protection of Research Reactors and Associated Facilities
Security of computer Systems at Nuclear Facilities
Material Accountancy and Control for Nuclear Security at Facilities
Model Regulations for Security of Nuclear Material and Associated Nuclear Facilities
Model Regulations for Security of Radioactive Sources
Identification of Radioactive Sources and Devices – No.5
Technical and Functional Specifications for Border Monitoring Equipment – No.1
Monitoring for Radioactive Material in International Mail – No. 3
Nuclear Forensics Support - No. 2
Combating Illicit Trafficking in Nuclear and Other Radioactive Material - No. 6
Detection and Response for Radioactive Material at Seaports
Detection and Response for Radioactive Material at Airports
National Threat Assessment
Detection Systems and Measures
Vulnerability Assessment of PP Systems
Protecting sensitive technologies
Nuclear security measures in uranium production
IPPAS guidelines, Rev of Service series No3
Handbook on Physical Protection Systems, Revision of Tecdoc 1276
Security and Control of High Activity Well Logging Sources
Sustaining Nuclear Security Systems
Import export guidance for nuclear security
Revision to Technical and Functional Specifications for Border Monitoring Equipment – No.1
Verification of Declared Content in the Transport of Radioactive Material
LEGEND
PUBLISHED
FINAL STAGES
ACTIVE REVIEW
HOLD

Scope of INFCIRC/225/Revision 5

- Nuclear Material and Nuclear Facilities Used for Civil Purposes
- In Use and Storage/During Transport
- Against
    - Unauthorized removal toward a nuclear explosive device
    - Unauthorized removal toward subsequent dispersal
    - Sabotage

Revision 5 and 4 Structure Comparison

Revision 5	Revision 4
1 Introduction	1 Introduction 2 Definitions (17)
2 Objectives (now 4)	3 Objectives (only 2)
3 Elements of a State's Physical Protection Regime	4 Elements of a State's Physical Protection System
4 Unauthorized Removal of Material in Use and Storage (Includes categorization of material and the addition of measures to locate/recover missing/stolen material)	5 Categorization of Nuclear Material 6 Unauthorized Removal of Material in Use and Storage
5 Sabotage of Facilities and Material in Use and Storage (Includes addition of process for graded measures for protection against sabotage and measures to mitigate/minimize consequences)	7 Sabotage of Facilities and Material in Use and Storage
6 Unauthorized Removal and Sabotage of Nuclear Material During Transport (Includes addition of measures to locate/recover and mitigate/minimize consequences)	8 Nuclear Material During Transport
Definitions (39)	

INCIRC/225/Revision 5 - Definitions

Terms used in this publication are defined below and are italicized in the text. New terms are in red. Modified terms are in blue

access delay. The element of a *physical protection system* designed to increase adversary penetration time for entry into and/or exit from the *nuclear facility* or *transport*.

central alarm station. An installation which provides for the complete and continuous alarm monitoring, assessment and communication with *guards*, facility management and *response forces*.

competent authority. Governmental organization(s) or institution(s) that has(have) been designated by a State to carry out one or more nuclear security functions.

contingency plan. Predefined sets of actions for response to unauthorized acts indicative of attempted *unauthorized removal* or *sabotage*, including *threats* thereof, designed to effectively counter such acts.

conveyance. For *transport* (a) by road or rail: any vehicle used for carriage of nuclear material cargo; (b) by water: any seagoing vessel or inland waterway craft, or any hold, compartment, or defined deck area of a seagoing vessel or inland waterway craft used for carriage of nuclear material cargo; and (c) by air: any aircraft used for carriage of nuclear material cargo.

defence in depth. The combination of multiple layers of systems and measures that have to be overcome or circumvented before physical protection is compromised.

design basis threat. The attributes and characteristics of potential *insider* and/or external adversaries, who might attempt *unauthorized removal* or *sabotage*, against which a *physical protection system* is designed and evaluated.

detection. A process in a *physical protection system* that begins with sensing a potentially malicious or otherwise unauthorized act and that is completed with the assessment of the cause of the alarm.

force-on-force exercise. A *performance test* of the *physical protection system* that uses designated trained personnel in the role of an adversary force to simulate an attack consistent with the *threat* or the *design basis threat*.

graded approach. The application of *physical protection measures* proportional to the potential consequences of a *malicious act*.

guard. A person who is entrusted with responsibility for patrolling, monitoring, assessing, escorting individuals or *transport*, controlling access and/or providing initial response.

inner area. An area with additional protection measures inside a *protected area*, where Category I *nuclear material* is used and/or stored.

insider. One or more individuals with authorized access to *nuclear facilities* or *nuclear material* in *transport* who could attempt *unauthorized removal* or *sabotage*, or who could aid an external adversary to do so.

limited access area. Designated area containing a *nuclear facility* and *nuclear material* to which access is limited and controlled for physical protection purposes.

malicious act. An act or attempt of *unauthorized removal* or *sabotage*.

nuclear facility. A facility (including associated buildings and equipment) in which *nuclear material* is produced, processed, used, handled, stored or disposed of and for which a specific licence is required.

nuclear material. Material listed in Table 1, in Section 4 of this publication, including the material listed in its footnotes.

nuclear security culture. The assembly of characteristics, attitudes and behaviours of individuals, organizations and institutions which serves as means to support, enhance and sustain nuclear security.

nuclear security event. An event that is assessed as having implications for physical protection.

operator. Any person, organization, or government entity licensed or authorized to undertake the operation of a *nuclear facility*.

performance testing. Testing of the *physical protection measures* and the *physical protection system* to determine whether or not they are implemented as designed; adequate for the proposed natural, industrial and threat environments; and in compliance with established performance requirements.

physical barrier. A fence, wall or similar impediment which provides *access delay* and complements access control.

physical protection measures. The personnel, procedures, and equipment that constitute a *physical protection system*.

physical protection regime. A State's regime including:

- The legislative and regulatory framework governing the physical protection of *nuclear material* and *nuclear facilities*;
- The institutions and organizations within the State responsible for ensuring implementation of the legislative and regulatory framework;
- Facility and transport *physical protection systems.*

physical protection system. An integrated set of *physical protection measures* intended to prevent the completion of a *malicious act*.

protected area. Area inside a *limited access area* containing Category I or II *nuclear material* and/or *sabotage* targets surrounded by a *physical barrier* with additional *physical protection measures*.

response forces. Persons, on-site or off-site, who are armed and appropriately equipped and trained to counter an attempted *unauthorized removal* or an act of *sabotage*.

sabotage. Any deliberate act directed against a *nuclear facility* or *nuclear material* in use, storage or *transport* which could directly or indirectly endanger the health and safety of personnel, the public or the environment by exposure to radiation or release of radioactive substances.

shipper. Any person, organization or government that prepares or offers a consignment of *nuclear material* for *transport* (i.e. the consignor).

stand-off attack. An attack, executed at a distance from the target *nuclear facility* or *transport*, which does not require adversary hands-on access to the target, or require the adversary to overcome the *physical protection system*.

system for nuclear material accountancy and control. An integrated set of measures designed to provide information on, control of, and assurance of the presence of *nuclear material*, including those systems necessary to establish and track nuclear material inventories, control access to and detect loss or diversion of *nuclear material*, and ensure the integrity of those systems and measures.

threat. A person or group of persons with motivation, intention and capability to commit a *malicious act.*

threat assessment. An evaluation of the *threats* — based on available intelligence, law enforcement, and open source information — that describes the motivations, intentions, and capabilities of these *threats*.

transport. International or domestic carriage of *nuclear material* by any means of transportation, beginning with the departure from a *nuclear facility* of the *shipper* and ending with the arrival at a *nuclear facility* of the receiver.

transport control centre. A facility which provides for the continuous monitoring of a *transport* conveyance location and security status and for communication with the *transport* conveyance, *shipper/*receiver, carrier and, when appropriate, its *guards* and the *response forces*.

two person rule. A procedure that requires at least two authorized and knowledgeable persons to be present to verify that activities involving *nuclear material* and *nuclear facilities* are authorized in order to detect access or actions that are unauthorized.

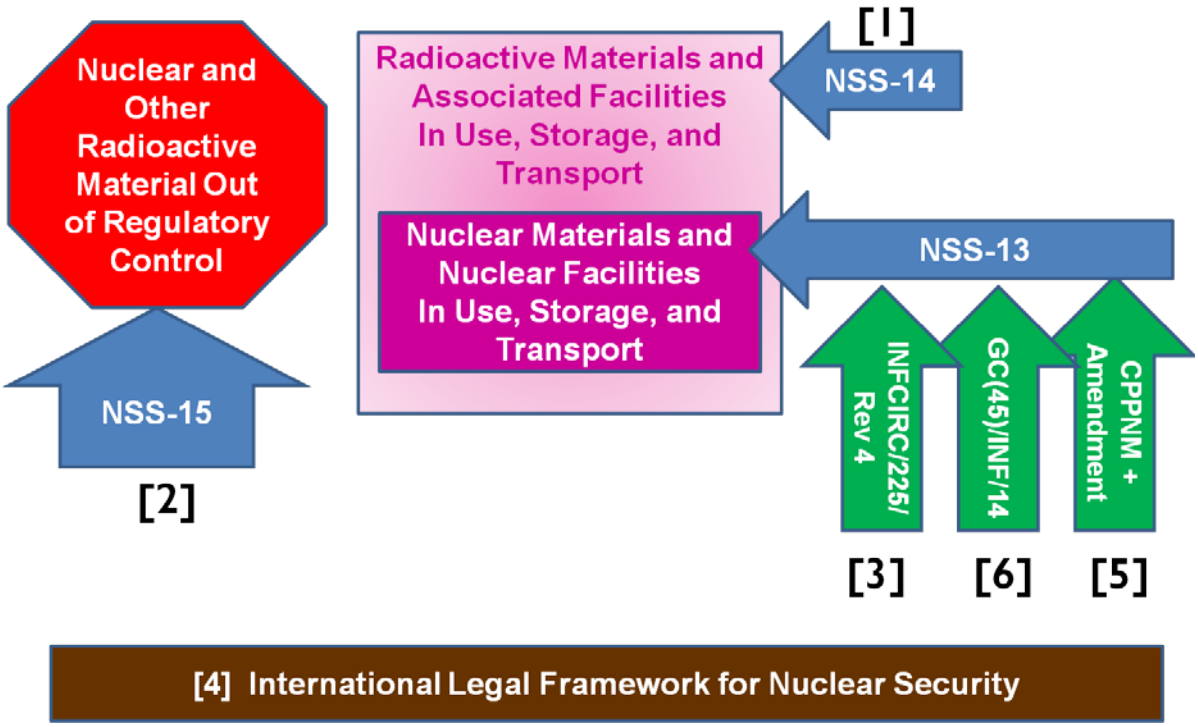
unacceptable radiological consequences. A level of radiological consequences, established by the State, above which the implementation of *physical protection measures* is warranted.

unauthorized removal. The theft or other unlawful taking of *nuclear material*.

vital area. Area inside a *protected area* containing equipment, systems or devices, or *nuclear material*, the *sabotage* of which could directly or indirectly lead to high radiological consequences..

Terms Deleted from Revision 4 to 5	Terms Modified from Revision 4 to 5
Assessment Intrusion Detection Patrol Security Survey	Central Alarm Station Defence in Depth Inner Area Physical Barrier Protected Area Response Forces Sabotage Transport Control Centre Vital Area

References



[1] INTERNATIONAL ATOMIC ENERGY AGENCY. Nuclear Security Recommendations on Radioactive Material and Associated Facilities, IAEA Nuclear Security Series No. 14, IAEA. Vienna (2011).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Texas Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control. IAEA Nuclear Security Series No. 15, IAEA. Vienna (2011).

[3] Physical Protection of Nuclear Material and Nuclear Facilities. INFCIRC/225/Rev.4 (Corrected). IAEA, Vienna (1999).

[4] INTERNATIONAL ATOMIC ENERGY AGENCY. The International Legal Framework for Nuclear Security. IAEA International Law Series No. 4. IAEA. Vienna (2011).

[5] Convention on the Physical Protection of Nuclear Material (CPPNM). INFCIRC/274/Rev. 1. IAEA. Vienna (1980): Amendment to the Convention on the Physical Protection of Nuclear Material. GOV/INF12005/10—GC(49)1NF/6, IAEA, Vienna (2005).

[6] Measures to Improve the Security of Nuclear Materials and other Radioactive Materials, GC(45)/1NF/14. IAEA. Vienna (14 September 2001).

Session 2
INFCIRC/225 Revision 5 – OBJECTIVES

Overall Objective (2.1)

Protect persons, property, society, and the environment from malicious acts involving nuclear material and other radioactive material.

Objectives of State's Physical Protection Regime (2.1)

- To protect against unauthorized removal: protecting against theft and other unlawful taking of nuclear material.
- To locate and recover missing nuclear material: ensuring the implementation of rapid and comprehensive measures to locate and, where appropriate, recover missing or stolen nuclear material.
- To protect against sabotage: protecting nuclear material and nuclear facilities against sabotage.
- To mitigate or minimize effects of sabotage: mitigating or minimizing the radiological consequences of sabotage.

Changes in Objectives

- Revision 5 - The establishment of four distinct physical protection objectives
    - To protect against unauthorized removal…
    - To locate and recover missing nuclear material
    - To protect against sabotage…
    - To mitigate or minimize effects of sabotage
- Revision 4
    - 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 rapid and comprehensive measures by the State to locate and recover missing nuclear material and to cooperate with safety authorities in minimizing the radiological consequences of sabotage which were part of Revision 4's two objective, but not covered in Revision 4.

Objective Achievement (2.2)

- Prevention of a malicious act by means of deterrence and by protection of sensitive information
- Management of an attempted malicious act or a malicious act by an integrated system of detection, delay, and response
- Mitigation of the consequences of a malicious act

Approach (2.3)

Integrated and coordinated manner, taking into account the different risks covered by nuclear security

Session 2 Discussion

1. Does the physical protection regime have measures for
    a. Locating and recovering missing or stolen nuclear material?
    b. Mitigating or minimizing radiological consequences from sabotage?

2. How is material determined to be missing or stolen?

3. When is the nuclear material considered out of regulatory control?

4. What provisions are made for locating and recovering nuclear material?

5. How is a graded approach applied to sabotage consequences?

6. How does the State determine high consequences facilities?

7. What provisions exist for mitigating or minimizing radiological consequences?

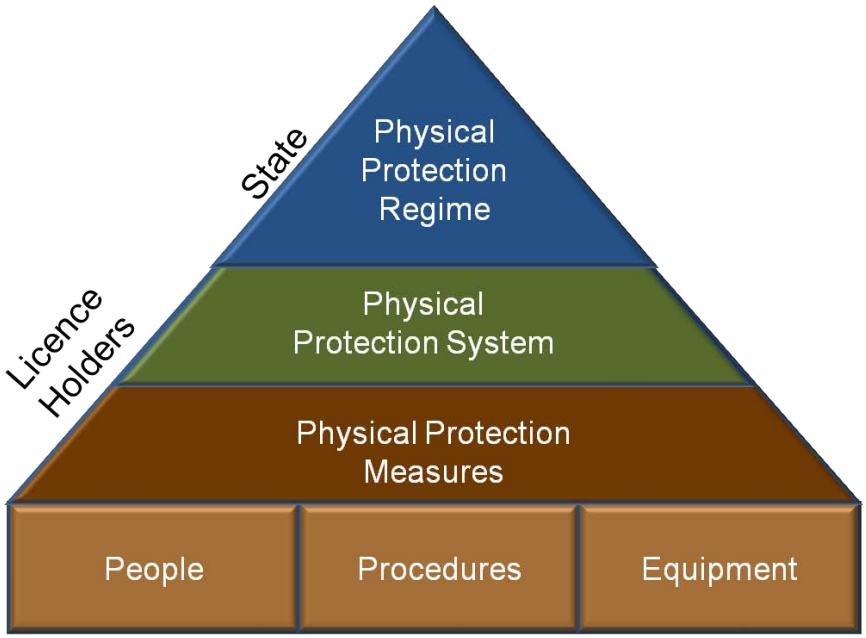
Session 3
OVERVIEW OF A PHYSICAL PROTECTION REGIME

Per the definition in INFCIRC/225/Revision 5, a State's Physical Protection Regime is comprised of

Physical Protection Regime Entities

- State
- Competent Authority
- Licence Holders
  - Operator of nuclear facilities
  - Shipper for transport of nuclear materials
- Nuclear Security Culture crosses all three levels

Physical Protection



Elements of A State's Physical Protection Regime

Part 1
Session 3

- State responsibility (Fundamental Principle A)
- International transport (Fundamental Principle B)
- Assignment of physical protection responsibilities

Part 2
Session 4

- Legislative and regulatory framework
  - Legislative and regulatory framework (Fundamental Principle C)
  - Competent authority (Fundamental Principle D)
  - Responsibilities of licence holders (Fundamental Principle E)
- International cooperation and assistance

Part 3
Session 5

- Identification and assessment of threats (Fundamental Principle G)

Part 4
Session 6

- Risk-based physical protection system and measures
  - Risk management
  - Graded approach (Fundamental Principle H)
  - Defence in depth (Fundamental Principle I)

Part 5
Session 7

- Sustaining the physical protection regime
  - Security culture (Fundamental Principle F)
  - Quality assurance (Fundamental Principle J)
  - Confidentiality (Fundamental Principle L)
  - Sustainability program

Part 6
Session 8

- Planning and preparedness for and response to nuclear security events (Fundamental Principle K)

REGIME ELEMENTS - PART 1

State Responsibility - Fundamental Principle A

The responsibility for the establishment, implementation, and maintenance of a physical protection regime within a State rests entirely with that State.

- Establishment, implementation, and maintenance of a physical protection regime
  - All nuclear material in use and storage
  - During transport
  - For all nuclear facilities
- Protection of nuclear material and nuclear facilities
  - Unauthorized removal
  - Sabotage
- State Responsibility
- Regular updates to reflect
  - Changes in threat
  - Advances in physical protection
    - Approaches
    - Systems
    - Technology
  - Introduction of new types of nuclear material and nuclear facilities

Additional State Responsibilities

- Section 4 – Requirements for Measures to Locate and Recover Missing or Stolen Nuclear Material (4.50-4.56)
  - Ensure rapid response and comprehensive measures to locate and recover missing or stolen material
  - Define roles and responsibilities for organizations
  - Ensure operator has contingency plans to locate and recover
  - Ensure all responsible State organizations have contingency plans to locate and recover any declared missing or stolen nuclear material (NSS-15 now applies)
  - Develop arrangements and protocols between appropriate response organizations and operators
  - Conduct evaluation exercises to assess and validate contingency plan and to train participants
  - Regularly review and update contingency plans

Additional State Responsibilities (continued)

- Section 5 – Requirements for Associated Measures to Mitigate or Minimize the Radiological Consequences of Sabotage (5.45-5.53)
    - Define roles and responsibilities for organizations
    - Contingency Planning
        - Develop contingency plans with prescribed content and make available to all relevant organizations
        - State's contingency plans complement operator contingency plans
        - Ensure operator has contingency plans to mitigate and minimize radiological consequences
    - Develop arrangements and protocols between appropriate response organizations and operators
    - Conduct joint exercises
        - To assess and validate contingency plan evaluation and to train participants
        - That simultaneously test emergency and contingency plans
    - Regularly review and update contingency plans
    - Ensure that response forces are familiar with sites and sabotage targets and have adequate knowledge of radiation protection measures

Contingency Plans (5.48)

- Description of the objectives, policy, and concept of operations for the response to
    - Sabotage
    - Attempted sabotage
- Structure, authorities, and responsibilities for a systematic, coordinated, and effective response

Contingency Plan	Emergency Plan
Includes measures which focus on preventing further damage, on securing the nuclear facility, and on protecting emergency equipment and personnel	Consists of measures to ensure mitigation or minimization of the radiological consequences as well as human errors, equipment failures and natural disasters

Contingency plans and emergency plans should be comprehensive and complementary

International Transport - Fundamental Principle B

The responsibility of a State for ensuring that nuclear material is adequately protected extends to the international transport thereof, until that responsibility is properly transferred to another State, as appropriate

- Continuous control of nuclear material while under jurisdiction of the State
- Custody transfer process
  - Fellow CPPNM party
  - Formal agreement for continued appropriate physical protection
  - Coordination and status communications
- Special provisions for Category I material

Assignment of Physical Protection Responsibilities

- At all levels of involved governmental entities
  - Competent authorities
  - Response forces
  - Operators
  - Shippers/Carriers
  - Emergency response
- Clear lines of responsibility

Session 3 Discussion

State Responsibility - Fundamental Principle A

1. Does your State have a clearly defined physical protection regime that includes
    - Nuclear material in use, storage, and during transport?
    - Unauthorized removal from nuclear facilities and sabotage of nuclear facilities and nuclear material?
    - Process for regular updates?

International Transport - Fundamental Principle B

1. Does your physical protection regime have provisions for international transport of nuclear materials?

2. Is the process for international transports established and documented? Where?

Assignment of Physical Protection Responsibilities

1. How are the roles and responsibilities within the physical protection regime established and documented with clear lines of responsibility?

Session 4
REGIME ELEMENTS - PART 2

Legislative and Regulatory Framework Fundamental Principle C

The State is responsible for establishing and maintaining a legislative and regulatory framework to govern physical protection. This framework should provide for the establishment of applicable physical protection requirements and include a system of evaluation and licensing or other procedures to grant authorization. This framework should include a system of inspection of nuclear facilities and transport to verify compliance with applicable requirements and conditions of the licence or other authorizing document and to establish a means to enforce applicable requirements and conditions, including effective sanctions.

- Laws to establish and ensure proper implementation of the physical protection regime
- Requirements for physical protection
    - Unauthorized removal of nuclear material
        - In use or storage
        - During transport
    - Sabotage of
        - Nuclear facilities
        - Nuclear material
        - During transport
- Trustworthiness policy
- Information Security
- Enforcement
- Sanctions (including criminal penalities)
- Interfaces with
    - Nuclear safety
    - Nuclear material accountancy and control
    - Radiation protection
    - Emergency response
- Regulatory framework
    - Licencing
    - Regulations
    - Evaluations
        - Compliance
        - Test physical protection systems including training and readiness of guards and/or response forces

Competent Authority - Fundamental Principle D

The State should establish or designate a competent authority that is responsible for the implementation of the legislative and regulatory framework and is provided with adequate authority, competence, and financial and human resources to fulfill the assigned responsibilities. The State should take steps to ensure an effective independence between the functions of the State's competent authority and those of any other body in charge of the promotion or utilization of nuclear energy.

- Designated by the State with clearly defined legal status and independent from
  - Applicants
  - Operators
  - Shippers
  - Carriers
- Provided adequate
  - Authority
  - Competence
  - Financial resources
  - Human resources
- Have access to State's system for nuclear material accountancy and control
- Be responsible for verifying continued compliance
- Conducting evaluation based on performance testing
- Ensure corrective actions are taken when needed
- Provide timely reports for nuclear security events

Licence Holders - Fundamental Principle E

The responsibilities for implementing the various elements of physical protection within a State should be clearly identified. The State should ensure that the prime responsibility for the implementation of physical protection of nuclear material or of nuclear facilities rests with the holders of the relevant licences or of other authorizing documents (e.g., operators or shippers).

- Compliance with regulations
- Cooperation & coordination with State entities having physical protection responsibilities
- Material accountancy and control
- Development of security plan and contingency plan

- Optimum site selection and design
- Development and implementation of means and procedures for evaluation and maintenance of the PPS
- Compensatory measures

International Cooperation and Assistance

- Exchange information on physical protection techniques and practices
- Provide points of contact to the IAEA
- Share credible threat intelligence or information on nuclear security events

Session 4 Discussion

Legislative and Regulatory Framework Organizations

Name the associated responsible organization for the following physical protection regime legislative and regulatory framework elements.

Legal and Regulatory Framework Element	Responsible Japanese Organization
International transportation	
Assignment of responsibilities within all levels of involved governmental entities	
Formulation for defining a threat assessment and, if needed, a design basis threat	
Requirements for physical protection	
Requirements for licensing	
Requirements for evaluating elements of a physical protection system	
Specification of a trustworthiness policy	
Requirements for enforcing physical protection regulations	
Sanctions against the unauthorized removal and against sabotage	
Designation of a competent authority	
Protocols for interacting with the International Atomic Energy Agency	
Risk-management process capable of maintaining the risk of unauthorized removal and sabotage at acceptable levels	
Identifying methods to ensure an effective nuclear security culture is established	
Quality assurance policy and quality assurance programmes	
Requirements and sanctions for protecting the confidentiality of information,	
Sustainability programme sustained and long term by commitment of necessary resources	
Contingency plan to respond to unauthorized removal of nuclear material or sabotage of nuclear facilities or nuclear material	
Rapid and comprehensive measures to locate and recover missing or stolen nuclear material during transport	
International cooperation points of contact	

Additional Questions

Legislative and Regulatory Framework Fundamental Principle C

1. Do the laws for the physical protection regime cover:

    - Unauthorized removal of nuclear material
        - In use or storage
        - During transport
    - Sabotage of
        - Nuclear facilities
        - Nuclear material
        - During transport

2. Do the laws include policies for

    - Trustworthiness
    - Information Security
    - Enforcement
    - Sanctions (including criminal penalties)

3. Does the regulatory framework include

    - Licencing requirements
    - Physical protection requirements
    - Inspection/evaluation requirements for
        - Compliance to PPS requirements
        - Performance testing of PPS

Competent Authority - Fundamental Principle D

1. Do you have a designated competent authority for physical protection?
2. Do you have a designated competent authority or state agency responsible for response forces?
3. Are your licensing requirements and process well documented?
4. Do your inspection processes include regular performance, inspection criteria, and performance-based evaluations?
5. What mechanisms exist for coordination and cooperation between State agencies associated with physical protection?

Licence Holders - Fundamental Principle E

Do you have

1. Process to integrate physical protection requirements into site selection and design processes?
2. Mechanisms for demonstrating compliance with State's regulations?
3. Evaluations that include performance testing?
4. Security plan, contingency plan, compensatory measures, emergency plan?

International Cooperation and Assistance

1. How do you keep up to date on physical protection techniques and practices?

2. Who are your points of contact to the IAEA?

3. What mechanisms do you have for sharing threat and event information?

Session 5
REGIME ELEMENTS - PART 3

Identification and Assessment of Threats - Fundamental Principle G

The State's physical protection should be based on the State's current evaluation of the threat.

- Explicitly includes insider threat
- Suggests design basis threat is only needed for Cat I material and high radiological consequences
- Recommends the required use as a common basis for design and implementation of PPS
- Be continuously updated
- Includes airborne threat and stand-off attacks

Session 5 Discussion

Identification and Assessment of Threats - Fundamental Principle G

1. Does the State have a threat assessment?
2. Is a design basis threat (DBT) needed?
3. If so, who develops the DBT?
4. Does the threat assessment/DBT include
    a) Insider threat?
    b) Airborne threat?
    c) Stand-off attack?
5. How is the threat assessment/DBT updated and when?
6. How is the DBT used?

Session 6
REGIME ELEMENTS - PART 4

RISK BASED PHYSICAL PROTECTION SYSTEM AND MEASURES

Risk Management

- State is now asked to manage the risk of theft and sabotage to keep the risk at acceptable levels
- Risks can be managed by
    - Reducing the likelihood of an attack
    - Improving the effectiveness of the security system
    - Reducing the potential consequences of a malicious act

Graded Approach - Fundamental Principle H

Physical protection requirements should be based on a graded approach, taking into account the current evaluation of the threat, the relative attractiveness, the nature of the nuclear material, and potential consequences associated with the unauthorized removal of nuclear material and with the sabotage against nuclear material or nuclear facilities.

- Takes into account the current evaluation of the threat
    - Relative attractiveness/nature of the nuclear material
    - Potential consequences associated with
        - Unauthorized removal
        - Sabotage
- Requires determination of
    - Risk thresholds
    - Unacceptable radiological consequences
    - Commensurate protection levels

Defence in Depth - Fundamental Principle I

The State's requirements for physical protection should reflect a concept of several layers and methods of protection (structural, other technical, personnel, and organizational) that have to be overcome or circumvented by an adversary in order to achieve his objectives.

- Physical Protection System has layers of protection
- Includes mixture of protection methods
    - Hardware (security devices)
    - Procedures (including the organization of guards and the performance of heir duties)
    - Facility Design (including layout)
- Applies to detection, delay, and response
- Takes into account system for nuclear material accountancy and control to protect against insiders and external threats

Session 6 Discussions

Risk Based Physical Protection System and Measures

1. How does the physical protection regime establish and maintain the risk of unauthorized removal and sabotage to acceptable levels?

2. How are risk levels determined?

Graded Approach - Fundamental Principle H

1. How are protection measures requirements determined so they are commensurate with risk?

2. How is the graded approach applied to

    a) Threat?

    b) Relative material attractiveness/nature of the material?

    c) Unacceptable radiological consequences?

Defence in Depth - Fundamental Principle I

1. Do the protection layers at sites include a mixture of

    a) Hardware?

    b) Procedures?

    c) Facility design?

2. Do the transports used have a mixture of hardware and procedures that can be described as protection layers? What is in each layer?

Session 7
REGIME ELEMENTS -PART 4

SUSTAINING THE PHYSICAL PROTECTION REGIME

Nuclear Security Culture - Fundamental Principle F

All organizations involved in implementing physical protection should give due priority to the security culture, to its development and maintenance necessary to ensure its effective implementation in the entire organization.

- Consistent with Nuclear Security Culture (NSS-7)
- Recognition that a credible threat exists and that the individual plays an important role in preserving nuclear security
- Includes strong security policies, good guidelines, and regular security training for State, Organization, managers in organizations, and individuals

A security regime can fail if those involved do not appreciate the threat and its potential consequences or do not fully appreciate the importance of their role.

Quality Assurance - Fundamental Principle J

A quality assurance policy and quality assurance programmes should be established and implemented with a view to providing confidence that specified requirements for all activities important to physical protection are satisfied.

- Established and implemented to provide confidence that specified requirements for all activities important to physical protection are satisfied
  - Design
  - Implementation
  - Operation
  - Maintenance
- In a condition capable of effectively providing physical protection against unauthorized removal and sabotage

Confidentiality - Fundamental Principle L

The State should establish requirements for protecting the confidentiality of information, the unauthorized disclosure of which could compromise the physical protection of nuclear material and nuclear facilities.

- Protects information that the unauthorized disclosure of which could compromise physical protection
- Limits access to sensitive information to those with
  - Established trustworthiness
  - Need to know
- Provides sanctions against person violating confidentiality

Sustainability Programme

- Provides the long-term commitment for the necessary resources to maintain physical protection systems including:
  - Operating procedures
  - Human resource management and training
  - Equipment updating maintenance, repair and calibration
  - Performance testing and operational monitoring
  - Configuration management
  - Resource allocation and operational cost analysis

Session 7 Discussions

Nuclear Security Culture - Fundamental Principle F

1. How involved are the State, organizations, managers, and individuals in establishing and maintaining an effective nuclear security culture?

2. How pervasive is the nuclear security culture?

3. What training supports the development of a nuclear security culture?

Quality Assurance - Fundamental Principle J

1. Do you have a quality assurance
    a) Policy?
    b) Program?
2. How do you assure confidence that physical protection systems are adequately performing?

Confidentiality - Fundamental Principle L

1. How do you identify sensitive information?

2. Do you have provisions for the protection of sensitive information?

3. How is access to this information limited?

Sustainability Programme

1. What resources do you have in place to ensure continuity of physical protection systems?

   a) Human resources

   b) Technology

   c) Procedures

   d) Configuration management

   e) Financial

Session 8
REGIME ELEMENTS - PART 5

Planning and Preparedness for and Response to Nuclear Security Events Fundamental Principle K

Contingency (emergency) plans to respond to unauthorized removal of nuclear material or sabotage of nuclear facilities or nuclear material, or attempts thereof, should be prepared and appropriately exercised by all licence holders and authorities concerned.

- State's physical protection measures to address
  - Response to unauthorized removal of nuclear material in use, in storage, or during transport
  - Location and recovery of missing or stolen nuclear material
  - Response to sabotage or attempted sabotage of nuclear facilities or nuclear material in use, in storage, or during transport
  - Mitigation/minimization or radiological consequences of sabotage

Contingency Plans

- Roles, Responsibilities, and Associated Structure
- Description of Objectives
- Policy and concept of operations for a systematic, coordinated, and effective response
- Arrangement and protocols for appropriate State agencies, operators/shippers/carriers, and other response organizations or relevant entities
- Plans to counter the threat assessment or design basis threat
- Actions of the response force both on-site and off-site
- Maintenance of physical protection effectiveness
- Exercised to
  - Assess and validate contingency plans
  - Train participants
  - Ensure response forces
    - Are familiar with
      - Sites
      - Nuclear material locations
      - Sabotage targets
    - Have adequate knowledge of radiation protection

Session 8 Discussions

Planning and Preparedness for and Response to Nuclear Security Events Fundamental Principle K

1. Do your contingency plans include

   - Location and recovery of missing or stolen materials?
     - From nuclear facilities
     - During transport

   - Mitigation/minimization of the radiological consequences of sabotage?
     - Nuclear materials in use, in storage, or during transportation
     - Nuclear facilities or transports

   - Response forces actions on-site and off-site?

   - Roles, responsibilities, and associated structure for systematic, coordinated, and effective response?

   - Provision to exercise?

2. How are your contingency plans exercised and how often?

Session 9
SUMMARY

Summary of New Elements

- Risk Management with graded approach
- Sustaining the Physical Protection Regime
  - Security Culture
  - Confidentiality
  - Graded Approach
  - Quality Assurance
- Location and Recovery of Missing or Stolen Nuclear Material
- Minimize/Mitigate Consequences of Nuclear Sabotage

Additional Considerations

- Information Security including
  - Physical protection information
  - Digital alarm and communication
  - Digital instrumentation and control
- Personnel Trustworthiness interfaces with
  - Nuclear material accountancy and control
  - Nuclear safety

Summary of Where More Detail Was Provided

- Clarification of use for design basis threat (DBT) and State's threat assessment
  - Category I
  - High consequences facilities
- New Threat Consideration
  - Stand-off attacks
  - Suicidal attacker - application of self-protecting principle
- Performance testing
- Contingency planning versus emergency planning

Conclusion

- Now Aligns with CPPNM
  - 4 Physical Protection Objectives
  - 12 Fundamental Principles of Physical Protection
  - Realization of the Physical Protection Regime
- Based on risk management and performance testing
- Recommend elements for a physical protection regime

Summary Tables

INFCRIC/225/Revision 5 references pertaining to the responsibilities for each of the following Physical Protection Regime entities.

Topic	INFCIRC/225/Revision 5 Reference
STATE	
Physical Protection Regime	3.1-3.58
Unauthorized Removal	4.6, 4.20
Locate and Recover	4.50-59
Sabotage	5.4-6
Mitigate/Minimize Consequences	5.45-53
Transport	6.20, 6.24, 6.58, 6.45-51, 6.61-69
COMPETENT AUTHORITY	
Fundamental Responsibilities	3.18-22
Legislative and Regulatory Framework	3.12
Pertaining to Licence Holders	3.24, 3.26-27, 3.30
Threats	3.38-39
Nuclear Security Events	3.58-59
Unauthorized Removal	4.8, 4.35
Locate and Recover	4.60, 4.62
Sabotage	5.1, 5.9, 5.15, 5.41
Transport	3.7, 6.22, 6.27, 6.33-34
LICENCE HOLDER	
General Responsibilities	3.24-30
Unauthorized Removal*	4.1-49
Locate and Recover	4.57-63
Sabotage	5.1-43
Mitigate/Minimize Consequences	5.54-58
Transport*	6-1-43, 6.52-59, 6.70-73

*Depends on Category of Nuclear Material

Category-Based Physical Protection Requirements

Topic	Category 1	Category II	Category III
Unauthorized Removal	4.1-49	4.1-35	4.1-20
Transport	6.1-43	6.1-31	6.1-18