



DEVELOPING AND SUSTAINING A PHYSICAL PROTECTION REGIME FOR NUCLEAR MATERIAL DURING TRANSPORT USE STORAGE AND FOR NUCLEAR FACILITIES

**INTERNATIONAL CONFERENCE ON PHYSICAL PROTECTION FOR NUCLEAR
MATERIAL AND NUCLEAR FACILITIES
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Background

IAEA,UNSCR,IPPAS mission and activities

PAST ,PRESENT AND THE FUTURE OF THE CPPNM

PHYSICAL PROTECTION AND NUCLEAR SECURITY INTERFACES

STATE'S ROLE for DEVELOPING NATIONAL PHYSICAL PROTECTION REGIME

Development of the PPR

Sustainability of the PPR

Conclusion

Background

- ❑ Nuclear Material Used worldwid to support the Development of different activities.
- ❑ Nuclear Material demands and requires the application of an effective Nuclear Security measures to keep them secured within the state.
- ❑ Protecting Nuclear Material hosted within the state and Also during their International Transport, use, Storage and In Nuclear facilities has been not Just matter at the International level, but Also has been as necessary concerns as a big challenges facing the international and national community.
- ❑ In the last years the terrorism has became a real threat in our nation and the probability for using NM could be real.
- ❑ In 2009, the President of US Mr Barak OBAMA has adressed the world in Prague that the Nuclear Terrorism is the one of the greatest threat facing the International Security.
- ❑ The NSS was considered as an important milestone to bring head of the state and the stakeholders involved on nuclear security to cooperate with each other.
- ❑ The entry in the force of the CPPNM was a result of the NSS as announced by the DG OF THE IAEA to bring state to work together to ensure the PPR of NM and NF.

International Atomic Energy Agency:

- ❑ Launched by the United Nations in 1957 .
- ❑ IAEA plays an important role at the international level in securing Nuclear and Radiological Materials that seeks to promote the peaceful use of Nuclear Energy.
- ❑ As an International Atomic Authority Regulatory, the IAEA provides different regulations, conventions, recommendations and guidelines in different topics related to the use of nuclear and radiological material aimed to help the member states of the IAEA to enhance the security of nuclear materials during their life cycles.
- ❑ The IAEA has actively involved on the development of the convention of physical protection of nuclear material which was revised 5 times in order to strength the physical Protection of nuclear material during transport use storage and for nuclear facilities.



Credit: Dean Calma/IAEA



United Nation Security Council Resolution (UNSCR) 1540:

- ❑ Aims to prohibit the proliferation of weapons of mass destruction such as Nuclear, Biological and Chemical weapons
- ❑ Adopted by the United Nation, in April 2004 under the chapter VII of the UN binding obligation for the first time.
- ❑ The UNSCR 1540 was created to oblige the member states of the UN to have and impose effective and appropriate measures to prevent the proliferation of mass destruction.
- ❑ Additionally, the member states have three fundamental obligations that are:
 - ✓ Prohibit support to non-State actors searching such substances;
 - ✓ Adopt and enforce effective laws aiming to prohibit the proliferation of such substances with prohibiting any financial or assistants support to non actor- states;
 - ✓ Take effective measures to control those items



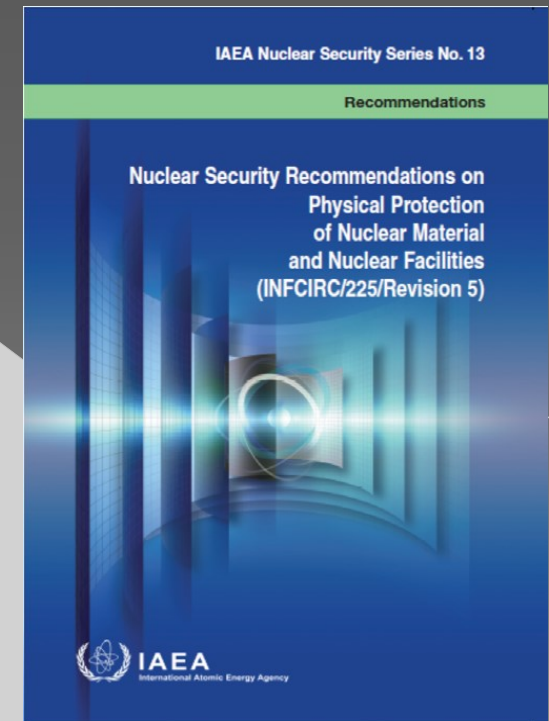
International Physical Protection Association Services: IPPAS

- ❑ Created by the International Atomic Energy Agency 20 years ago in 1995.
- ❑ The International Physical Protection Association Services helps the member states of the IAEA to strength their Nuclear Security Regime based on different guidance provided by the Agency.
- ❑ Gathers a numerous of the International Nuclear Security Experts who visit the member states of the IAEA if requested in the aim to help it to implement design and Establish their Physical Protection Regime of Nuclear and Radiological Material and associated facilities.
- ❑ The IPPAS expert 's reviewed and compared the state's physical protection regime established with the International Atomic Energy Agency guidelines as (INFCIRC/225/5) and after the mission the IPPAS Wrote confidential report to the IAEA which focuses on different areas like government organizations, regulations, physical protection, legislations, inspections and licensing, and also physical protection implementation measures for nuclear facility.
- ❑ IPPAS has marked an important milestone worldwide when it has succeeded to help Canada and Netherlands to implement and establish robustness Nuclear Security Regime

PAST ,PRESENT AND THE FUTURE OF THE CPPNM

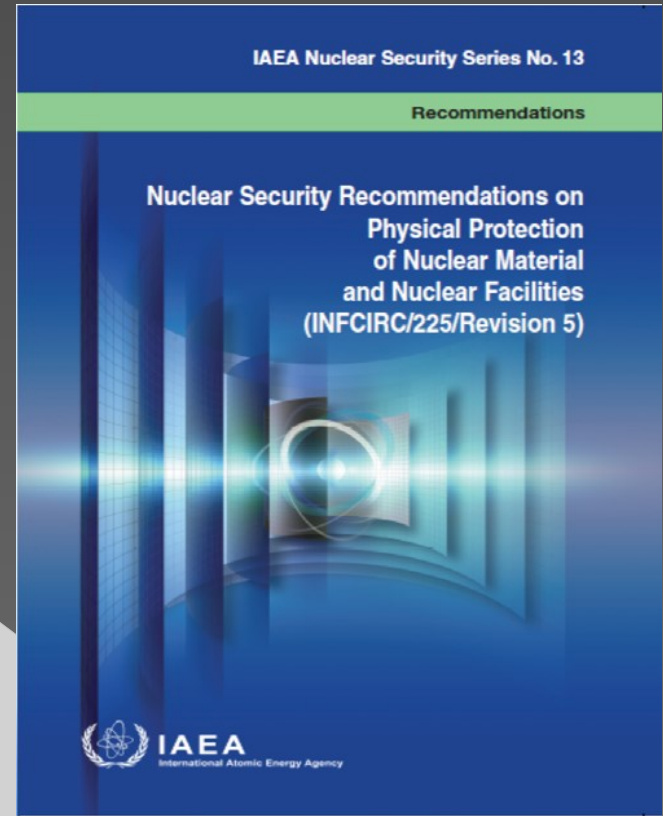
- ❑ Was Proposed by the United states in 1974 and the Text of the convention adopted in october 1979 in Vienna.
- ❑ Opened For signature in March 1980 and Entered in force in February 1980.
- ❑ The CPPNM was adopted to ensure the Physical Protection of Nuclear Material during their International transport in the Past.
- ❑ The CPPNM, contains specific requirements adressing to the different actors involved on the transport of the Nuclear Material as the consignee and the consigner.
- ❑ The CPPNM categorizes the Nuclear Material for the Most Dangerous to the modest which provides specific measures Should be taken.
- ❑ The CPPNM revised 5 times successively by the IAEA and Now applied to ensure the PP for NM during transport, use, Storage and for Nuclear Facilities last revision was in January 2011 under the title of INFCIRC/225/Rev.5 and Entered in force on 8 May 2016 .
- ❑ The IAEA has taken an intelligent step to oblige its member States to reinforce their PPR by transferring the amended of the CPPNM as IAEA Nuclear Security Series NO.13.

IT will be the revision 6?



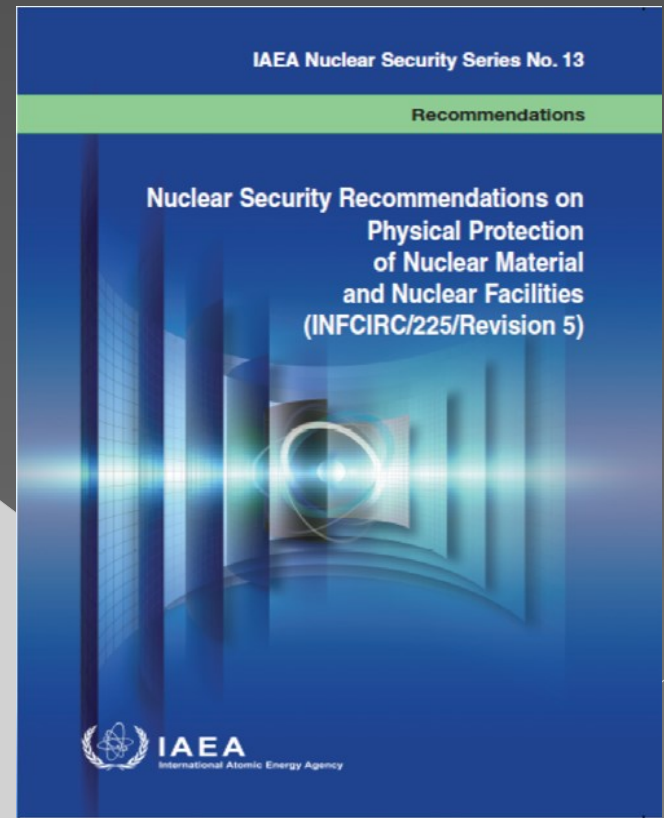
State's objectif of the PPR

- ❑ 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.



State's objective of the PPR

- ❑ The State's physical protection regime should seek to achieve these objectives through:
 - ✓ 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



PHYSICAL PROTECTION REGIME

Fundamentals Principles

- A. Responsibility of the State
- B. Responsibilities During International Transport
- C. Legislative and Regulatory Framework
- D. Competent authority
- E. Responsibility of the License Holders
- F. Security Culture
- G. Threat
- H. Graded Approach
- I. Defense in Depth
- J. Quality Assurance
- K. Contingency Plans
- L. Confidentiality

PHYSICAL PROTECTION REGIME

Fundamentals Principles

- ❑ **Responsibility of the state:** The responsibility for the establishment, implementation and maintenance of a physical protection regime within a state rests entirely with that state .
- ❑ **Responsibilities during international transport:** The responsibility of a state for ensuring that nuclear material is adequately protected extends to its international transport, until that responsibility is properly transferred to another state
- ❑ **Legislative and regulatory framework:** The state is responsible for establishing and maintaining a legislative and regulatory framework to govern physical protection, including a system of evaluation, licensing, inspection of nuclear facilities and transport to verify compliance with applicable
- ❑ **Competent authority:** The state should establish or designate a competent and independent well-resourced authority responsible for the implementation of the legislative and regulatory framework.
- ❑ **Responsibility of the license holders:** The state should ensure that the prime responsibility for the implementation of physical protection of nuclear material or facilities rests with the holders of the relevant licenses or of other authorizing documents (e.g., operators or shippers).

PHYSICAL PROTECTION REGIME

Fundamentals Principles

- ❑ **Security culture:** All organizations involved in implementing physical protection should give due priority to the development and maintenance of an appropriate security culture, within the entire organization
- ❑ **Threat:** Physical protection should be based on the state's current threat evaluation.
- ❑ **Graded approach:** Physical protection requirements should be based on a graded approach, taking into account the current threat evaluation, and the nature of the material and potential consequences associated with its unauthorized removal or sabotage against nuclear material or nuclear facilities.
- ❑ **Defence in depth:** Requirements for physical protection should reflect a concept of several layers and methods of protection that have to be overcome or circumvented by an adversary.
- ❑ **Quality assurance:** Quality assurance policies and programmes should be established and implemented to provide confidence that specified requirements for all activities important to physical protection are satisfied.
- ❑ **Contingency plans:** Contingency (emergency) plans to respond to unauthorized removal of nuclear material or sabotage of nuclear facilities or nuclear material should be prepared and appropriately exercised by all license holders and authorities.
- ❑ **Confidentiality:** 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

PHYSICAL PROTECTION AND NUCLEAR SECURITY INTERFACES

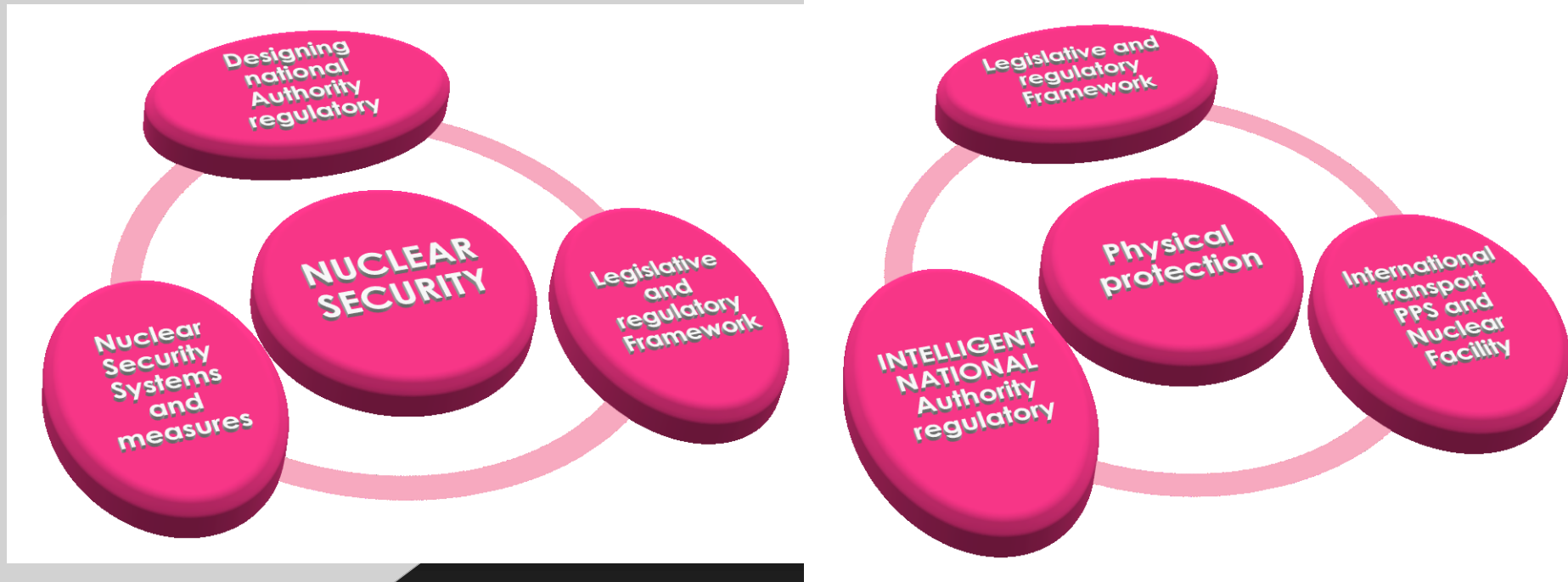
Nuclear Security

- ❑ IAEA defines the NS as the prevention and detention of, and response to, theft, sabotage unauthorised access and other such criminal or international malicious acts involving Nuclear Material, radioactive material and associated facilities or activities.
- ❑ NS has as objectives to protect people, environment and the society against the unlawful consequences of ionizing radiation.
- ❑ NS coexist with the Safety but focuses on a common purpose.
- ❑ Nuclear Security bases on principles functions that are detention prevention and response.
- ❑ NS requires Confidentiality, based on the graded approach and defense in depth according to the categorization of NM.

Physical Protection

- ❑ Used to characterize what is Now known as the Nuclear Security of Nuclear Material and Facility.
- ❑ Defined as a variety of Physical Security measures aiming to keep the PP of NM and NF against theft, sabotage, diversion and other unlawful acts.
- ❑ PP includes the personnel, procedures and equipment that constitute a physical protection system (NSS13).
- ❑ Aiming to prevent insider and outsider threat collusion as preventive and protective measures.
- ❑ Based on the graded approach, defence in depth and confidentiality.
- ❑ The PP considered as a part of the safety.
- ❑ PP consists on three fundamentals systems as deterrence, prevention and response.

PHYSICAL PROTECTION AND NUCLEAR SECURITY INTERFACES



→ The physical protection encompasses with the nuclear security and made an effective security measures to protect nuclear material during use, storage, transport and for nuclear facilities.

STATE'S ROLE for DEVELOPING NATIONAL PHYSICAL PROTECTION REGIME

- ❑ The responsibility for the establishment, implementation and maintenance of a physical protection regime within a state rests entirely with that state .
- ❑ State is first responsible for designing an intelligent National Authority Regulatory to govern the PPR within the state's as a part of its responsibility .
- ❑ State has the first responsibility to implement an effective PPR legislative and regulatory framework based on the CPPNM Under the review of the IPPAS.
- ❑ State should address those who would govern or manage the NM within its borders to design an effective PPS as part of its responsibility.
- ❑ State have to address directly to the consignee and the consigner to respect the requirements announced on its regulation as they have the responsibility to ensure the PP of nuclear material or nuclear facilities .
- ❑ State should review periodically its regulation according to the new revision providing by the IAEA

Effective Physical Protection Regime

Designing
National
authority
regulator



legislative
and
regulatory
framework



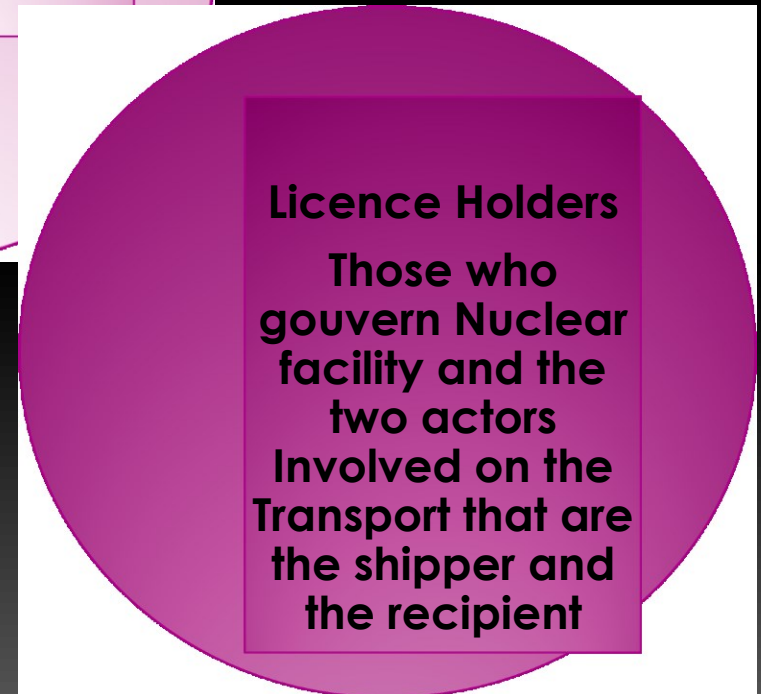
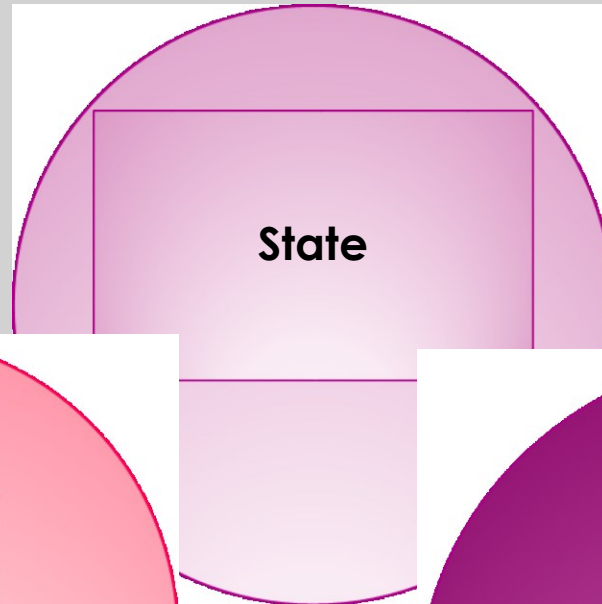
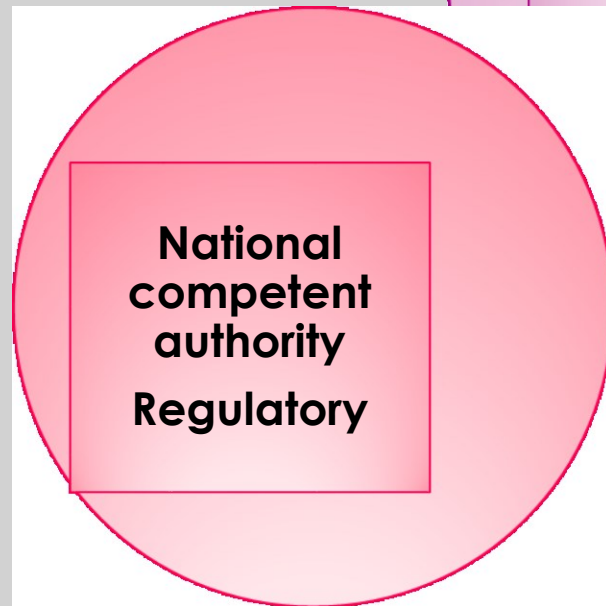
development
of the physical
protection
systems



Physical
Protection
Regime

Principal stakeholders Involved on the PPR

17



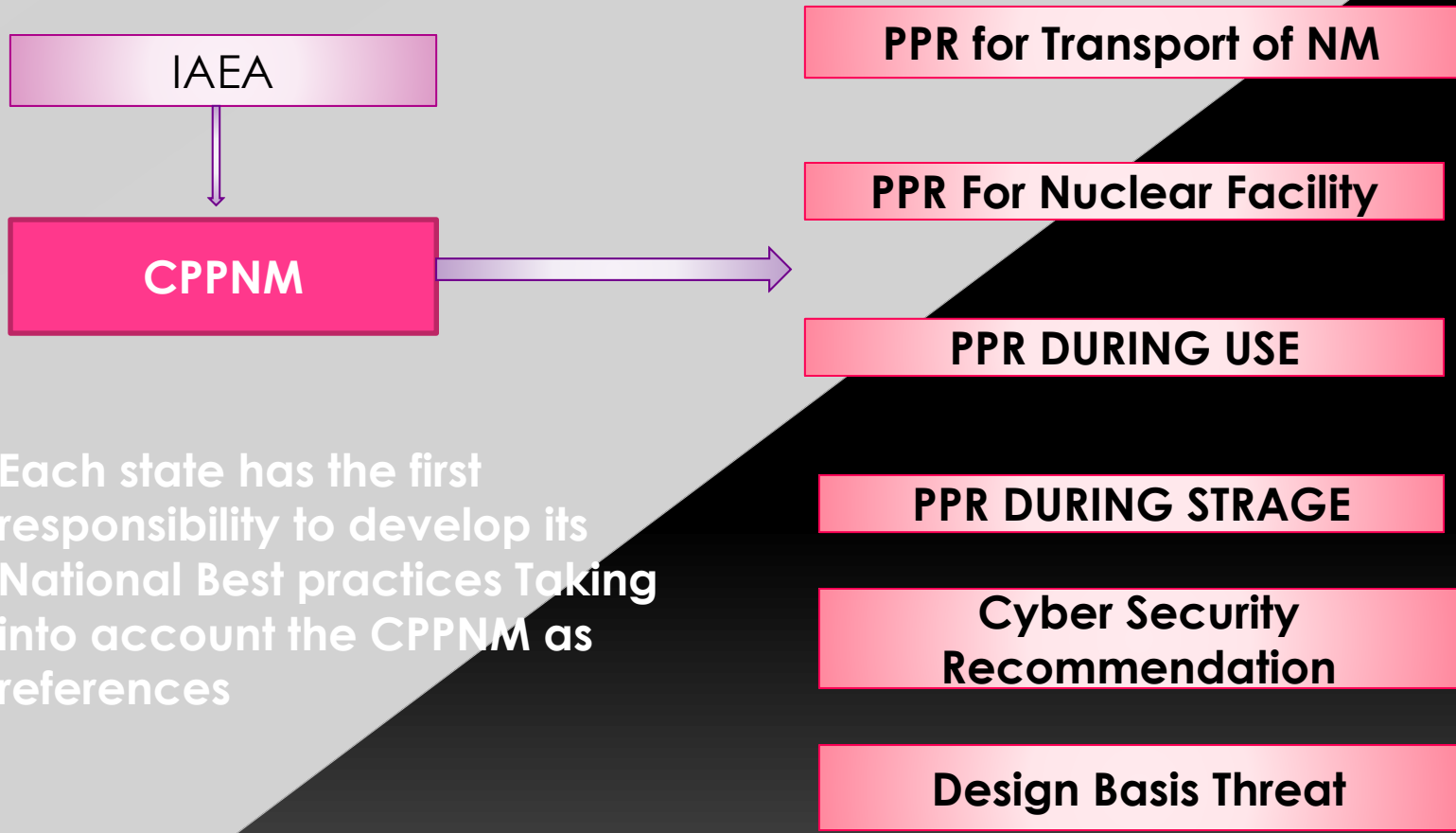
**DEVELOPING PHYSICAL PROTECTION REGIME FOR
NUCLEAR MATERIAL DURING TRANSPORT USE
STORAGE AND FOR NUCLEAR FACILITIES**

Main keys Involved on the Development of the PPR

Developing Physical Protection Regime
requires de Development of

- ✓ National legal framework of PPR
- ✓ Defense in Depth
- ✓ Graded approach
- ✓ Cyber Security

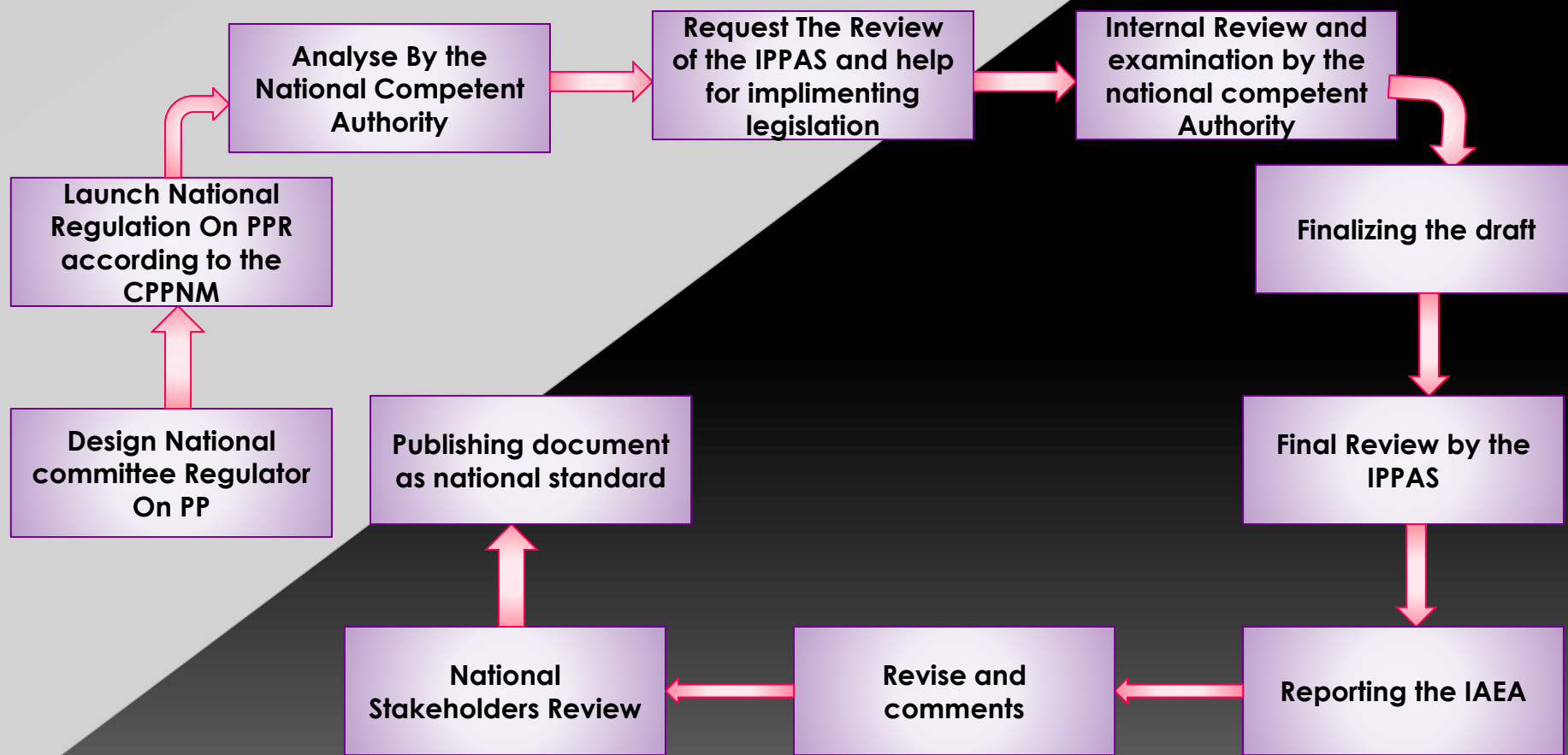
National legal framework of PPR



Each state has the first responsibility to develop its National Best practices Taking into account the CPPNM as references

National legal framework of PPR

Processus To Develop
National regulation related
to the PPR



Defense in Depth

- ❑ Historically used to ensure the safety of Nuclear reactor and Nuclear facility.
- ❑ Defense in depth is the most important factor for the development of the Physical protection regime for Nuclear material.
- ❑ Defense in depth is used to reinforce either the Physical Protection for Nuclear materials and Nuclear facilities.
- ❑ Designing and defining Basis threat is the first principal keys for defense in depth for the Physical Protection for Nuclear Materials and facilities to prevent:
 - ✓ Outsider and insider threat collusion.
 - ✓ Terrorist attack
 - ❑ Insider

Cyber Security

- ❑ Indeed, cyber Security Now is becoming the new challenges facing the facility operators as well as national authority.
- ❑ Cyber Security is an important Key for the developement of the Physical protection for Nuclear facilities as an important factor influencing the developement of the Physical Protection Regime.
- ❑ Cyber Security Within Nuclear facilities Should be developed to Protect Nuclear material hosted at the Nuclear Facilities That could lead an act Of the theft or sabotage.
- ❑ Each state has the responsibility for implimenting and establishing an effective national cyber Security regulation related to the Nuclear Security by establishing legislative and rregulatory Framework.
- ❑ strengthen computer security (e.g., protection of networks and sensitive information).
- ❑ Establishing specific program on cyber security education .

Transport of Nuclear Material

- ❑ The transport of nuclear material occurs near of the public and is considered as the most sensitive operation in the life cycle of the nuclear material.
- ❑ The transport should be more secured by establishing an effective plan to ensure the highest physical protection of those nuclear materials needed to be transported.
- ❑ Two parts are the responsible to establish and develop a physical protection for nuclear material that is the consignee and the consigner.
- ❑ The consignee and the consigner should cooperate with each other's before any operation of the transport and especially there is the different of the regulation between two states that make to apply the nuclear security complicated.
- ❑ For developing a physical protection regime during transport, it should be:
- ❑ Development of the national regulation on transport security inspired by the International Atomic Energy Agency.
- ❑ Developing a physical protection convention based on the convention on the physical protection CPNM or transferred the INFCIR/225/5 as national recommendations.
- ❑ Confidentiality: the confidentiality of the operation of the transport such as time, the categorization of nuclear material and the physical protection measures taken should be secured.(

Nuclear Facility

- ❑ Each nuclear facility should be characterized According to its structure.
- ❑ The operator has the first responsibility to define:
 - ✓ Controlled area(area Outer Protected area).
 - ✓ Protected area,
 - ✓ Vital area,
- ❑ As well as :
 - ✓ Inner Protected area.
 - ✓ Vital areas inside inner protected areas.
- ❑ The operator is the first responsible to design the PPS for each area defined to achieve the access control and delay.
- ❑ Roles of two person should be applied too.
- ❑ Defining the feebleness of the exit and the entry point.

Physical protection systems

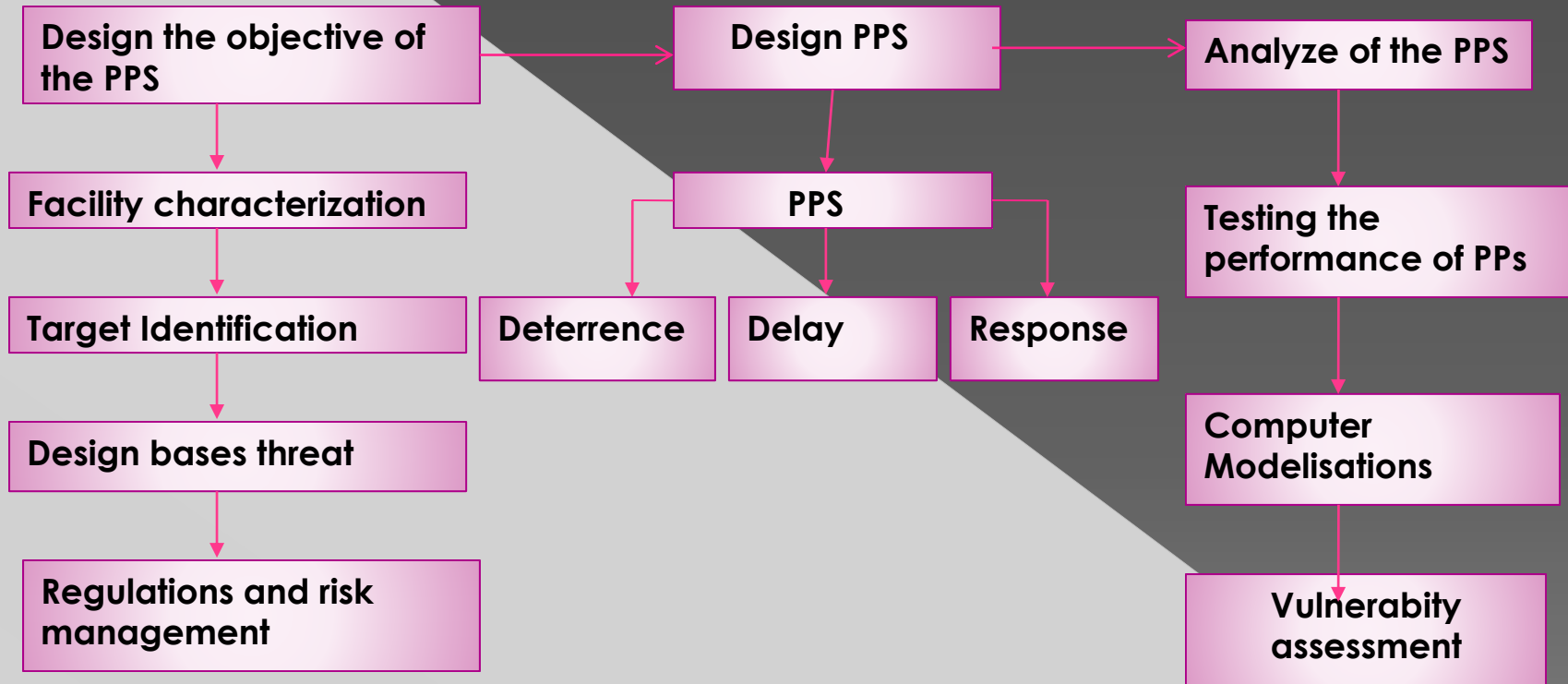
- ❑ The physical protection system includes three physical systems deterrence delay and response.
- **Deterrence:** Its the first Processes in a Physical Protection System which consists to deter the adversary, who has a motivation to commit a malicious act. The deterrence measures have the effect of convincing him that this act would be too difficult to achieve, that his success would be uncertain, or that its consequences would be very unpleasant for him if he performs it.
The deterrence could be by the presence of fences at the outer boundary and the presence of the guards around the facility, use of barriers if personnel or vehicle at the entry points of the facility
- **Delay:** second based PPS after the deterrence
Designed to slow down any adversary progress
For the entry to the exit of the nuclear facility as well
As the transport which response would be executed
- **Response:** final PPS consists on the action taken
By the persons as guards or response forces
Who are armed or equipped to prevent the adversary
Success.



Design Physical Protection Systems

- ❑ Development the physical protection systems it is the first step of the development of the physical protection regime to ensure the physical protection for nuclear material
- ❑ The development of the physical protection systems requests :
 - ✓ Identifying the objectives of each physical protection systems
 - ✓ Designing the physical protection systems to achieve the objectives.
 - ✓ Analysing and evaluating the physical protection systems
 - ✓ Developing PPS for nuclear material :
 - During Transport:
 - ✓ Identify the categorization of Nuclear Material and the quantity transported
 - ✓ Modify the mod of transport used: road, sea, air.
 - For Nuclear Facility:
 - ✓ Each Nuclear Facility has its special characteristics,
 - ✓ Defining the point of the entry and the exit
 - ✓ Identify the target

Design Physical Protection Systems

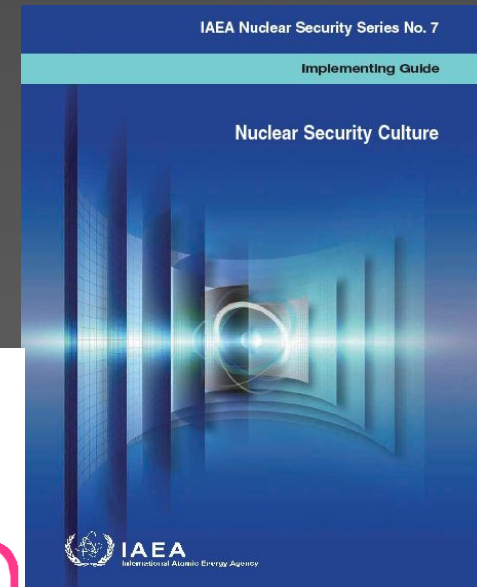
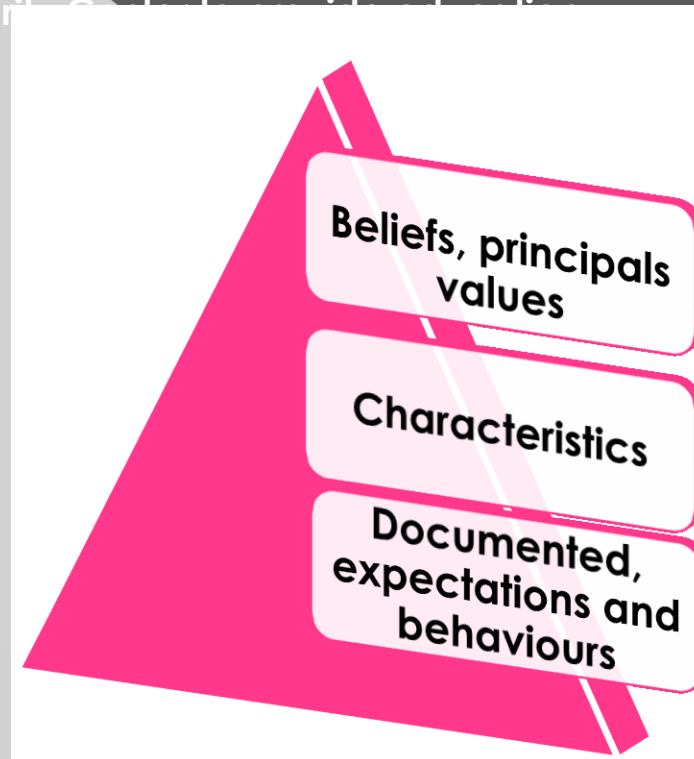


Processes of the development of the Physical Protection Systems

**SUSTAINABILITY OF THE PHYSICAL PROTECTION REGIME
FOR NUCLEAR MATERIAL DURING TRANSPORT USE
STORAGE AND FOR NUCLEAR FACILITIES**

Promoting Nuclear Security Education

- ❑ The term nuclear security culture focuses on the assembly of the characteristics, attitudes and behaviour of individuals, organizations and institutions which serves as a means to support and enhance nuclear security.
- ❑ Nuclear Security Culture plays an important role around the state, organization, and those who hosted the Nuclear Material.
- ❑ Raising awareness of the Nuclear Security Culture request a creation of national Nuclear Security Culture with emphasis on nuclear Security.



Training Exercises and cooperation

- ❑ Each state should establish and organize education programs related to the Physical Protection under the review of the International Atomic Energy Agency taking into account the cooperation with the International Institutions that are involved directly to the Nuclear Security.
- ❑ state should maintain program education which should be addressed for those who work in the Nuclear Security sector Such as who are workers on the Physical Protection department at the Competent authority , as well as safeguard department , material control and accountancy, National Policy and response guards , either for workers on nuclear facilities or those who are involved in transporting nuclear material.
- ❑ Organizing Practical Exercises for times to times on Physical Protection For Nuclear Material during international transport which requests collaboration state –state Under the sponsor of the IAEA.

Sustainability program

- ❑ The State should ensure that the legal and regulatory framework provides for sustaining the physical protection infrastructure, systems, and measures as part of the nuclear security regime IAEA .
- ❑ The program includes:
 - ✓ Testing the performance of the equipment for nuclear facilities and for nuclear material.
 - ✓ Providing the infrastructure to train on physical protection the operator personnel and the state.
 - ✓ Testing the performance of the physical protection systems before being applied at the nuclear facilities or for nuclear materials during transport use and storage.

Confidentiality ,Quality assurance

- ❑ **Confidentiality:**The confidentiality of the sensitive information is required to protect the nuclear material and the nuclear facilities, thus allowing to specify which information should be protected and how would be protected using the graded approach.
In order to promote the confidentiality of the sensitive information the state should provides guidance on security of information to promote protecting the security of the state and the nuclear facility as well as the nuclear material hosted within the state.
- ❑ **Quality assurance :**The quality assurance for the physical protection regime has to enhance that the physical protection system is implementing and designing in order to response effectively to the design basis threat or the threat assessment.

Conclusion

- ❑ Using nuclear material within the state requests the development of the physical protection regime to enhance a high physical security for nuclear material during transport use storage and for nuclear facilities.
- ❑ stakeholders has the first responsibility around the nuclear material by applying adequately measures to meet the objective of the physical protection regime, which is to prevent any unauthorized removal for nuclear material by designing a specific physical security measures, and testing their performance before being applied ,in order to minimise the probability of the insider or outsider threat collusion .
- ❑ state has the first responsibility to develop best practices on physical protection regime as essential element to strength it nuclear security regime by providing periodically training exercises on physical protection for those who manage the nuclear materials

Thinking Security ,Is

PLAN
PUT IN PRACTICE
REVISE
Education
Leadership
confidentiality

