

INDONESIA'S EXPERIENCE IN IMPLEMENTING THE AMENDMENT TO CPPNM FOR PHYSICAL PROTECTION OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES

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INTRODUCTION

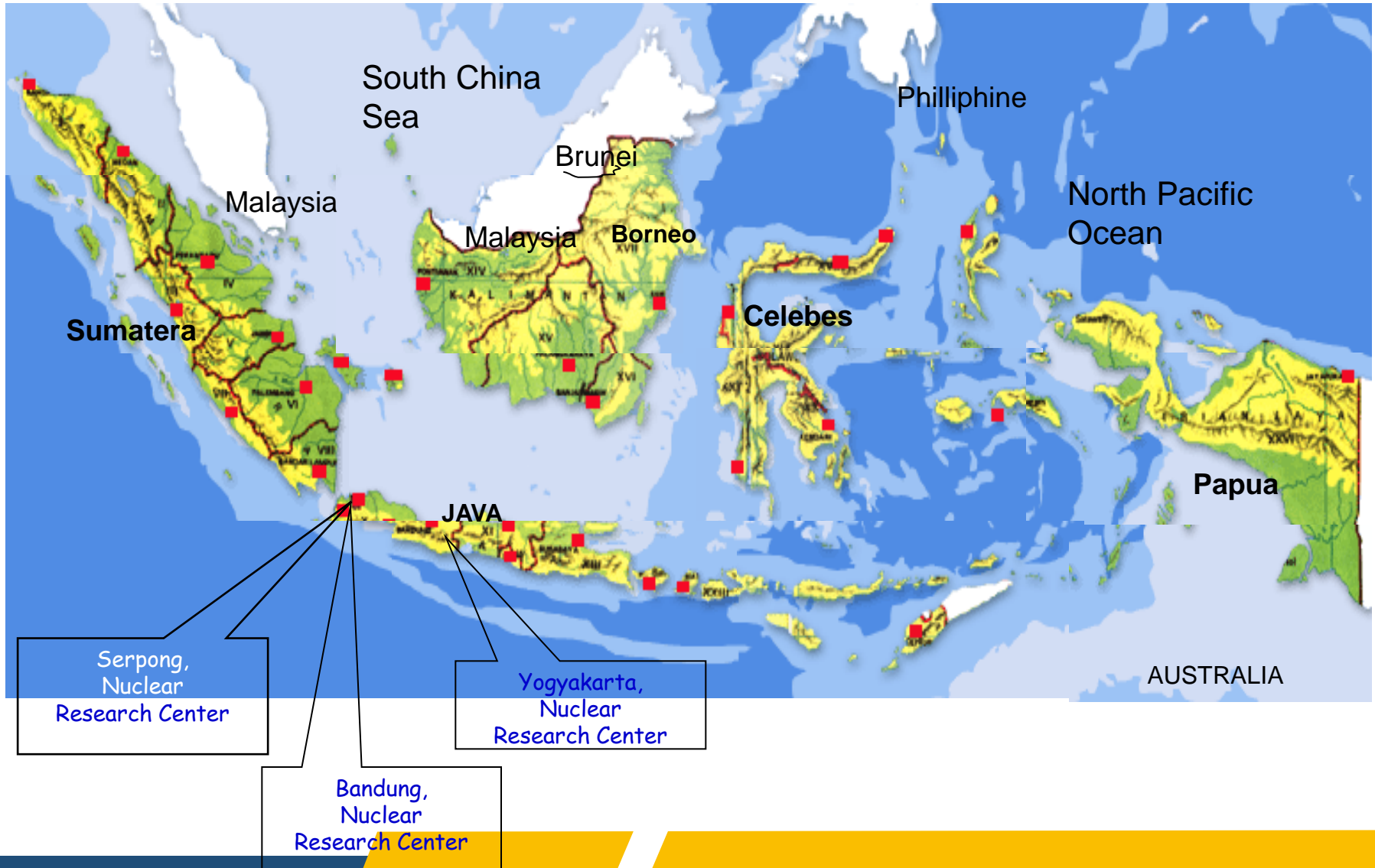
Nuclear Activities in Indonesia



- The research and development of nuclear technology in Indonesia has been operating since the late 1950s, and has contributed in various sectors of life. To date, the nuclear research and development is mainly carried out by the National Nuclear Energy Agency of Indonesia (BATAN), which was established in 1958.
- According to Act No. 10/1997 on Nuclear Energy, two agencies responsible for nuclear activities in Indonesia are BATAN as promoting body and Nuclear Energy Regulatory Agency of Indonesia (BAPETEN) as regulatory body.
- BAPETEN is authorized to formulate the necessary rules and regulations and is responsible for the enforcement of these activities through licensing and inspection.
- BATAN is authorized to conduct research and development, production of raw materials for the manufacture of nuclear fuel, radioisotope production for research and development purposes, and management of radioactive waste. Various research programs and activities are focused on several important areas: energy, food, health and medicine, natural resources and environment, industry, and advanced materials.
- All research and development activities are carried out professionally for peaceful purposes by taking into account the principles of safety, security, and environment protection.

- **Indonesia has three research reactors and several supporting nuclear facilities, including nuclear fuel and radioactive waste treatment facilities, which are operated by BATAN. The work at these facilities involves the use of nuclear materials.**
- **To ensure the security of nuclear material and associated facilities from various threats, BATAN has implemented physical protection system of nuclear material and associated facilities according to existing standards developed by the IAEA, and maintained and strengthened the system through security systems measures.**
- **As a party to the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment (CPPNM/A), Indonesia recognizes the importance of promoting the physical protection (or nuclear security) objectives, and affirms its international commitment to support the strengthening of global nuclear security by ratifying and implementing the CPPNM/A. Indonesia ratified the CPPNM in 1986 and its Amendment in 2009.**
- **Indonesia (BATAN) has implemented physical protection of nuclear material and nuclear facilities based on such important instrument.**

Indonesia's Nuclear Facility Sites



Indonesian Nuclear Research Reactors



- Location: Bandung
- Operated on 1964, 250 kW
- Upgraded to 2000 kW on 2000
- Main Function: Isotope research and production

- Location : Yogyakarta
- Operated on 1979, 100 kW
- Main Function ; Research and Human Resource Training Facilities

- Location : Serpong, Tangerang
- Operated on 1987, 30 MW
- Main Function : Isotope research and production and material research

ROAD TO STRENGTHEN THE GLOBAL NUCLEAR SECURITY

- Nuclear terrorism has gained a global recognition as one of the most challenging threats to global security in this century. Attempts by individuals and groups of persons are still made to acquire nuclear material for terrorist and other malicious purposes.
- The threat of nuclear terrorism remains real and terrorist attacks continue across the globe. Protecting nuclear materials and nuclear facilities from the threats posed by terrorists and other non-state actors is an urgent priority. One of the most important tools in fighting against nuclear terrorism is the CPPNM/A. The CPPNM/A is the sole legally binding instrument for the security of nuclear materials in peaceful use in facilities, transport and storage.
- The Amendment to the CPPNM expands and deepens the effect of the CPPNM and it was regarded as the single most important step which the world can take to strengthen nuclear security.
- In reflecting the importance of national responsibility for physical protection of nuclear material and nuclear facilities, the Amendment introduces a legal commitment to have and implement a physical protection regime covering the physical protection objectives as reflected therein.
- Further, in implementing this undertaking, the states parties shall: establish and maintain an appropriate legislative and regulatory framework for physical protection; establish or designate a competent authority responsible for its implementation; and take other appropriate administrative measures necessary for the physical protection of such material and facilities.

CPPNM

Signed at Vienna and at New York on March 3, 1980
Enter into force in February 8, 1987



Amendment to CPPNM

Adopted in July 8, 2005
Enter into force in May 8, 2016



Effective Physical Protection/Nuclear Security

IMPLEMENTATION OF THE CPPNM/A FOR STRENGTHENING NUCLEAR SECURITY IN INDONESIA

- Indonesia is a party to the **Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment**, and recognizes its responsibility for establishing, implementing and maintaining a physical protection regime against theft and sabotage for all its nuclear facilities.
- Indonesia is also a party to some treaties and conventions on nuclear safety, security, and safeguards, such as **Convention on Nuclear Safety, Joint Convention of the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, Convention on Early Notification of a Nuclear Accident, Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, International Convention for the Suppression of Acts of Nuclear Terrorism, and Treaty on the Non-Proliferation of Nuclear Weapons**. This shows her commitment to use nuclear for peaceful only with its emphasis on safety and security. Indonesia also has a strong commitment to fully support the IAEA efforts to continually improve security system, and has cooperated with other countries for such purpose.

	Signature	Date of Deposit/ Enter into force	Instrument of Ratification
Convention on Physical Protection of Nuclear Material	July 3, 1986	November 5, 1986/ February 8, 1987	Presidential Decree No 49/1986 (September 24, 1986)
Amendment to the Convention on Physical Protection of Nuclear Material	July 8, 2005	May 27, 2010/ May 8, 2016	President Regulation No 46/2009 (October 29, 2009)

- As a party to the CPPNM/A, Indonesia recognizes its responsibility for establishing, implementing and maintaining a physical protection regime against theft and sabotage for all its nuclear facilities.
- Indonesia has established and maintained a national legislative framework to govern physical protection of nuclear material and the associated facilities. The framework for the regulation of nuclear security within Indonesia consists principally of **Act No 10/1997 on Nuclear Energy**, and the **Government Regulation (GR) No 54/2012 on the safety and security of nuclear installations**. Other regulations relevant to nuclear security are GR 33/2007 on the safety of ionizing radiation and security of radioactive sources, GR 29/2008 on the licensing of ionizing radiation sources and nuclear materials utilization, GR 2/2014 on licensing of nuclear installations, and GR 58/2015 on radiation safety and security in transport of radioactive materials, and **BAPETEN's Chairman Regulation (BCR) 1/2009 on the requirement of physical protection of nuclear materials and nuclear facilities**, BCR 6/2015 on the security of radioactive sources, and BCR 1/2010 on emergency preparedness and response.

- To implement the state responsibility, Indonesia has developed and established a physical protection regime for the security of nuclear materials and nuclear facilities. Implementation of the physical protection regime is carried out by the establishment of legislative and regulatory framework, the establishment of competent authorities and design of physical protection system.
- The establishment of legislative and regulatory framework is particularly in the form of the stipulation of GR 54/2012 on the safety and security of nuclear installations and BCR 1/2009 on the requirement of physical protection of nuclear materials and nuclear facilities.
- GR 54/2012 requires the license holders to ensure the safety and the security of nuclear facilities. The security of nuclear facilities according to this regulation is to prevent, detect, assess, delay, and respond to unauthorized transfers of nuclear material and sabotage of nuclear facilities and nuclear materials.
- During design and construction activities, the license holders shall establish and implement a physical protection system that includes an assessment of the vulnerability of the facility; physical protection plan; physical protection system characteristics; control of communication lines; access controls; and testing of the function of physical protection systems.

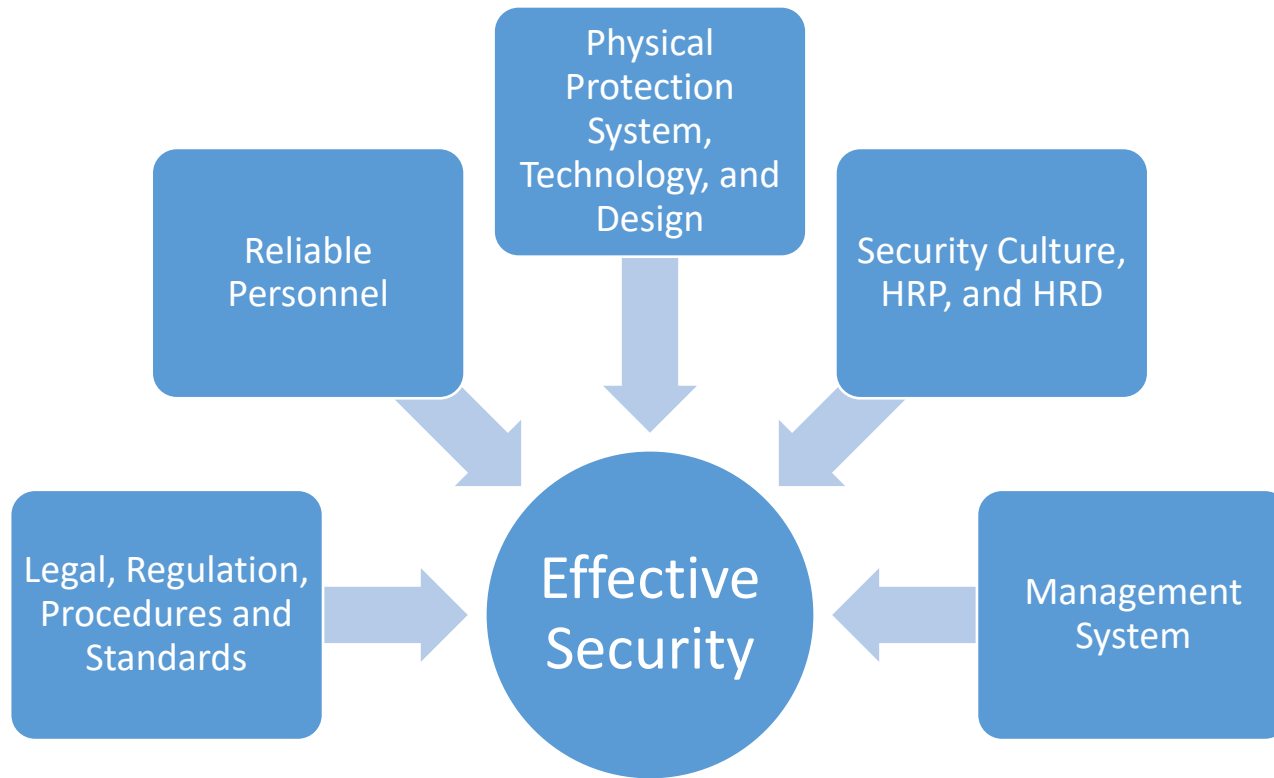
- The license holders, in establishing and implementing the physical protection plan, shall classify nuclear materials that used, stored and transported; refers to the design basic threat in accordance with the classification and location of nuclear material; and applying the concept of defense-in-depth for prevention and protection.
- The license holders shall implement and maintain a physical protection system for nuclear facilities from the time of construction until their decommissioning.
- In implementing and maintaining a physical protection system, the license holders shall establish and implement procedures to ensure the security is controlled in all situations.
- Meanwhile, BCR 1/2009 further regulates technically the physical protection system. According to this regulation, the license holders shall establish, implement and maintain a physical protection system of nuclear materials and nuclear facilities based on the design basic threat in order to prevent unauthorized transfer of nuclear material; recovering lost nuclear material; to prevent sabotage of nuclear installations and nuclear materials; and to mitigate the consequences of sabotage.
- BATAN, as the license holder and the operator of the Indonesian nuclear facilities, has applied consistently the terms and requirements provided by these regulations.

Implementation of Amendment to CPPNM



Fundamental Principles	Implementation
<i>A: Responsibility of the State</i>	Establishing the Physical Protection regime
<i>B: Responsibilities During International Transport</i>	Indonesia has some experiences in nuclear material transport
<i>C: Legislative and Regulatory Framework</i>	Establishing some regulations: GR No 54/2012, GR No 2/2014, BCR No 1/2009
<i>D: Competent Authority</i>	Establishing BAPETEN as the Regulatory Body and Competent Authority
<i>E: Responsibility of the License Holders</i>	Responsibilities for Physical Protection has been clearly identified.
<i>F: Security Culture</i>	Promoting and conducting self-assessment of security culture
<i>G: Threat</i>	Formulation of the national design basis threat (DBT)
<i>H: Graded Approach</i>	Designing physical protection system refer to the DBT
<i>I: Defence in Depth</i>	Applying defence in depth in BATAN's nuclear facilities
<i>J: Quality Assurance</i>	Implementing the nuclear security management system
<i>K: Contingency Plans</i>	Exercising regularly the contingency plans
<i>L: Confidentiality</i>	Establishing the requirements of information confidentiality

BATAN'S PRACTICES: APPROACHES TO PROMOTING EFFECTIVE SECURITY



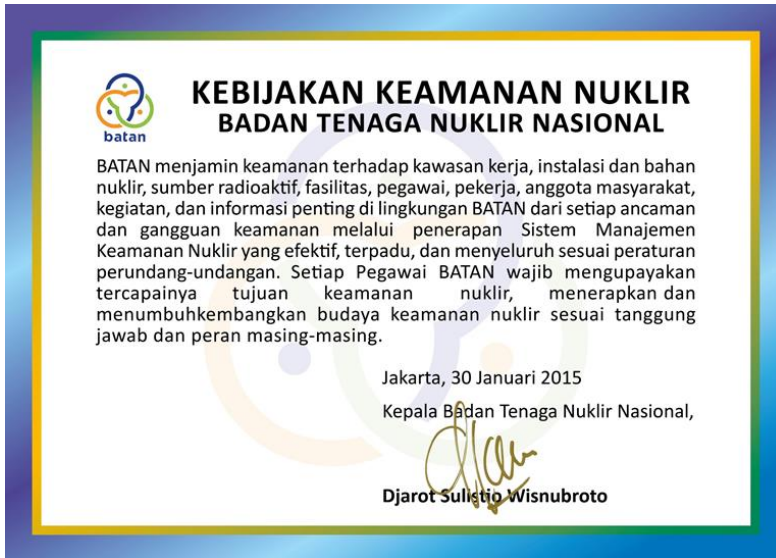
BATAN's NUCLEAR SECURITY POLICY STATEMENT



NUCLEAR SECURITY POLICY NATIONAL NUCLEAR ENERGY AGENCY

BATAN is committed to ensure the security of its nuclear materials and installations, radioactive sources, facilities, employees, workers, visitors, activities and important information from any security threats through the implementation of an effective, integrated, and comprehensive Nuclear Security Management System in accordance with the laws and regulations. Every BATAN's employee shall strive for the achievement of nuclear security objectives, and shall implement nuclear security culture according to his or her respective roles and responsibilities.

**Jakarta, January 30, 2015
Chairman of BATAN,
Djarot Sulistio Wisnubroto**



To ensure the security of its nuclear material and nuclear facilities, BATAN has implemented:

- **the recommended security measures pursuant to the regulatory body's regulations (to comply with regulations, procedures, and standards),**
- **the design of physical protection system,**
- **the nuclear security management system,**
- **the internalization of nuclear security culture to all employees at its nuclear facilities, and the development of human reliability program (HRP).**

BCR 1/2009 on the Requirement of Physical Protection of Nuclear Material and Nuclear Facilities gives the provisions of:

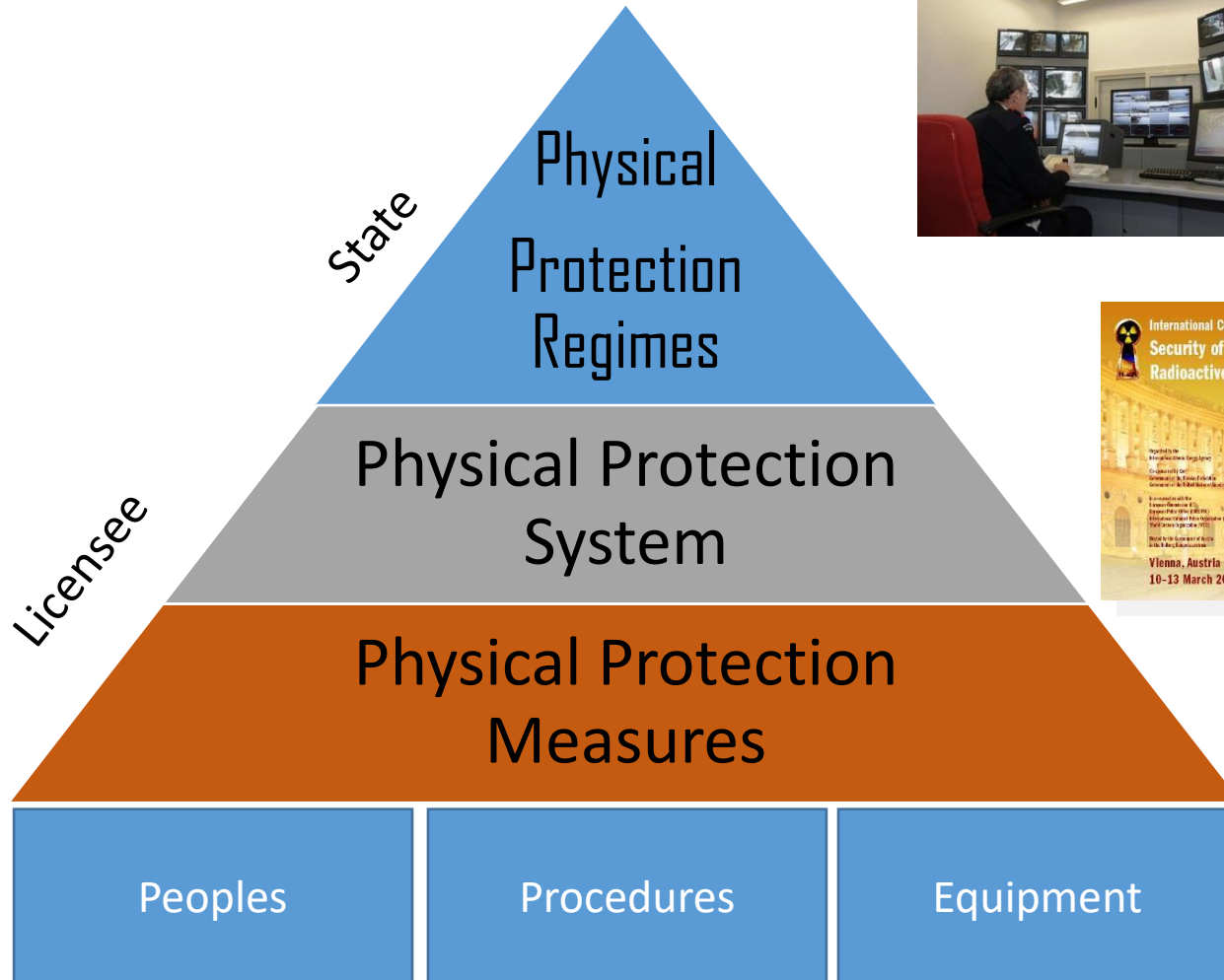
- Physical Protection System
- Nuclear Material Categorization
- Physical Protection of Nuclear Material in Use and Storage
- Physical Protection of Nuclear Material in Transport
- Physical Protection of Nuclear Material and Nuclear Facility from Sabotage in Use and Storage

The operator shall develop a document of Physical Protection Plan with the contents:

- Design Basis Threat
- Organization and Personnel of Physical Protection System
- Nuclear Material Categorization
- Standard Operating Procedure
- Design and Area Identification of Physical Protection
- Detection System
- Physical Barrier (Delay) System
- Access System
- Communication System,
- Maintenance and Surveillance
- Contingency Plan
- Documentation

- **Physical protection system**
 - Deter adversary from attacking
 - Defeat adversary if he does attack
- **Security management**
 - Ensure that the physical protection system functions properly
 - Includes measures such as verifying trustworthiness of employees and protecting sensitive security information

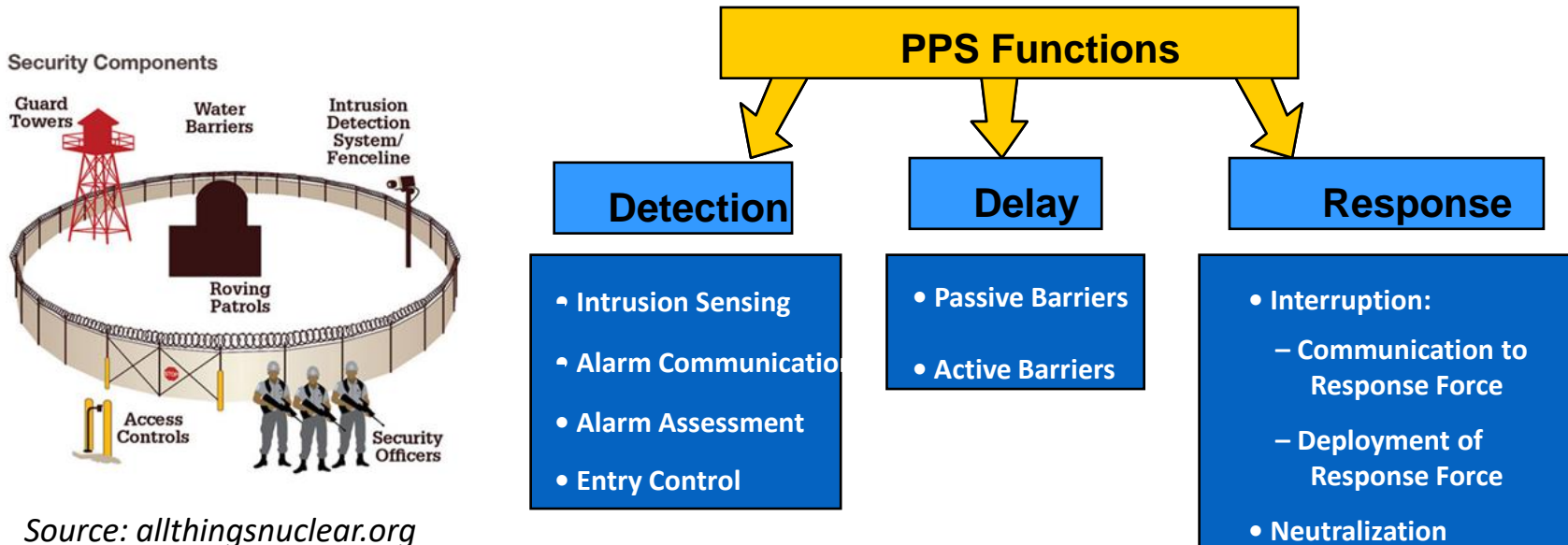
Physical Protection System



PHYSICAL PROTECTION FUNCTIONS



A physical protection system is the integration of **people**, **procedures**, and **equipment** used to protect assets or facilities against theft, sabotage, or other malicious human attacks



Source: allthingsnuclear.org

Three Functions of Physical Protection Systems

Detection



The first step in stopping a security threat.

Delay



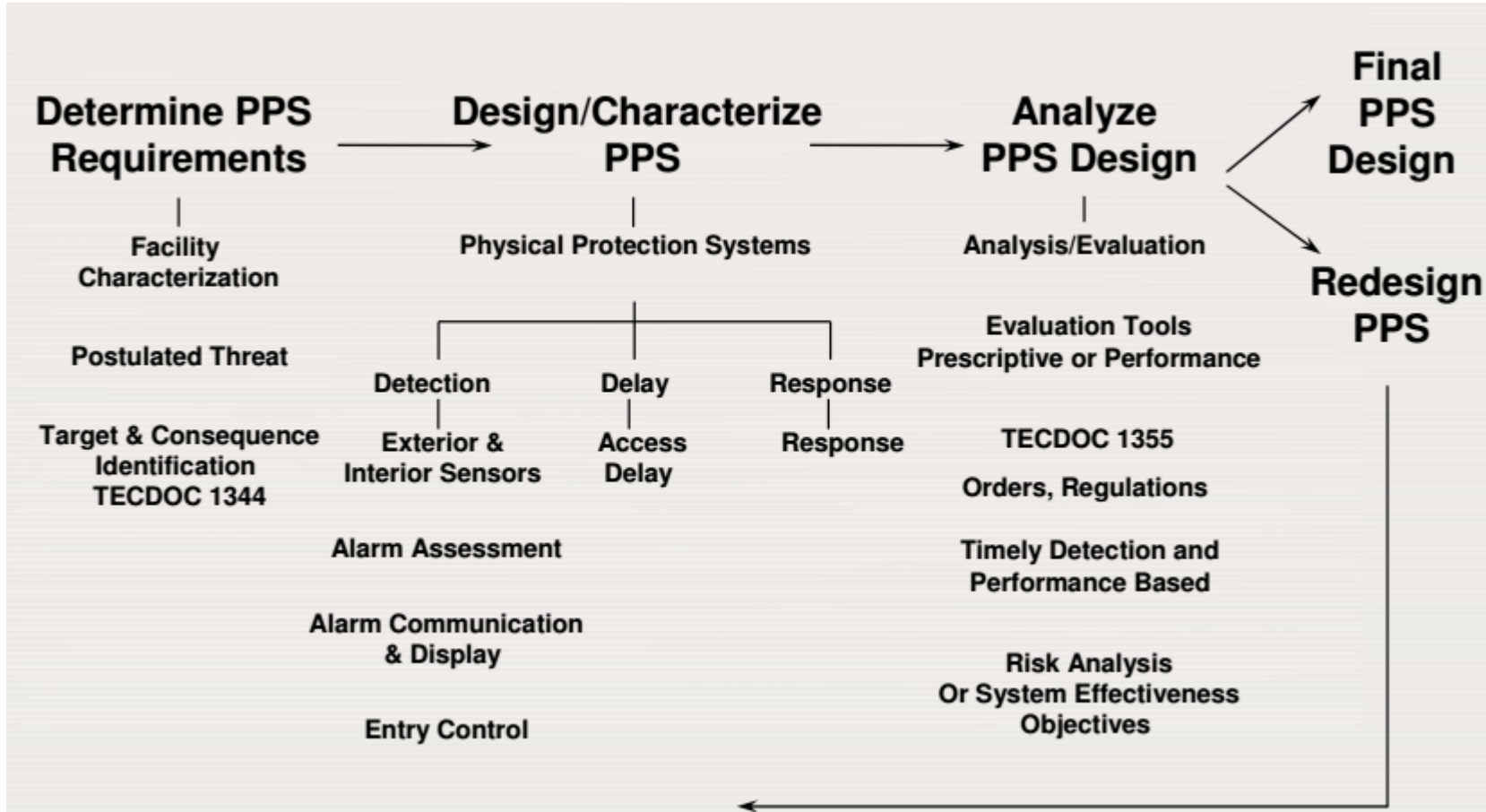
Delay measures slow the threat to give the response force time to arrive.

Response



Security guards or law enforcement arrive and neutralize the threat.

Physical Protection Fundamentals: Design and Evaluation Process Outline (DEPO)



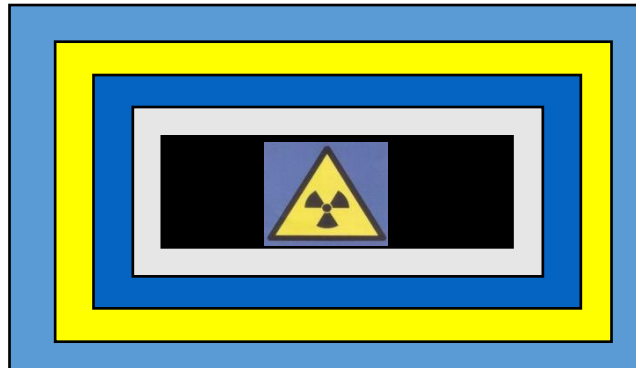
Characteristics of an Effective Physical Protection System



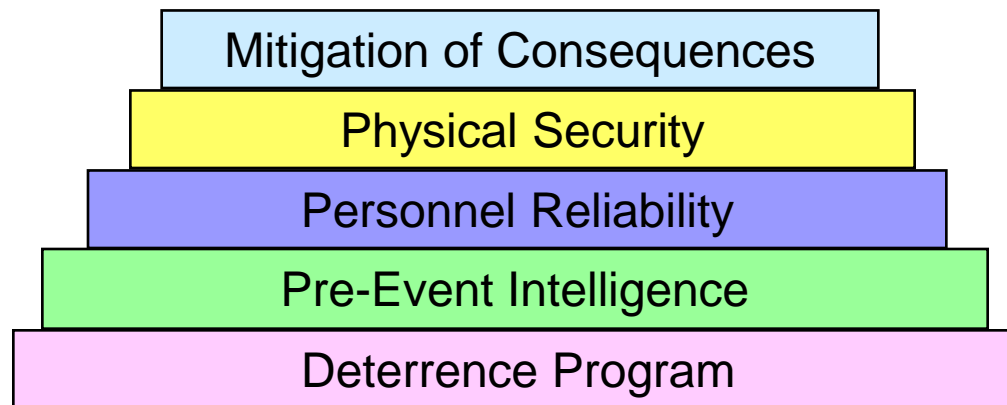
- **Defence-in-depth**
 - **Series of detectors better than a single one**
 - **Prefer to use complementary sensors that use different principles**
- **Balanced protection**
 - **Does not create an easy path for adversary**
 - **Applies to Detection as well as Delay**
- **PPS based on threat, and the Graded Approach.**
 - **Enough Detection, Delay, and Response**
- **One feature can compensate for another's weakness**

Defense in Depth

- Layers
 - Physical



- Administrative and Programmatic



- The graded approach ensures that the highest consequence sources receive the greatest degree of physical protection
- Graded approach is based on:
 - Evaluation of threat
 - Relative attractiveness
 - Nature of the source
 - Potential consequences of malicious acts



Security Check at the Main Gate of Nuclear Serpong Complex



Radiation Portal Monitor at the main gate of the Serpong nuclear complex

DELAY: BARRIER & FENCE



RESPONSE



Promoting Security Culture



Internalization
of Nuclear
Security
Culture

Conducting
Self-
Assessment

Enhancement
Program

The purpose of the self-assessment to provide a clear picture of the extent to which nuclear security is part of BATAN's culture.

Self-assessment plays a key role in developing and maintaining an awareness of the strengths and weaknesses of BATAN's nuclear security culture.

Self-assessment is to complement the currently used methods for evaluating vulnerabilities and nuclear security systems, to help management to refine BATAN's overall nuclear security arrangements.

Self-assessment in BATAN



Time	2012	2015	2018
Location	Three Reactor Research in Serpong, Bandung, Yogyakarta	Three Nuclear Facilities in Serpong Reactor Research GAS, Nuclear Fuel Fabrication Installation, Radioactive waste installation	Radioactive sources (Irradiator) in Pasar Jumat, Jakarta
Methods	Questionary and Interviews	Questionary, Interviews, Documents, and Observation	Questionary, Interviews, Documents, and Observation
Facility related to	Nuclear Material	Nuclear Material	Radioactive Sources

INTERNALIZING THE SECURITY CULTURE



SELF-ASSESSMENT OF SECURITY CULTURE



HUMAN RELIABILITY PROGRAM





Workshop on Indonesia's Nuclear Security Success: Establishing the Human Reliability Program, 11-13 December 2019, Serpong, Indonesia

INSPECTION & EVALUATION ON PPS



CAPACITY BUILDING ON PHYSICAL PROTECTION SYSTEMS



- Nuclear use can across generations in which the sustainability efforts for maintaining and improving capabilities on the implementation of physical protection systems are required. Elements of capacity building consists of training, human resource development, knowledge management, and networking. Capacity building is done by training the personnel of physical protection in the expertise of designing, implementing and evaluating the physical protection system.
- One of the highest priority on nuclear security activities is the development of personnels capability in nuclear security. Such activities are integrated as far as possible with the development of human resources. BATAN is working on human resource development, and conducting training courses, workshops, and briefings to anchor nuclear security as an aspect of daily life for relevant personnel, especially those involved with physical protection.
- International cooperation and expert supports are essential for maintaining and strengthening nuclear security. To this end, BATAN has developed a broad network for strengthening its nuclear security systems: IAEA, USDOE, U.S. Department of States (USDOS), University of Georgia (UGA) of USA, King's College London (KCL) of UK, ANSTO of Australia, and JAEA of Japan.

Improving Personnel Skill

Exercise on countering terrorism:

- Involving all stake holders: police, army, fire brigades, radiological first responder unit
- Theft and sabotage scenario



SHOOTING DRILLS



EMERGENCY EXERCISE



WORKSHOP ON PHYSICAL PROTECTION SYSTEM



One of the important activities is the implementation of a series of workshops on physical protection system, conducted in the period of 2014-2019, in cooperation with the experts of the USDOE. The workshops consist of a gap analysis in 2014; performance testing and contingency plan in 2015-2016; nuclear security plan and cyber security in 2017; and nuclear security areas in 2019. The main objective of the workshops is to improve the capability of BATAN's nuclear security personnel in the framework of strengthening the physical protection system of its nuclear material and nuclear facilities.

PP OF NUCLEAR MATERIAL IN TRANSPORT



- BATAN has experienced in implementing physical protection of nuclear material in transport: spent fuel for re-export, nuclear material, and radioactive sources
- Involving related government agencies:
 - Police
 - Military as back up
 - Regulatory Body



CONCLUSION

- To ensure the security of its nuclear material and nuclear facilities, Indonesia has developed, established and implemented a physical protection regime for the security of nuclear material and nuclear facilities by applying the twelve fundamental principles as required by the Amendment to the CPPNM.
- The implementation of the physical protection regime is carried out with the establishment of legislative and regulatory framework, the establishment of competent authorities and design of physical protection system.
- In the facility level, BATAN, as the operator of Indonesia's nuclear facilities, has applied the robust physical protection system by integrating the following key elements such as procedures, personnel, equipment and technology, security culture, and management systems in order to prevent unauthorized acquisition and malicious use of nuclear material and other radioactive material.

THANK YOU



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