

# STRENGTHENING REGULATORY REQUERMENTS FOR PHYSICAL PROTECTION IN INDONESIA BASED ON INFCIRC 225 REV.5

Presented by : Suharyanta  
BAPETEN

*International Conference on Physical Protection of  
Nuclear Material and Nuclear Facilities,  
Vienna, 13-17 November 2017*





# Outline of Presentation

- Introduction (Nuclear security regime, Nuclear facilities in Indonesia, Implementation of PPS)
- Objective of regulation strengthening
- Review and identification of the existing nuclear security regulations and INFCIRC 225 Rev 5, and the challenges.
- Best practice of contingency plan exercise
- Conclusion



# Introduction

## Indonesia Nuclear Security Regime:

- Main government policy ensure that any uses of nuclear energy in Indonesia conform with rules and regulations and intended for peaceful purposes.
- Committed to define each individual function for Regulatory body, Operator, and Other Competent authority.
- Main task of BAPETEN are developing regulations, issuing licenses and performing inspections with coverage safety, security and safeguards
- Operator task is mainly executing R&D on nuclear technology and their application.
- Other competent authorities are supporting nuclear development performed by regulatory and/or executing body in the country.
- **Indonesia has ratified the CPPNM (1989) → and also ratified the amendment of CPPNM (2009).**



# Introduction

## **The objective of activity are :**

- To review existing regulations to accomodate CPPNM Amendment into operational regulations.
- To harmonize the implementation of “3S” regulatory aspect in the regulatory functions: regulation development, licensing and inspection.
- To optimize any participation to the Global Nuclear Security regime and International and bilateral cooperations.



# Nuclear Facilities in Indonesia

## 3 Research Reactor:

- a. MTR GA Siwabessy Reactor, Serpong  
Power 30 MWt; First criticality: 1987, Fuel  $U_{3Si2}19.75\%$
- b. TRIGA-2000 Reactor, Bandung  
Power 2000 kWt, First criticality 1964, Fuel U-ZrH 19.75 %
- c. TRIGA Kartini Reactor, Yogyakarta  
Power 100 kWt, First criticality:1979, Fuel U-ZrH 19.75 %



## Other Nuclear Fuel Facility

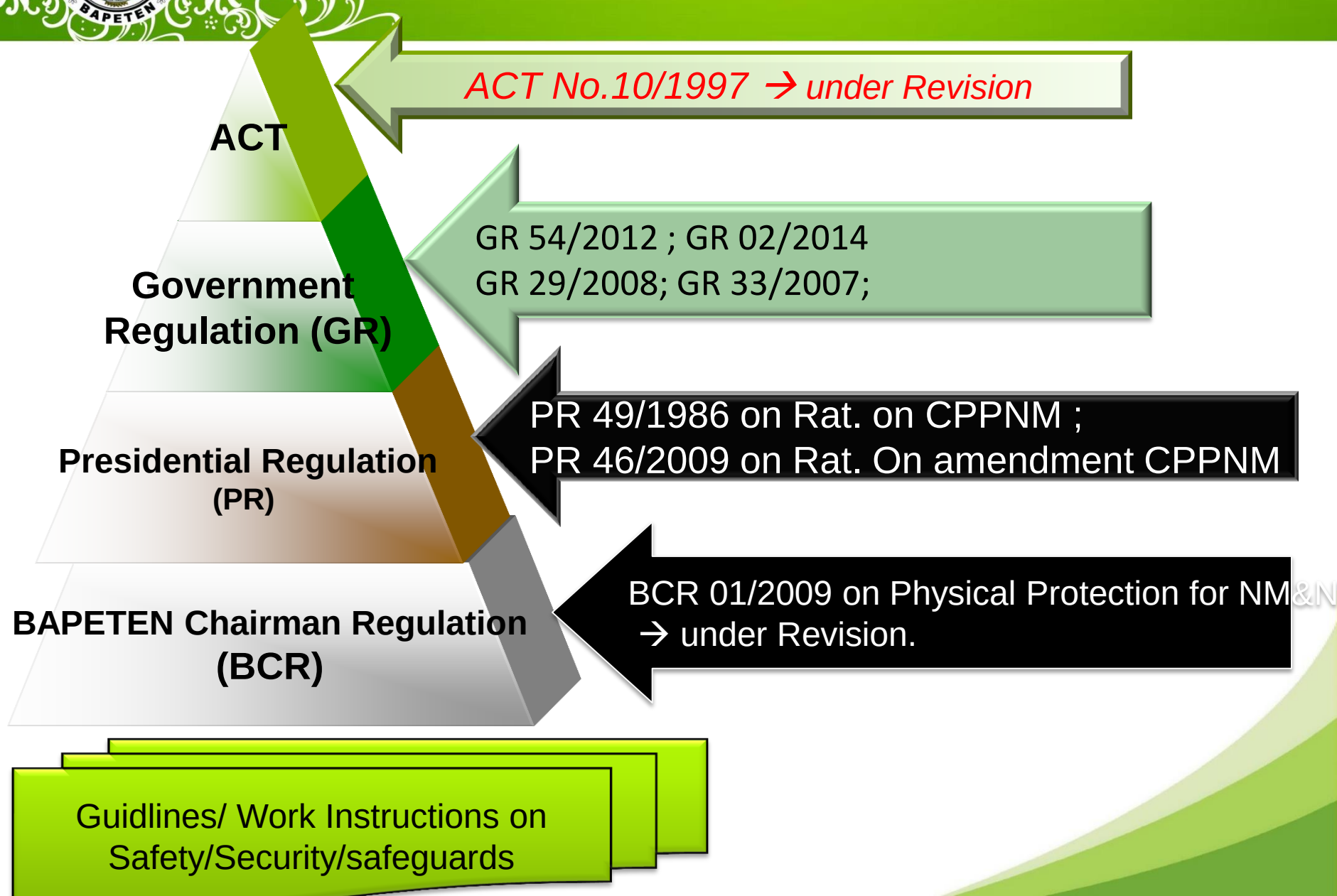
MTR Fuel Element Production Installation, Experimental Fuel Element Installation, Radio metallurgy Installation, Interim Storage for Spent Fuel.

## Updating Status :

- Physical protection Category of Facility : Class II and III,
- Apply PPS also during transportation.
- Implementation of graded approach system.
- Indonesia not only develop regulation for existing nuclear facilities, but also develop regulation for future NPP .



# Hierarchy of legislation and Regulation, and The existing regulation on security / Physical protection







# Comparison between Existing Regulation on Security/ Physical Protection and INFCIRC/225 Rev.5 contents.

|   | INFCIRC/225 Rev.5                                         | Existing Regulation                                  | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---|-----------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | <b>REGULATORY POLICY</b>                                  | Act 10/1997 on Nuclear Energy                        | A Nuclear Regulatory Control Agency named BAPETEN is an agency that has responsibility to perform regulatory control through drafting of the regulation, licensing process, and carrying out inspection of any activity of nuclear energy utilization.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2 | <b>OBJECTIVES OF A STATE'S PHYSICAL PROTECTION REGIME</b> | GR 54/2012 - Article 2<br><br>BCR 1/2009 Article 4-A | <p>Regime of Nuclear security cover and applies to the physical protection of <i>nuclear material</i> in the <b>facility</b> and or during <b>transport</b> against <i>malicious acts</i>.<br/> The objective of <b>essential component of the security regime</b> contain of :</p> <ul style="list-style-type: none"> <li>— To protect against <i>unauthorized removal</i>.</li> <li>— To locate and recover missing <i>nuclear material</i>.</li> <li>— To protect against <i>sabotage</i>.</li> <li>— To mitigate or minimize effects of <i>sabotage</i>, which are closely link with the <b>existing emergency preparedness</b> and response measures.</li> </ul> <p>Article 4, if in the facility there is RA material other than NM, it will be applied with one of the higher standard of protection</p> |



# Comparison between Existing Regulation on Security/Physical Protection and INFCIRC/225 Rev.5 contents.

|   | INFCIRC/225 Rev.5                                                                                                                                                                      | Existing Regulation                                                                      | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | <p><b>ELEMENTS OF A STATE'S PHYSICAL PROTECTION REGIME FOR NM and NF :</b></p> <p><b>State responsibility</b></p> <p><b>Physical protection responsibilities at Facility Level</b></p> | GR 54 Article 57                                                                         | <p>Government of Indonesia is responsible to establish, implement and maintaining a <i>physical protection regime</i> within country jurisdiction.</p> <p><i>Physical protection regime</i> should be reviewed and updated regularly, in certain conditions.</p> <ul style="list-style-type: none"> <li>- Overall responsibility on physical protection within facility is down to the <i>Operator</i>, and if it is during transport ation of NM the main responsibility is down to the <i>Shipper</i>, or if any other declare arrangement.</li> <li>- Licensee/Operator shall perform periodic evaluation on the local design basis threat (DBT) and physical protection system.</li> </ul> |
| 4 | <b>International transport</b>                                                                                                                                                         | GR 58/2015 (amendment) on Safety and Security of Transportation of Radioactive Material. | <p>The government take responsibility of any international transport of NM based on existing regulations during import, export and/ or transit activities such as:</p> <ul style="list-style-type: none"> <li>- permitted only for transaction from and to the country who has signed the CPPNM,</li> <li>- there is special condition that nuclear material has been declared under safeguards agreement with the Agency,</li> <li>- Should be licensed by BAPETEN under regulation of the GR No. 2 year 2014.</li> </ul>                                                                                                                                                                     |





# Comparison between Existing Regulation on Security/ Physical Protection and INFCIRC/225 Rev.5 contents.

|   | INFCIRC/225 Rev.5                                                                                                                                                                                               | Existing Regulation                                                                                                                                                                                                                               | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5 | <p><b>Legislative and regulatory framework of Competent authority :</b></p> <p><b>Legislative and regulatory framework to govern physical protection, including licensing, inspection and enforcement .</b></p> | <p>Act 10/1997</p> <p>GR 54/2012 Article 57</p> <p>BCR 1/2009 Article 17</p> <p>GR 2/2014 on Licensing Nuclear Installation.</p> <p>GR 54/2012, Article 43</p> <p>Amendment process of Act 10/1997, or New Act on Nuclear Security : Sanction</p> | <ul style="list-style-type: none"> <li>- BAPETEN as <b>independent</b> regulatory body is one of competent authority on security regime in Indonesia, among other competent authorities in coordination link .</li> <li>- Licensee shall perform evaluation on the <b>local</b> design basis threat and physical protection system periodically.</li> <li>- PPS should prepare a “<b>Security Contingency Plan</b>” for each scenario of threats.</li> <li>- This framework is provided for the establishment of technical physical protection requirements and include evaluation system and mechanism for <b>granting authorization</b>.</li> <li>- Safeguards and physical protection requirements are implemented during licensing stages: a. site monitoring, b. design and construction; c. operation; d. decommissioning. → Specific term are requirements for “<b>Safeguards by design</b>” and “<b>physical protection by design</b>”.</li> <li>- This framework shall include a system for <b>inspection of NM &amp;NF</b> by Reg Body, and to establish a means to enforce applicable requirements and conditions, including effective sanctions. → Sanction on violation of security regulation is drafted in New Act on Nuclear security, or alternatively will be covered in the Amendment of Act 10/1997. The existing GR only impose administrative sanctions. Inspection is done by BAPETEN inspector.</li> </ul> |



# Comparison between Existing Regulation on Security/ Physical Protection and INFCIRC/225 Rev.5 contents.

|   | INFCIRC/225 Rev.5                                                                                                                                                                                                                                                                                                                                                          | Existing Regulation                                                                                                                                                                                                                                                                                                          | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 | <p><b>Competent authority:</b></p> <ul style="list-style-type: none"> <li>- Adequate authority</li> <li>- Adequate financial &amp; Adequate human resources</li> </ul> <p><b>Responsibilities of the licence holders:</b></p> <p><b>INTERNATIONAL COOPERATION AND ASSISTANCE</b></p> <ul style="list-style-type: none"> <li>- Bilateral</li> <li>- Multilateral</li> </ul> | <p>GR 54/2012, Article 43-46,<br/>BCR 1/2009 Article 7.</p> <p>Approval of PPS design and their changes.</p> <p>GR 54/2012 Article 81</p> <p>Article 46-48 : PPS design, maintain, dan performance test.</p> <p>GR 54/2012 Article 90<br/>BCR 1/2010 on EPR.</p> <p>- Legal instrument and/or Capacity Bldg cooperation.</p> | <ul style="list-style-type: none"> <li>- Inter-Agency coordination on national level will be maintained by Reg body.</li> <li>- <b>RB has authority to give PPS design approval and also approval of any PPS design changes.</b> PPS design is one of license requirements in each of licensing stages.</li> <li>- Relevant authority are government own institution, therefore <b>budgeting allocation will be assured based on the annual budget of government.</b></li> </ul> <p>Licensee should submit PPS design based on credible threat to Regulatory body for approval during each of licensing stages.</p> <ul style="list-style-type: none"> <li>- Bilateral : <b>INSSP</b> between Indonesia and the Agency, G to G Cooperation such as BAPETEN- US- NRC, China</li> <li>- NNSA, Malaysia -AELB, etc</li> <li>- Multilateral : <b>ITDB programme</b> membership</li> <li>- Chairman of BAPETEN as <b>NCA-A</b> shall inform IEC IAEA and other countries in the case of nuclear emergency in the country under Convention on Early Notification of Nuclear Accident, and Convention on Assistance in the case of radiological and nuclear accidents.</li> </ul> |



# Comparison between Existing Regulation on Security/ Physical Protection and INFCIRC/225 Rev.5 contents.

|   | INFCIRC/225 Rev.5                                                                                                                                    | Existing Regulation                                                       | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <b>RISK BASED PHYSICAL PROTECTION SYSTEM AND MEASURES :</b><br><br>- Risk management<br>- Graded approach<br>- Defence in depth<br>- Balanced system | GR 54/2012 Article 61<br><br>GR 54/2012 Article 46<br>BCR 1/209 Article 6 | - Government has developed GR and BCR to ensure protection system of all threats<br><b>Licensee shall be responsible for ensuring that design system at the facility can achieve the safety and security objective.</b><br><br>- PPS design requires some <b>characteristics</b> , such as: <ul style="list-style-type: none"> <li>• Considering safety system and component .</li> <li>• Having defence in depth protection</li> <li>• Minimizing consequence from any component failure.</li> <li>• Designed as balance system from all component of protections (detection, delay, n response), and</li> <li>• Considering graded approach protection (categorization)</li> </ul> |
| 8 | <b>IDENTIFICATION AND ASSESSMENT OF THREATS</b><br><br>DBT implication                                                                               | GR 54/2012 Article 44 - 55.<br>BCR 1/2009 Article 5-7 .                   | - DBT analysis contain: motivation, objective, strategy, tactic, capability of any threat..<br><b>- DBT national has been developed and coordinated by Regulatory body, and all security related stakeholder on 2002.</b><br>DBT will be reviewed and updated every 2 year.<br>Local DBT provided by License holder based on National DBT                                                                                                                                                                                                                                                                                                                                            |



# Comparison between Existing Regulation on Security/ Physical Protection and INFCIRC/225 Rev.5 contents.

|   | INFCIRC/225 Rev.5                                                                              | Indonesia Regulation                              | Remark                                                                                                                                |
|---|------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 9 | <p>TOPICAL CONDITION ON REGULATION:</p> <p>a. Frequency for Comprehensive Assessment (CA).</p> | GR 54/2012 article 55<br>BCR 1/2009 article 5, 16 | - Implementation of operational PPS at the facility shall be reported to BAPETEN.                                                     |
|   | b. Security Contingency Plan Exercise / Drill                                                  | GR 54/2012 article 50                             | <p>- <b>Responsibility of license holder.</b></p> <p>- Optional basis with BAPETEN as observer.</p>                                   |
|   | c. Requirements for trustworthiness determination                                              | BCR 1/2009 article 76                             | - Trustworthiness determination is not only for workers who go into the vital area, but also to all level of manager.                 |
|   | d. Categorization of NM                                                                        | BCR 1/2009 (article III, table 1)                 | Adoption to IAEA Security Series No. 13, with additional <b>Category IV for NM</b> under Additional protocol to Safeguards Agreement. |
|   | e. Cyber security                                                                              | Not yet covered                                   | <b>New option for next revision</b>                                                                                                   |



# Security Contingency Plan Exercise

- Security contingency plan exercise is one of key performance indicator for capability and reliability of PPS.
- GR 54/2012 article 50 requires that Licensee shall establish and implement security contingency exercise/drill during commissioning stage which is before the first fuels loaded into the reactor core.
- Article 69 requires that nuclear contingency exercise shall be performed at least once a year in the facility level, once every 2 years in the province level, and once every 4 year in the national level.
- Field exercise of security contingency plan is more efficient if it is integrated with nuclear emergency plan exercise, with scenario of security initiating events such as theft and/or sabotage actions.





# Contingency plan Exercise

FIGURE 2 SCHEMATIC PICTURES OF CONTINGENCY PLAN EXERCISE IN RESEARCH REACTOR

| <b>Contingency plan</b><br>(Combined security and safety contingency plan)                                                                                                                                                                                                                                                                  | <b>Response Activity &amp; Neutralism</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Final Evaluation</b>                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Operating Facility:</p>  <p>Schenario of sabotage :</p>  <p>Preparedness drill:</p>  | <p>Coordination after events:</p>  <p>Outside Response force:</p>  <p>Actual security intruder :</p>  <p>Radiation Survey:</p>  <p>Treatment and hospitalism:</p>  | <p>Neutralism:</p>  <p>Wrap up meeting:</p>  <p>Clear normal facility:</p>  |





# Challenges

- Some options on regulation strengthening of physical protection in each level of regulation (Act, GR and BCR) :
  - Act has to consider more clear definition on responsibilities of all stakeholder involved in the security,
  - Define more specific sanction on enforcement action, either administrative and criminal sanctions.
  - Enhance mechanism to perform analysis on performance based physical protection.
  - Develop more technical guidance to fulfill the regulations, such as harmonizing security contingency plan and radiation emergency contingency plan.
- Promoting nuclear security culture
- Enhancing coordination among security-related authorities
- Enhancing International cooperation, including IAEA and/or bilateral cooperation, on capacity building in Regulatory body, licensee, and stakeholder.
- Others.



# CONCLUSION

1. Indonesia will continue to maintain commitment for strengthening and harmonizing the safety, security and safeguards aspects of regulations.
2. Indonesia ratified the Amendment of CPPNM into national regulation. Hence, some existing regulations should be revised accordingly, in the level of an Act, Government regulation and technical BAPETEN Chairman regulations.
3. Strengthening effort in implementing security contingency plan have been performed through field exercise. The experience on exercise in the case of security contingency plan and nuclear and radiation emergency plan should be considered more effectively as one integrated system, with interrelated mechanism where some functions are linked to each other.