Republic of Indonesia

NATIONAL REPORT FOR THE SECOND EXTRAORDINARY MEETING OF CONVENTION ON NUCLEAR SAFETY

May 2012

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THE SECOND EXTRAORDINARY MEETING OF
CONVENTION ON NUCLEAR SAFETY

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1. INTRODUCTION

Nuclear accident that recently occurred at the Fukushima Daiichi nuclear power plant has highlighted the importance of nuclear safety and the need for improved safety analysis by taking into account various factors, both internal and external hazards, such as earthquake, tsunami, station black-out, and so on, as a basis to permit the construction and operation of nuclear facilities. These events also reinforced the importance of constantly learning and improving skills and expertise in safety technology. Although the incident occurred in Japan, nuclear community throughout the world should learn the lessons and take necessary measures to anticipate, so that similar incidents will not occur elsewhere. In principle, any nuclear accident at one place could foreshadow future accidents in other places.

In light of the incident, the IAEA has initiated an extraordinary meeting (Second Extraordinary Meeting of Convention on Nuclear Safety) by inviting representatives of all countries party to the Convention on Nuclear Safety to discuss the steps taken and/or plan of action performed, including lessons taken by each respective country, to serve as general guidelines or best practice for all parties. And for that, every state party is expected to make a report and submit it before the meeting takes place.

This report was prepared as a discussion paper of the extraordinary meeting of the Convention on Nuclear Safety that is planned for the end of August 2012. This report has been prepared and is based on guidelines provided by the IAEA, while discussing related matters covering topics: External Events, Design Issues, Severe Accident Management and Recovery (on-Site), National Organizations, Emergency Preparedness and Response and Post-Accident Management (off-site), and International Cooperation.

Related to the Fukushima Daiichi nuclear power plant accident, Indonesia has conducted a series of responsive measures during the year 2011 (since the incident) and had to take anticipatory measures that would begin the following years.

Responsive measures that have been done in Indonesia include:

a. Radiation monitoring at several locations near the boundary of the State;
b. Radiation monitoring at airports and international ports, and
c. Coordination with agency of food and drug control, agricultural, fisheries, and marine-related ministries.

Some anticipatory steps that have been made include:

a. Review of nuclear safety regulations and research reactors.
b. Review of the status of seismicity on the entire research reactor in Indonesia.
c. Review of the emergency preparedness plan and accident management.

2. EXTERNAL EVENTS

Associated with the planned introduction of NPP in Indonesia and the occurrence of Fukushima Daiichi nuclear power plant accident, it is imperative to strengthen nuclear regulatory control. Especially for the safety aspects in siting, there should be an in-depth study of the seismic potential of the region and in areas around nuclear power plant siting candidates. Such studies are also needed to the site of existing facilities.

This is particularly relevant, because Indonesia has a history of earthquakes and tsunamis which are still likely to happen in the future and could have an impact on existing facilities. History of earthquake and tsunami that have occurred in Indonesia (and recorded since 1674) is shown in Figure 1.

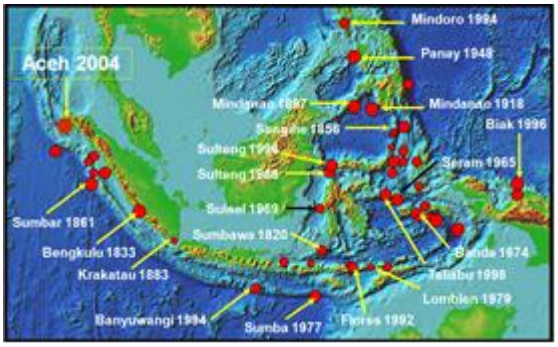


Figure. 1. Historical Tsunami Events in Indonesia (after Puspito, 2002)

Map seismicity (earthquake zone) of Indonesia and a map containing the location of the history of the tsunami in Indonesia is shown in Figure 2.

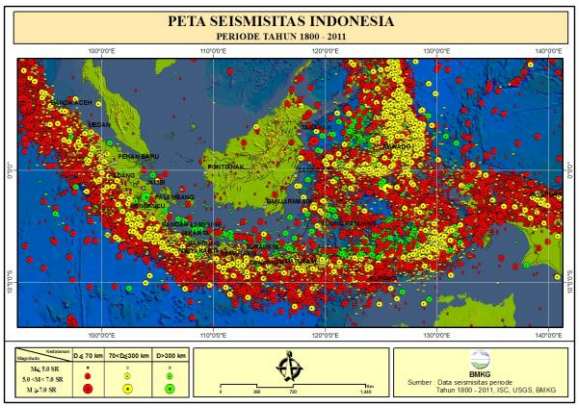


Figure 2. Seismicity Map in Indonesia Tectonic Regime 1800 - 2011

Since of the Fukushima Daiichi nuclear power plant accident occurred, a series of comprehensive safety evaluations related to external events of nuclear reactors has been done, especially of the three research reactors. To the three research reactors in Indonesia, an evaluation of the safety status of external events has been performed, particularly by reviewing aspects of the earthquake and tsunami potential by using the provisions of Zoning Map of Indonesia's latest earthquake, applicable since 2010.

Associated with site evaluation, the Indonesian Nuclear Energy Agency Regulatory (BAPETEN) has conducted a review of some following regulation in the aspects of safety of seismic and tsunami:

1. BAPETEN Chairman Regulation (BCR) No 5/2007 on the Safety Provisions for Siting of Nuclear Reactors.
2. BCR No. 1/2008 on the Site Evaluation of Power Reactor: Aspect of Seismicity.

In addition, BAPETEN has also performed a review of regulations related to safety analysis beyond the design basis or severe accidents, including analysis by considering more than one external event, and has been working to revise pertinent regulations on the safety of nuclear installations.

2.1 Seismicity in Indonesia

Indonesia is made up of complex interactions of earth's major plates, where the Indo-Australian Plate on the south side is moving north with a speed of 6-7 cm/year in subduction process to the stable Eurasian Plate along the Sunda Trench. From the east, the Pacific Plate hits eastern Indonesia during the New Guinea Trench-Pacific region with speeds up to 11 cm/year.

Interaction between the Earth's plates causes the formation of the crust faults or faults in both the ocean (Mentawai Fault in Sumatra; Sula-Sorong Fault in Maluku-Papua, Flores Fault in north of Flores) and on the ground (Sumatra Fault, Fault-Baribis Cimandiri and Opak Fault in Java Island, Palu-Koro Fault in Sulawesi, and Sorong and Tarera-Aiduna Fault in Papua).

Tectonic plates interaction points along the trench as well as fragments of the earth's crust are the sources of earthquakes, both land and sea. When the earthquake occurs beneath the sea with the epicentre relatively shallow (<70 km) and a magnitude of more than 7, it could trigger a tsunami. Map of earthquake source path is given in Figure 3.

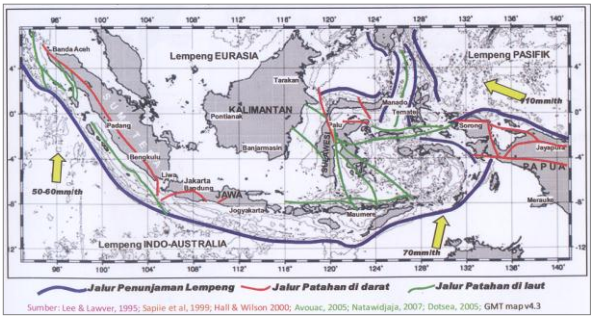


Figure 3. Map of Earthquake Source Path

Tsunami can be generated by submarine earthquakes that occur due to a shift plate, especially along the subduction zone plate or fracture. Therefore, western Sulawesi, Gorontalo Bay, on the west coast Sangihe-Talaud Islands, west coast, north and east of the coast of Indonesia could be potentially hit by the tsunami disaster. Potential tsunami devastated the region is given in Figure 4.

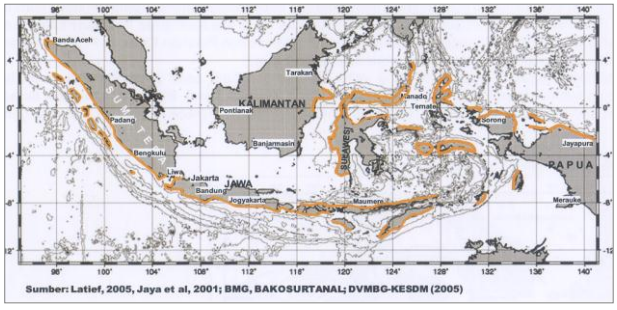


Figure 4. Potential Tsunami Devastated Region

The high seismic activity can be seen from the recording and historical records over a period from 1800 to 2011. In reducing casualties and damage caused by the earthquake, the Ministry of Public Works has issued the latest Indonesian earthquake maps. This map illustrates the response spectra and peak acceleration from bedrock probabilistic analysis for various periods of the earthquake. Map of the peak ground acceleration (PGA) on bedrock for the probability exceeded 10% in 50 years, is given in Figure 5.

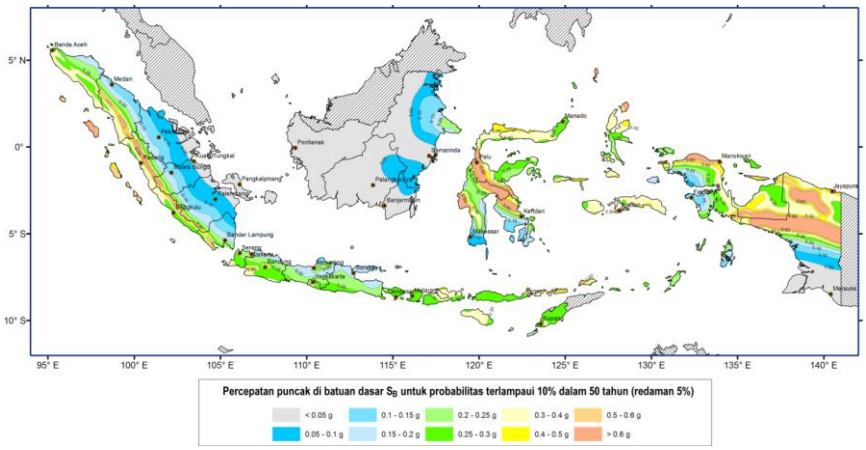


Figure 5. Map of the Peak Ground Acceleration (PGA) on Bedrock (SB) for Probability Exceeded 10% in 50 Years

The Map of Indonesian Earthquake of 2010 was used as a reference basis for planning and designing earthquake-resistant infrastructure, including replacement of existing seismic maps in the Indonesian Standard Rules on Earthquake-Resistant Building Planning (SNI-03-1726-2002).

Figure 6 shows that cities such as Jakarta, Bandung, Yogyakarta and Surabaya have a higher value of PGA. The Map of Indonesian Earthquake of 2010 provides a reference for the planning of the building with the availability of information on the bedrock seismic acceleration spectral period of 0 seconds (PGA), spectral period of 0.2 seconds (S_2) and the spectral period of 1.0 seconds (S_1). From the Map of Indonesian Earthquake of 2010 and data of classification review of the site location, the analysis of wave propagation from bedrock to ground surface, in determining the earthquake shocks at ground level, can be carried out. Shocks on the soil surface generally may amplify due to the different characteristics of the material between the bedrock and the soil surface.

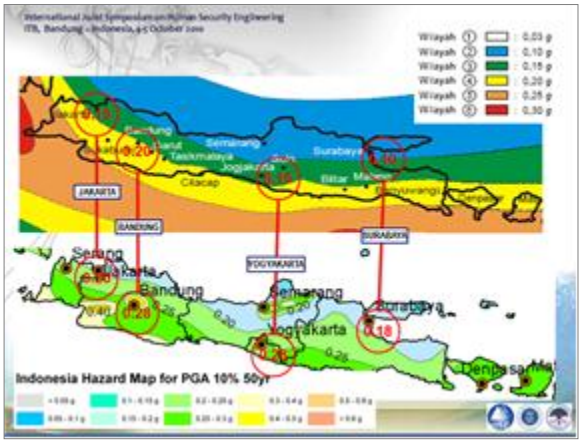


Figure 6. Changes in the Value of PGA in the Indonesian Earthquake Map of 2002 to that of 2010 for Several Cities in Java.

2.2 Seismicity Assessment of Around BATAN Reactors

Currently there are three research reactors in Indonesia (all located on the island of Java) operated by the National Nuclear Energy Agency (BATAN).
The reactors are: (1) Multipurpose Reactor 30 MW (MPR-30) which is located in Serpong, Banten (hereinafter Reactor Serpong), (2) Reactor TRIGA Mark-2000 - 2000 kW (TRIGA-2000) located in the city of Bandung, West Java (Bandung Reactor), and (3) Kartini Reactor 100 kW located in Yogyakarta (Yogyakarta Reactor).

Figure 7 shows that in the western part of Java, especially in the southern area, earthquakes have occurred at depths <70 km, from 1900 to 2011. However, in Serpong Reactor the strength of earthquakes was more than magnitude 5.5 R, and earthquake centre was deep enough (> 70 km). Hence, the Serpong Reactor is quite safe in terms of seismicity.

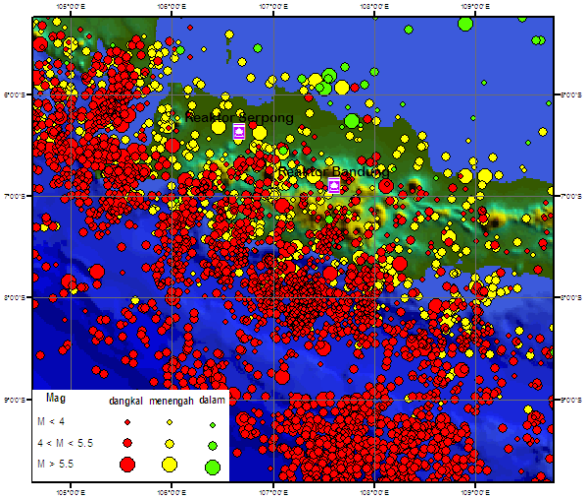


Figure 7. Seismicity Map in the Vicinity of the Serpong and Bandung Reactors Year 1900-2011

Bandung Reactor requires attention because there have been many earthquakes with the depth <70 km, from 1900 to 2011. There is an active fault in the West Java-Baribis Cimandiri and Lembang Fault. Based on seismic data and records, relatively small earthquake could cause significant damage, because the epicentre is fairly shallow. Based on the depth of epicentres, *Fowler* classifies the earthquakes into:

- Shallow earthquake (less than 70 km).
- Medium earthquake (more than 70 km and less than 300 km).
- Deep earthquake (more than 300 km, or sometimes > 450 km).

Figures 8 and 9 show close to the Yogyakarta Reactor, there are many shallow earthquakes with the strength less than 4 R. These earthquakes occur because of Opak Fault in the eastern of Yogyakarta city. Opak Fault, initially considered inactive, has recently become active and has caused some damage during the earthquake on May 26, 2006. In addition, there is also an intermediate depth earthquake with the strength above 5.5 R.

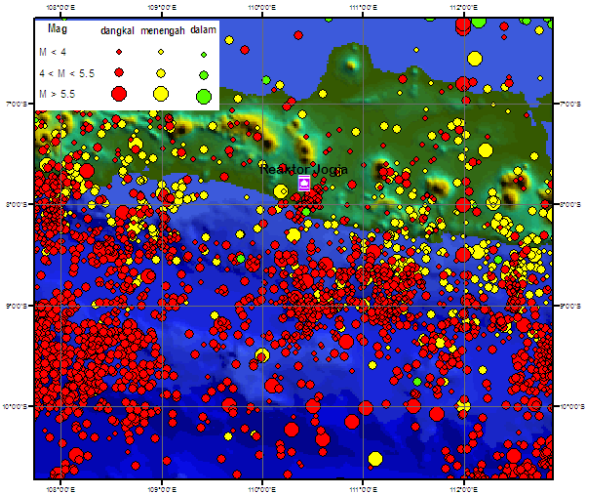


Figure 8. Seismicity Map around the Site Location of Yogya Reactor Year 1900-2011

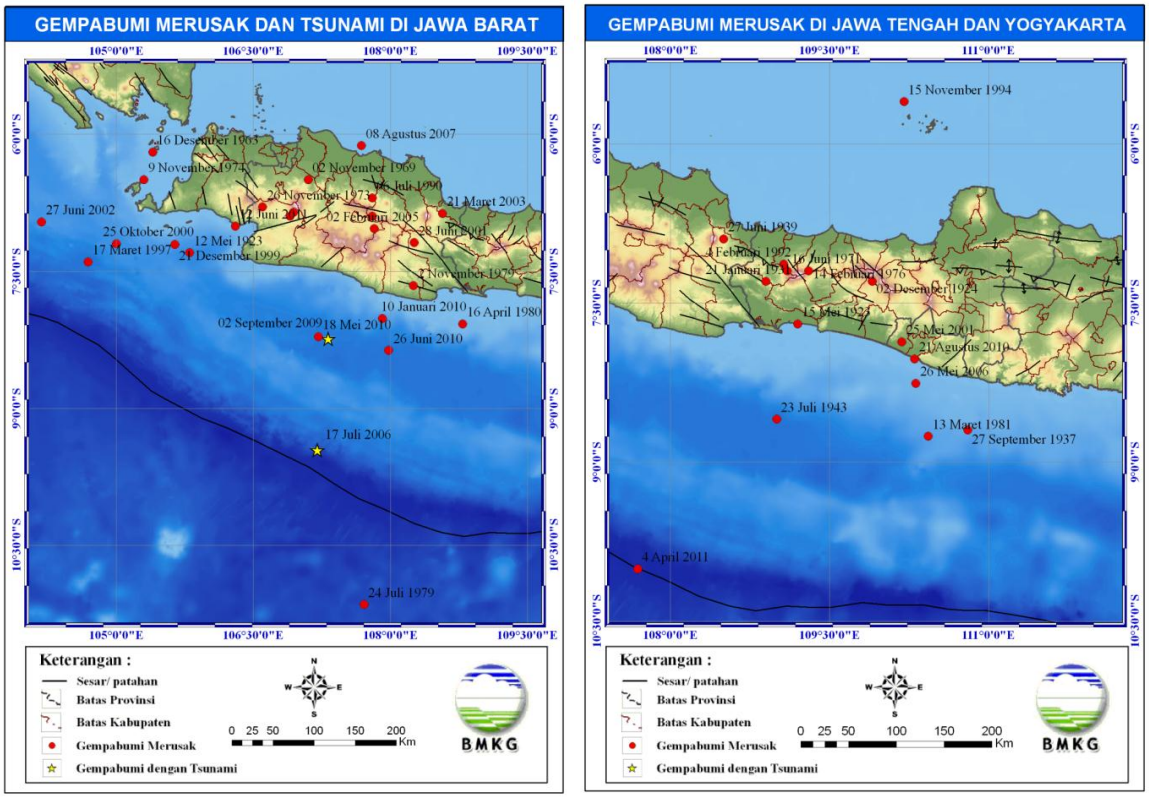


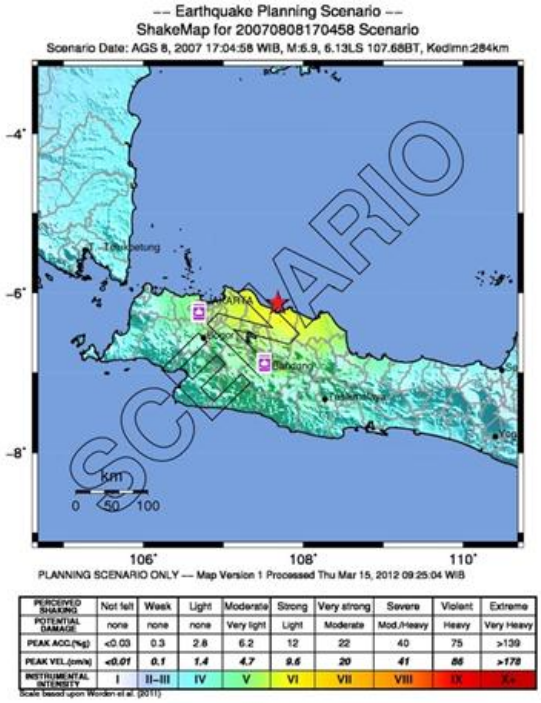
Figure 9. Map of Destructive Earthquake in West Java (left) and Central Java - Yogyakarta (right)

Earthquakes with significant damage in the vicinity of the Yogyakarta Reactor site occurred on May 15, 1923, December 2, 1923, 27 September 1937, July 23, 1943, March 13, 1981, May 25, 2001, May 26, 2006, and August 21, 2010.

Meanwhile, earthquakes with significant damage around the reactor site in Bandung and Serpong occurred on March 17, 1997, December 21, 1999, October 25, 2000, July 17, 2006, and August 8, 2007.

Currently, The Indonesian Agency for Meteorology Climatology and Geophysics has performed the assessment on the effect of significant/destructive earthquake on the reactors,

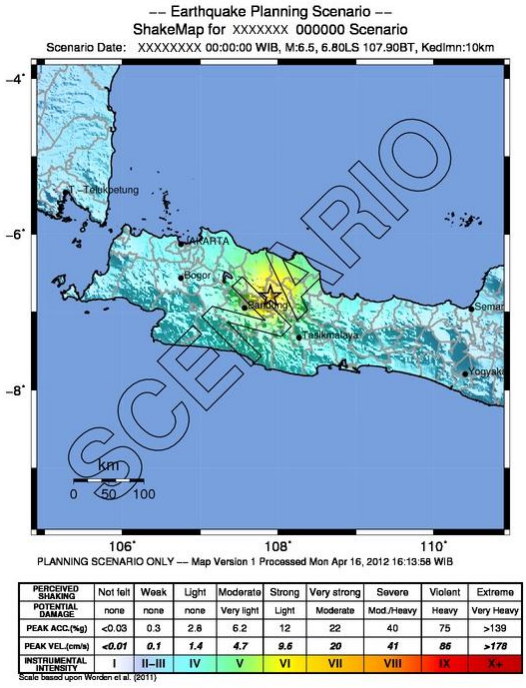
used a simulation with a significant earthquake, one of the earthquakes occurred in Indramayu (north of West Java) as a reference. From the simulation analysis by shake map in Figure 10, the Serpong Reactor will have light to moderate shaking (about IV-V MMI).



Earthquake Source Parameters:
Magnitude : 6.9
Latitude : 6.13 0 S
Longutude : 107.68 0 E
Depth : 284 km

Figure 10. Shake Map the Source of the Earthquake in Northern of West Java (Indramayu)

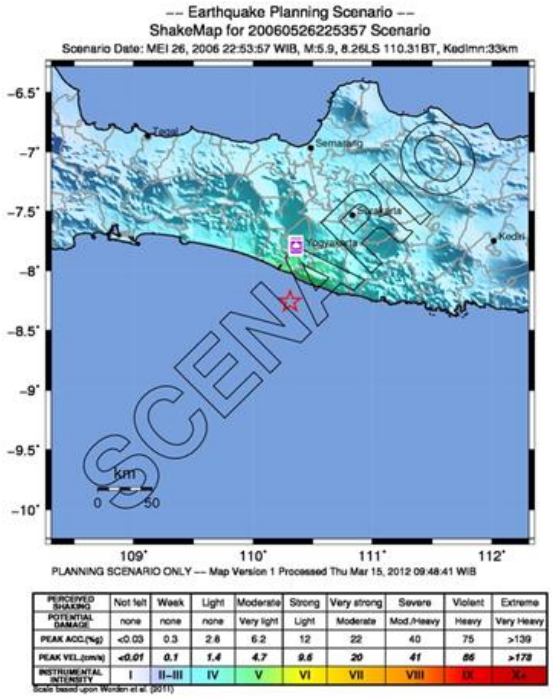
With regard to the Bandung Reactor, the earthquake simulation was conducted with a significant earthquake in Lembang. From the simulation results by shake map, the Bandung reactor will have a strong shock (approximately VI MMI), shown in Figure 11.



Earthquake Source Parameters :
Magnitude : 6.5
Latitude : 6.8 0 S
Longitude : 107.9 0 E
Depth : 10 km

Figure 11. Shake Map the Source of the Earthquake in Lembang - West Java

For the earthquake in the southern of Central Java, a simulation used a scenario of significant earthquake that occurred on May 26, 2006. From the simulation results by shake map as shown in Figure 12, Yogyakarta reactor will have a light shock (about IV MMI).



Earthquake Source Parameters :
Magnitude : 5.9
Latutude : 8.26 0 S
Longitude : 110.31 0 E
Depth : 33 km

Figure 12. Shake Map the Source of the Earthquake in Southern of Central Java

Based on the safety evaluation, some conclusions have been drawn, such as follows:

1. Earthquake in Yogyakarta on May 27, 2006 was in the connection between the Oyo River and the Opak River, with the hypocentre depth of 10 km (<70 km).
2. Active faults play a role in the earthquake, either above the Opak River, or about 5-10 km from eastern of the Opak River. The fault lines follow the morphology of the mountains. GPS measurements show horizontal deformations after the earthquake have happened from 0.3 to 9.1 cm.
3. PGA value calculation based on the guidelines of SNI-03-1726-2002 result in a range of values from 0.238 to 0.288 g and its risk is in the level 3. Meanwhile, the calculations performed by a team of MAEC gave the PGA value of 0.5 g on the horizontal position and 0.47 g on the vertical position. The value of horizontal amplification was stronger than the vertical amplification.
4. In fact, May 27, 2006 earthquake caused no meaningful impact on Kartini Reactor construction.

3. DESIGN ISSUES

Design problems should be the next major concern, because earthquakes, floods and other extreme weather conditions can affect the loss of safety functions in nuclear installations, which include loss of function of the reactivity control, heat removal from the reactor core or the decay heat of radionuclides, as well as the function of the confinement of radioactive materials and containment of radiation.

Concerning the existing research reactor in Indonesia, several things need to be reported related to design issues as the impact of external events are considered. Evaluation of the design has been performed towards the earthquake and tsunami aspects for the research reactors. The summary of the evaluation is as follows:

3.1 Serpong Reactor

The design evaluation was not performed particularly for the Multi-Purpose Reactor 30 MW located in Serpong (Serpong Reactor), since from the seismic and volcanic assessment the reactor site is not significantly affected by seismic and volcanic conditions in the surrounding area. This is considering the area around the reactor which is quite stable in terms of seismicity and volcanic hazards.

3.2 Bandung Reactor

Such studies of the detailed technical design have been conducted by BATAN in the framework of building retrofitting of the reactor TRIGA-2000 in Bandung (Bandung Reactor). It uses the latest seismic data after considering the recent earthquakes with higher magnitude, such as in Sumatra in 2004, Yogyakarta 2006 and Fukushima 2011.

The results and recommendations for the seismic analysis of structures, systems and components of Bandung Reactor include:

a. Stack, still has a sufficient bend and shear, and has elasticity when exposed to strong earthquakes;
b. Reactor building, needs to be strengthened (retrofitted) in the reinforced concrete walls, and needs reinforcement in beams and columns;
c. Reservoir/elevated water tank, needs to be installed the steel beams to reinforce the reservoir base plate and to prevent the occurrence of cracks on the plate;
d. Catwalk, needs to be de-coupled the bridge between the catwalk and the platform, and structural integrity needs to be improved between the beams and catwalk columns;
e. Bridge and platform, needs to be installed by additional anchor, bolt, and brace for a rigid structure;
f. Strong motion accelerograph, needs to be installed for recording the acceleration of the earthquake; and
g. Columns supporting the platform are required for shear reinforcement.

3.3 Yogyakarta Reactor

After an earthquake Yogyakarta May 27, 2006, a safety evaluation of Kartini Reactor in Yogyakarta (Yogyakarta Reactor) has been conducted.

Safety evaluation of Yogyakarta Reactor was performed by taking into account the safety factors of the structure, including (i) resistance to bending, shear, axial, torsion and combinations thereof, (ii) the stability of the structure of the catastrophe; (iii) the integrity of the building, especially the connections between elements and anchor; (iv) the integrity of a large leak or a sloshing effect, (v) the interaction between the parts or components of the structure; and functionality or performance of equipment, components and instruments.

The results of safety evaluation with emphasis in structure, system and component safety factors indicated that the earthquake caused no significant impact of the construction of Yogyakarta reactor.

The results and recommendations for the seismic analysis of structures, systems, and components of Kartini reactor at post-earthquake include:

a. The reactor building, needs to be retrofitted by a plate bending for a few panels, multiple beams, columns, and some point the foundation; shear reinforcement for several blocks;
b. Control Room, needs to be retrofitted by a concrete slab panel, and needs to be installed by the base isolation anchored on the legs of control panel;
c. Catwalk, needs to be de-coupled by the bridge between the catwalk and the reactor platform;
d. Seismic switch / automatic scram system, needs to be installed;
e. Strong motion accelerograph, needs to be installed for recording the acceleration of the earthquake; and
f. Reactor core and reflector, needs required rigidity on levelling screws.

Based on the recommendations from the safety evaluation, BATAN has performed retrofitting (columns additions) to the reactor building structure.

In addition to the seismic safety evaluation of volcanic and seismic aspects mentioned above, BATAN has also conducted a review on the condition of the integrity of the cooling system, power supply systems, confinement (reactor building) and the system for handling and storage of nuclear fuel in the three research reactors.

In addition to the safety evaluation of the three research reactors by the licensee, BAPETEN as a regulatory authority is also undertaking a review of existing nuclear regulations, especially in relation to the external hazards to the reactor.

4. SEVERE ACCIDENT MANAGEMENT AND RECOVERY (ON-SITE)

From the Fukushima accident, a nuclear accident can happen not only due to the single event but also due to a series of or simultaneous multi-events or multi-failures. Therefore, taking aspects of multi-events or multi-failures into account of safety regulation is inevitable in the future, particularly those related to the function of safety related structures, systems and components of the nuclear installations.

In our case, the current provisions on safety related structures, systems and components for the nuclear installations has been stipulated in the Government Regulation on Nuclear Installation Safety and Security. Structures, systems and components important to safety include structures, systems and components that provide functions to ensure the safety of the postulated initiating events to prevent exceeding limits of anticipated operational occurrences and design basis accidents. However, in the existing regulations, aspect of multi-events or multi-failures has not been considered yet.

In the future, aspects of the multi-events will be considered in formulating the new and reviewing the existing BAPETEN Chairman Regulations (BCR) that related to design.

5. NATIONAL ORGANIZATIONS

BAPETEN has issued the Quality Assurance System in 1999 and recently revised it, based on IAEA publications GS-R-3, into the Management System. It is stipulated in the BCR No. 10 Year 2011.

Referring to that regulation, BAPETEN always carries out the continuous improvement to enhance the quality of regulatory system of the utilization of nuclear energy in Indonesia.

At present, the review is being conducted on BAPETEN organisational structure, as well as the possibility of establishing a Technical Supporting Organization that will support the implementation and evaluation of the safety analysis of nuclear installations, including nuclear power plants. Currently, these activities (functions) are conducted by an assessment centre in BAPETEN.

Related to regional and national organizations for nuclear emergency preparedness and response, in a few years, nuclear emergency preparedness and response system is being developed.

The nuclear emergency preparedness and response system includes:

a. nuclear emergency preparedness; and
b. nuclear emergency response.

The nuclear emergency preparedness and nuclear emergency response are divided into several levels, namely: the installation level, provincial level, and national levels. Nuclear emergency preparedness and response are implemented based on emergency preparedness plan.

Nuclear emergency preparedness plan is provided up by the licensee, concerning to preparedness and response infrastructure on the level of nuclear installations; the Head of the Regional Disaster Management Agency establishes nuclear emergency preparedness plan for the provincial level; the Head of National Disaster Management Agency provides national nuclear emergency preparedness plan.

The implementation of a nuclear emergency preparedness and response plan in the provincial level involves the relevant agencies, such as Regional Disaster Management Agency, local police, health department and fire department.

The agencies have their duties and functions in the implementation of a nuclear emergency preparedness and response based on to the relevant regulations.

The implementation of a nuclear emergency preparedness and response plan in national level involves relevant agencies such as National Disaster Management Agency, ministry of health, ministry of transportation, Police, Army, ministry of social affairs, ministry of public works, ministry of agriculture, and National Save and Rescue (SAR) Agency.

From the Report of the Integrated Nuclear Infrastructure Review (INIR) Mission 2011, it is stated that BATAN, as a licensee of nuclear installations in Indonesia, has to provide the guidelines for nuclear emergency preparedness and response plan in Serpong area. In this regards, BAPETEN has developed and implemented the guidelines for three research reactors.

Meanwhile, Nuclear Preparedness Emergency and Response Plan for provincial government level, especially where there are non-power reactors in have not been developed. Nevertheless, it has been established a functional framework for all agencies involved in a National Nuclear Emergency Response Organization.

In the action plan of national nuclear infrastructure development program (2010-2014), central and local governments will always be involved in the preparation process of assessment of nuclear emergency preparedness and response.

6. EMERGENCY PREPAREDNESS AND RESPONSE AND POST-ACCIDENT MANAGEMENT (OFF-SITE)

In the Ministerial Meeting - IAEA on Nuclear Safety (Vienna, Austria, 20-24 June 2011), Indonesia presented the topic "Fukushima Accident Emergency Response by the Government". Presentation covered the introduction of Law No. 10/1997 on Nuclear Energy that established the Regulatory Body (BAPETEN) to develop legislation and regulation, perform licensing process and carry out inspections in ensuring the safety and health of workers and public, and protect the environment.

In addition, there is the Act No. 24/2007 of the National Disaster Management Agency, as a basis for mitigation of natural and human-induced disasters. In addition, BCR No. 01/2010 on Nuclear Emergency Preparedness and Response has been established.

In nuclear emergencies, the role of BAPETEN includes:

- formulating national policies relating to nuclear/radiology emergency preparedness and response.
- conducting training on the nuclear facilities, related to nuclear emergency preparedness and response.
- coordinating improvement of the infrastructure of nuclear/radiological emergency preparedness and response.
- establishing a crisis centre and emergency contact numbers nationwide.
- depending on the scale of the accident, monitoring or observing directly the actions taken by other organizations responding in national and the consequences of the accident
- coordinating with the IAEA on emergency notification and assistance, through:
    - NCA-A: Deputy Chairman for Licensing and Inspection, BAPETEN
    - NCA-D: Director for Engineering and Nuclear Emergency, BAPETEN
    - NWP : Deputy Director for Nuclear Emergency Preparedness, BAPETEN.

Indonesia also has strengthened its regulatory infrastructure, including some legal instruments, as follows:

- Presidential Decree No. 81/1993 on Ratification of the Convention on Early Notification of a Nuclear Accident: providing information to the IAEA on the nuclear accident conditions;
- Presidential Decree No. 82/1993 on Ratification of the Convention on Assistance in the Case of a Nuclear or Radiological Emergency: providing information to other countries, and vice versa;
- Presidential Decree No. 106/2001 on Ratification of Convention on Nuclear Safety: establishing emergency response plans.

Related to Fukushima Accidents, the Indonesian government has implemented some activities:

- Cooperating with other agencies or ministries to control materials and goods of import from Japan. The other agencies and ministries include BAPETEN, Ministry of Health, Ministry of Agriculture, Ministry of Foreign Affairs, BATAN (National Nuclear Energy Agency), BPOM (Agency for Food and Drug Control), BMKG (The Agency for Meteorology, Climatology, and Geophysics), and Customs. This includes monitoring of radioactive contamination and radiation exposure on air plane, transported goods and materials from Japan;
- Providing the information on real time condition and status of Fukushima accident to the public by the BAPETEN and BATAN website;
- Radiation monitoring of personnel by measurements of the aircraft passengers, crews, and goods in Soekarno-Hatta Airport, Jakarta and Ngurah Rai Airport, Bali to the possibility of contamination from nuclear power plant accident in Fukushima, Japan.
- The result of measurement indicated that the environmental conditions are not contaminated by radioactive from Fukushima accident and five Indonesian citizen passengers of an airline have been contaminated on cloths and luggage below the radioactive contamination limit. Appropriate decontamination has been carried out.
- Environmental radioactivity monitoring by taking air, water, and soil samples in Manado, Sangihe, North Sulawesi; Nunukan, East Kalimantan; and Jayapura, Papua. It has been implemented on May-June, October, and November 2011. BAPETEN has provided team conducted the monitoring to these areas.
- 1 (one) BAPETEN staff has participated in the IAEA fact-finding mission to respond the Fukushima accident.

In carrying out the preparation of technical policy, formulation in guidance of system development and control of nuclear emergency preparedness, Indonesia has performed a number of national and international activities related to national nuclear emergency preparedness and response.

In the national level activities related to nuclear emergency preparedness, Indonesia has conducted several training and exercise of nuclear emergency response in the Serpong Reactor, and in the Port of Tanjung Perak, Surabaya, in 2011.

These activities involved several institutions and organization, including: National Disaster Management Agency, police, military, local governments, and others.

At international level, Indonesia participates in the communication training - training of the Convention (Convex) - IAEA, a national workshop organized by the intervention level of cooperation between the IAEA-BAPETEN, and ANSN meeting on the topics of emergency preparedness and response.

From the national workshop on “operation in the intervention level, decision on Urgent Protective Action (UPA) and the protection of workers”, the comparative data of UPA boundary of each country in Asia have been collected and the applications of values in each State have been shared.

The action plans in 2012 and the next five years include:

- Perform monitoring of environmental radioactivity in the three reactors (Serpong, Yogyakarta and Bandung), and installing the radioactivity detector in the border areas of Indonesia, where sensors (detectors) connected to the Real Database Monitoring System in BAPETEN in 2013.
- Provide awareness for Regional Disaster Management Agency in the Southern of Tangerang in terms of potential radiological hazards in the region, by implementing and providing:
    - Capacity building enhancement for Regional Disaster Management Agency of the South Tangerang (including 75 disaster volunteers in each district) to visit the Serpong Reactor and participate in the national and international training, seminars, and workshops.
    - Coordination between Regional Disaster Management Agency of the South Tangerang and the Nuclear Facilities at the Serpong areas and other related organization (police, fire department, health office, transportation agency, etc.) to formulate the Memorandum of Understanding (MoU) for emergency preparedness and response.
    - Nuclear emergency infrastructure, such as materials, equipment, facilities, transport vehicles, and iodine tablets.
- Disseminate Government Regulation on Safety and Security on Nuclear Installation as a legal basis of emergency preparedness and response.

Government Regulation that governs nuclear emergency preparedness and response has just been published in the last April 2011. The government regulation governs nuclear emergency preparedness and response both on-site and off-site, in national, provincial and installation level. Besides that, it regulates the nuclear emergency infrastructure and response functions, conditions and status of a nuclear emergency, the responsibility of the owner of the installation, the head of National, and Regional Disaster Management Agency, controlling and reporting mechanisms, and international cooperation.

In terms of allocation of funds related to a nuclear emergency preparedness and response, it is also stipulated the funding mechanism, the obligation of licensee for allocating budget for nuclear emergency preparedness and response.

As the implementation of the Government Regulation, relevant institutions, both at provincial and national level, will establish a nuclear emergency preparedness and response system.

7. INTERNATIONAL COOPERATION

As a member state of the International Atomic Energy Agency (IAEA), Indonesia co-operate closely with the Agency especially in the area of nuclear safety. Indonesia strongly abides international safety standards established by the Agency and participates in its development through the Safety Standards Committees. Indonesia continues to follow the recommendations provided by the Agency to strengthen national and regulatory infrastructures, as well as to enhance the national preparedness and response for nuclear emergency.

Indonesia also actively participates in the Asian Nuclear Safety Network (ANSN), which provides the forum for co-operation between IAEA member states in Asia on various topics of nuclear safety. Our participation in ANSN includes the topics of management of research reactor safety, operational safety, safety analysis of research reactors, radioactive waste management, emergency preparedness and response, governmental and regulatory infrastructure, siting, and education and training.

In response to the Fukushima accident, BAPETEN requested the Agency, through its Technical Cooperation Projects, to provide assistance in strengthening regulatory capacity of nuclear safety, with a focus on management system of regulatory body, enhancement of regulatory infrastructure, and the improvement of regulatory effectiveness.

In addition, BAPETEN has requested the Agency to perform Integrated Regulatory Review Service (IRRS) mission to Indonesia in 2014, which will further strengthen the national regulatory infrastructure in nuclear safety. As anticipation for the upcoming IRRS missions, BAPETEN has hosted a regional workshop on Self Assessment in the preparation of IRRS mission, which successfully provided a benchmark for Indonesia and other Asian countries.

To enhance regulatory infrastructure and capability, BAPETEN intensifies cooperation with various international organisations, such as the Nuclear Energy Agency (NEA) of the Organisation for Economic Co-operation and Development (OECD) and the European Union. As Indonesia is a new-entrant country, BAPETEN is committed to participate regularly in the activities of the Committee on Nuclear Regulatory Activities (CNRA) of the NEA-OECD. The European Union through its Nuclear Safety Cooperation Instrument assists Indonesia in terms of strengthening the regulatory infrastructure and improving emergency preparedness.

In anticipation of the construction and operation of the first nuclear power plant in Indonesia. BAPETEN embarks further collaboration with various IAEA member states, especially the United States Nuclear Regulatory Commission (NRC), the Canadian Nuclear Safety Commission (CNSC), the Nuclear Regulatory Authority (NRA) of Slovak Republic, the Korea Institute of Nuclear Safety (KINS), the Atomic Energy Licensing Board (AELB) of Malaysia, and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). Furthermore, BAPETEN also seeks to strengthen its human resources, by dispatching its selected employees to perform on-the-job training programme in the NRC and CNSC for the period of 2 to 9 months.

8. SUMMARY

Indonesia is committed to improving nuclear safety by building of regulatory infrastructure of utilisation of nuclear energy by taking into account lessons learned Fukushima tragedy, by focusing on:

1. Improvement of legislation and regulation with respect to external events, particularly the design issues in anticipation of multi-events hazards and to multi-unit events in a single site. There are some reviews of the status of seismicity in all reactors based on the new Indonesia Earthquake Map of 2010.

2. Building and enhancing their capabilities on:
    a. Severe accident management and recovery (on-site);
    b. National Organizations; and
    c. Emergency preparedness and response and post-accident management (off-site), through reviewing of the documents of nuclear preparedness and accident management, establishing a clear roles and functions of BAPETEN and other related organizations, and coordinating for nuclear emergency preparedness and response, formulating the national policies related to nuclear/radiological emergency preparedness and response, enhancing nuclear emergency preparedness and response in nuclear facilities, related to.

3. Building and enhancing regional cooperation and international cooperation within the framework of capacity building, such as:
    a. institutional capacity building, technical upgrading of nuclear emergency preparedness and response and prevention of nuclear/radiological disaster, control and coordination among agencies; and
    b. sharing of information.

In order to provide a high level summary of the items specified under IAEA Guidance for National Reports, a summary table was developed and given below (Table 1):

Table 1. Summary Table

Activity	Activities by the Operator*			Activities by the Regulator*		
	(Item 2.a)	(Item 2.b)	(Item 2.c)	(Item 3.a)	(Item 3.b)	(Item 3.c)
	Activity - Taken? - Ongoing? - Planned?	Schedule or Milestones for Planned Activities	Results Available - Yes? - No?	Activity - Taken? - Ongoing? - Planned?	Schedule or Milestones for Planned Activities	Conclusion Available - Yes? - No?
Topic 1 – External Events						
Evaluation of Seismicity and Seismological Studies	Ongoing	2012	No	-	-	No
Requested Implementation of State-of-the Art Models	-	-	-	Ongoing	-	No
Assessing of Events Beyond Current Licensing Basis	-	-	-	Ongoing	2012	No
Topic 2 – Design Issues						
Evaluation of Loss of Electrical Power (Evaluate Long Time Availability of Diesel Fuel)	-	-	No	-	-	No
Evaluation Loss of Cooling	-	-	No	-	-	No
Evaluation of Containment Integrity	Taken	2011	Yes	Ongoing	-	No
Evaluation of Loss of Spent Fuel Pool Cooling	-	-	No	-	-	No
Topic 3 – Severe Accident Management						
Personnel Resources and Training (for severe accident scenarios emergency)	Planned	-	No	-	-	No
Adequacy of procedure	-	-	-	-	-	-
Multi-unit events	-	-	-	Planned	-	No
Equipment availability	-	-	-	-	-	-

Activity	Activities by the Operator*			Activities by the Regulator*		
	(Item 2.a)	(Item 2.b)	(Item 2.c)	(Item 3.a)	(Item 3.b)	(Item 3.c)
	Activity - Taken? - Ongoing? - Planned?	Schedule or Milestones for Planned Activities	Results Available - Yes? - No?	Activity - Taken? - Ongoing? - Planned?	Schedule or Milestones for Planned Activities	Conclusion Available - Yes? - No?
Topic 4 - National Organizations (Regulator, TSO, Operator, Government)						
Organizational Changes and Improvements	-	-	-	Taken Ongoing	-	Yes
Interaction among Organizations	-	-	-	Ongoing	-	Yes
Transparency /Openness	-	-	-	Planned	-	No
Topic 5. Emergency Preparedness and Response and Post-Accident Management (Off-Site)						
Multi-unit events	-	-	-	-	-	-
Crisis management	-	-	-	Ongoing	-	No
Radiation protection	-	-	-	Taken Planned	2011 2014	Yes No
Incident response	-	-	-	Taken	2011	Yes
Communications	-	-	-	Ongoing	-	No
Transparency/ openness	-	-	-	Taken	-	Yes
Topic 6. International Cooperation						
Conventions	-	-	-	Ongoing Taken Planned	2012 2011 2014	No Yes No
Communications	-	-	-	Ongoing	2011	No
Assistance from International Organizations	-	-	-	Ongoing	2012	No
Sharing Operating Experience	-	-	-	Ongoing		No

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[4] Coordinator’s Report Guidance Documents and Template.

[5] The Agency for Meteorology Climatology and Geophysics (Division of Mitigation of Earthquakes and Tsunami) - Seismicity in Indonesia, Seismicity Review around Reactors in Serpong, Bandung and Yogyakarta - 2012.

[6] BATAN – TECHNICAL REPORT - Nuclear Infrastructure Development in Indonesia, August 2011.

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[8] http://balisafety.baliprov.go.id/Edukasi.aspx?id=3.