

**NATIONAL REPORT
ON COMPLIANCE TO
CONVENTION ON NUCLEAR SAFETY**

**INDONESIA
2004**

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NATIONAL REPORT ON COMPLIANCE TO CONVENTION ON NUCLEAR SAFETY

1. INTRODUCTION

The national policy of Indonesia dictates that any nuclear activities should be directed toward the welfare of people. In line with its national policy, Indonesia continues to support the IAEA's role in promoting the peaceful uses of nuclear energy and its efforts in the field of nuclear safety. Accordingly, the government of Indonesia intensifies its commitment by adhering to the Convention on Nuclear Safety. The government of Indonesia signed the Convention on Nuclear Safety on September 20th, 1994. Subsequently, Indonesia ratified the convention in the year 2001 and has, as stipulated by the convention, officially become a contracting party since July 2002. The convention would certainly galvanise global efforts in achieving safety of nuclear installations and security of nuclear materials, therefore assuring the safety of individuals, the public and the environment.

National legislation stipulated in Act No. 10/1997 on Nuclear Energy has provided a legal basis for the Nuclear Energy Regulatory Authority (BAPETEN) to perform regulatory functions on the use of nuclear energy in Indonesia, including authorisation, inspection and enforcement. The Nuclear Energy Act stipulates effective separation between the regulatory body, BAPETEN, and the promoting body, BATAN. This policy highlights the endeavours of the Indonesian Government in fulfilling its obligation under the convention on nuclear safety. Moreover, the government is finalising principal laws and related regulations for the construction and operation of a nuclear power plant.

This is the first national report of Indonesia as contracting party since the year 2002. As the Convention on Nuclear Safety encompasses three aspects, i.e. Nuclear Installation, Regulatory Framework and Regulatory Body, the report is arranged accordingly.

2. EXISTING NUCLEAR INSTALLATIONS

Article 2 of the Convention defines "nuclear installation" as a nuclear power plant and stipulates that contracting parties must possess at least one nuclear power plant. However, the Nuclear Energy Act of Indonesia stipulates that research reactors could be classified as nuclear installations, and therefore requires the government to abide by nuclear safety standards. To date, Indonesia does not own any nuclear power plants but research reactors instead. There are currently three research reactors operating in Indonesia, namely GA Siwabessy 30MW Reactor in Serpong, Triga 2MW Reactor in Bandung and Kartini 100kW Reactor in Yogyakarta.

RSG-GAS Reactor which is located in Serpong, about 60 km from the capital Jakarta, achieved its first criticality in 1987. The reactor, in the view of the safety aspect, is considered in good condition. Although some small incidents

have occurred, they were successfully contained and there were no radiological consequences.

The Triga 2000 Reactor in Bandung reached its first criticality in 1971. The reactor was initially designed to operate at 1 MW nominal power. Later in 2000, the reactor was further upgraded to 2 MW thermal power. There was also a problem found during the upgrading of the reactor, which was thinning of the liner due to corrosion. The problem was resolved by adding extra 5mm-aluminum liner on the trouble spots. During the upgrading, there were several actions taken to improve the safety of the reactor, e.g. replacing the shell-tube heat exchangers with the flat type, upgrading the emergency cooling system, increasing the cooling water level and improving the quality of the reactor's control system and instrumentation.

The Kartini Reactor in Yogyakarta was initially designed to operate at 250kW and attained its first criticality in 1979. However, the reactor is currently operated at maximum power of 100kW. It is expected that the 25-year old reactor is undergoing an ageing process. Ageing analysis has been performed on the reactor, especially on its tank and its liner. Preliminary results of the survey indicated that the reactor could continue its operation for several years to come. However, the results are far from conclusive and therefore further analyses are being carried out.

There are other nuclear installations in Indonesia, such as fuel fabrication, radiometallurgy, and experimental fissile fuel installations, as well as waste management and interim storage for spent fuel facilities.

3. LEGISLATIVE AND REGULATORY FRAMEWORKS

A. Nuclear Legislation and Regulations.

Nuclear legislation in Indonesia was first issued in Act No. 31/1964 on Principal Requirements for Nuclear Energy, which stated that BATAN would act as both research institution and regulatory body. The Nuclear Energy Control Bureau (BPTA) operated under BATAN and performed regulatory functions on the use of radioactive sources, ranging from licensing to enforcement. The separation of regulatory and promotion functions of nuclear energy was effected by the enactment of Act No. 10/1997 on Nuclear Energy, as a replacement for Act No. 31/1964. Pursuant to Articles 3 and 4 of Act No. 10/1997, regulatory and promoting functions should be separated and both bodies would report directly to the President of Indonesia. According to Article 14 of Act No. 10/1997, the regulatory body regulates, authorises, and inspects the use of nuclear energy in Indonesia. Furthermore, Presidential Decree No. 76 issued in May 1998 stipulated the establishment of BAPETEN.

Act No. 10/1997 dictates the functions of regulatory authority in its control on the use of nuclear energy, e.g. establishing regulation and guides, undertaking authorisation processes, carrying out inspection and enforcing the regulation and license conditions. The nuclear energy act also covers liability

for nuclear accidents (articles 28-40) and penalties for breach of regulations (articles 41-44). However, financial obligations related to waste management and decommissioning of nuclear facilities, as well as requirements for emergency preparedness, are not covered in this nuclear energy act and will be regulated in a government regulation instead.

In accordance with Act No.10/1997, four government regulations have been issued:

1. Government Regulation No. 63/2000 on The Safety and Health for the Use of Ionising Radiation
2. Government Regulation No. 64/2000 on the Authorisation of the Use of Nuclear Energy
3. Government Regulation No. 26/2002 on Safe Transport of Radioactive Materials
4. Government Regulation No.27/2002 on Radioactive Waste Management

A government regulation on authorising construction and operation of nuclear reactors, either for power generation or research purposes, is currently being drafted and will be established in the near future.

B. Licensing System

For the moment, BAPETEN has not established any regulations that stipulate more detailed requirements or guides on the construction and operation of nuclear reactor. Consequently, BAPETEN takes into account IAEA safety standards and standards developed by other countries in regulating the operation of nuclear reactors in Indonesia.

BAPETEN issues various licenses which correspond to different stages of a reactor's life, i.e. siting license, construction license, operational license and decommissioning license. Prior to authorisation of activities on a nuclear reactor, BAPETEN undertakes evaluation of the proposed activities within a predetermined evaluation period. The evaluation periods for authorising site preparation, construction, operation and decommissioning activities are 12 months, 24 months, 18 months and 12 months, respectively. Within these evaluation periods, BAPETEN may request additional information from the operators, as necessary. BAPETEN also uses the services of experts/consultants outside BAPETEN or an advisory committee in performing evaluation of the proposed activities.

B.1. Siting License

The purpose of the siting license is to finalise the conceptual design of research reactors and to ensure that appropriate design, construction and operation of nuclear reactors on the proposed site have met the safety standards and requirements established by BAPETEN. Primary documents that shall be submitted by the operator along with the proposal for the siting license are a siting evaluation report and an

environmental analysis. If these documents meet the safety requirements, BAPETEN will issue a siting license with a validity period of four years, which can be renewed twice for a one-year period for each renewal.

B.2. Construction License

Before commencing any construction activities, the operator must be able to assure BAPETEN that the design of a nuclear reactor has fulfilled safety requirements and considerations set by BAPETEN and the reactor has been constructed in accordance with high safety standards. Principal documents that shall be submitted pertaining to the proposed construction are Preliminary Safety Analysis Report, Probabilistic Safety Analysis and a statement on a proposed schedule for construction.

The Preliminary Safety Analysis report contains substantial information which was summarised from the Site Evaluation Report, nuclear reactor design and preliminary safety analysis. The operator shall include a comprehensive quality assurance program in the report, especially for the construction and the commissioning of a nuclear reactor.

The authorisation for construction is issued for a maximum duration of eight years, provided that the operator has met the safety requirements for the basic design and the modifications of the nuclear reactor. The construction license outlines the conditions that any modifications that may affect the safety aspects of the reactor shall not be carried out without prior approval from BAPETEN.

In case the construction of a nuclear reactor has not commenced during the period of 18 months following the issuance of the construction license, the operator shall notify BAPETEN about the delay and submit sufficient explanation. If BAPETEN is unable to find any satisfactory explanation for the construction delay, BAPETEN may suspend the construction license.

In case the licensee is unable to accomplish the construction on the agreed time schedule, the licensee shall apply for an extension of the construction license three months before the license is due, along with justification for the proposed extension. The extension period normally spans about one year.

B.3. Operational License

As the construction of a nuclear reactor nears completion, the licensee shall submit authorisation for operation to BAPETEN before bringing any fissile or radioactive materials to the site. Principal documents that have to be submitted to BAPETEN are the Final Safety Analysis Report, the commissioning activities report, a personnel assessment

and authorisation, approval for operational policy, an emergency plan and preparedness, and a quality assurance program for the operation and maintenance of nuclear reactor.

The operational license is issued in two stages:

1. A temporary operational license, issued for a maximum duration of 2 years, including pre-operational and early-operational stages.
2. An operational license will be issued for a maximum period of 40 years, providing that all necessary requirements, including environmental management and monitoring programs, have been fulfilled satisfactorily.

If the licensee is unable to fulfil the necessary requirements within the period of time established in the temporary license, the temporary license could be renewed for a period determined by BAPETEN.

In case the facility is operated near its operational period of 40 years, the licensee could submit for license renewal for a maximum period of 20 years, provided that all operational safety requirements have been fulfilled.

Under its statutes, BAPETEN is authorised to perform inspection and review of safety performance in the reactor regularly and comprehensive assessment whenever the license needs to be renewed. However, the responsibility for maintaining high level safety in the operation of a nuclear reactor rests on the licensee.

B.4. Decommissioning License

Should the operator not intend to renew its operational license, the operator shall propose decommissioning activities to BAPETEN. Decommissioning shall only be authorised once the requirements set forth by BAPETEN are fulfilled satisfactorily.

During and after decommissioning period, BAPETEN undertakes inspection to ensure that decommissioning activities have been carried out in accordance with the regulations and that the facilities do not present any radiological risks to the public and the environment.

C. Regulatory Inspections

BAPETEN performs inspections on the construction and operation of nuclear reactor during the authorisation process and operation activities. Various regulatory inspections are carried out as follows:

1. Inspection for siting license, to confirm the validity of data and information submitted by the operator.
2. Inspection during the construction stage, to ensure the conformity of operator's activities with the requirements and license conditions,

including its quality assurance program and component fabrication facilities.

3. Inspection during the pre-operational stage, to ensure that all operational requirements have been fulfilled.
4. Inspection during the operational stage (both periodic and unplanned inspections), to assure the operator's compliance with the regulations, especially those related to occupational and environmental safety.

D. Regulatory Enforcement

BAPETEN can revoke licenses granted to the operators of nuclear reactors for the following reasons:

1. There is convincing proof beyond any doubt that the authorisation proposal or the safety report contains false and misleading information.
2. The operator of nuclear reactors does not comply with requirements and license conditions established by BAPETEN.
3. The license holder does not abide by applicable laws and regulations.

4. REGULATORY BODY

A. Legal Basis for Regulatory Body

The separation of regulatory and promoting nuclear energy bodies is based on Nuclear Energy Act No. 10 Year 1997. Article 3 of the Act provides that the government shall establish a promoting body that is responsible for promoting the use of nuclear energy and will report directly to the president. In discharging its function, the promoting body carries out research and development, exploration and exploitation of nuclear substances, production of radioisotopes and radioactive waste management.

Independent regulatory functions are stipulated in Article 4 and Article 14, which require the government to establish a regulatory body that reports directly to the president and is responsible for control of the use of nuclear energy. In discharging its duties, the regulatory body performs regulation, authorisation and inspection. Moreover, article 15 defines the objectives of regulatory functions, i.e.:

1. To ensure the welfare, security and benefit of people.
2. To ensure the safety and health of workers, the public and the environment.
3. To maintain the order of practice in the use of nuclear energy.
4. To improve the awareness among the users of nuclear energy in implementing safety culture.
5. To maintain the peaceful use of nuclear energy
6. To ensure the maintenance and the improvement of personnel discipline in utilising nuclear energy

B. Main Duties and Functions of the Regulatory Body

Pursuant to Article 4 of Act No. 10/1997, the government established BAPETEN under Presidential decree No. 76 Year 1998, further renewed by Presidential decree No. 103 Year 2001. BAPETEN is a non-departmental body and reports directly to the President. According to Article 28 of the presidential decree, the main duty of BAPETEN is to discharge the government's responsibility in controlling nuclear energy in line with applicable laws and regulations.

In implementing its duties, BAPETEN carries out functions such as:

1. Assessing and establishing national policy for controlling nuclear energy.
2. Co-ordinating functional activities in regulatory duties.
3. Facilitating and developing activities in governmental institutions for the purpose of controlling the utilisation of nuclear energy.
4. Establishing general administration services, e.g. planning bureau, general service, management, staffing, financial planning, documentation.

C. The Authority of the Regulatory Body

The authority of BAPETEN includes:

1. Establishing a national plan in controlling the use of nuclear energy.
2. Ordaining regulatory policy on the utilisation of strategic technology in controlling nuclear energy.
3. Establishing regulatory guidelines on the use of nuclear energy.
4. Ensuring the welfare, the safety and the security of the public from nuclear hazards.
5. Ensuring the safety and the health of workers and public, as well as the environment from radiation exposure.
6. Ensuring the exclusively peaceful use of nuclear energy.

5. RESPONSIBILITY OF THE LICENSE HOLDER

The operating organisation has the prime responsibility for safety in nuclear installations. The license holder is responsible for taking necessary actions to fulfil the requirements under the regulations, ranges from the construction to operation and maintenance. In addition, the license holder is required to improve safety and reliability of the nuclear installation through education and training of personnel, preparation of operating procedures, planning for emergencies and establishing a radiation committee.

A. Responsibility of License Holder

As stipulated by the National Policy on Nuclear Safety established by BAPETEN, the prime responsibility for the safety of a nuclear installation rests on the operating organisation. The burden of responsibility of the

operating organisation cannot be shared with the designers, the suppliers or the regulatory body.

The construction licensee is responsible for the construction of the nuclear reactor approved by BAPETEN. The license holder is responsible for the fulfilment of the operational limits and conditions under the construction license.

B. Mechanism for assuring compliance of license holder.

Pursuant to Article 20 of Nuclear Energy Act, BAPETEN is authorised to perform inspection to ensure that the construction and the operation of a nuclear reactor do not violate license conditions. Should there be any violation of applicable regulations and license conditions, BAPETEN will prescribe corrective actions to attain safety in the nuclear reactor.

The constructor shall allow BAPETEN to inspect the installation at each of its stages in order to ensure that the activities in the reactor are being conducted according to the approved plan. The frequency of the inspection is commensurate with the potential hazards associated with the nuclear reactor.

If the license holder does not abide by the license conditions, BAPETEN can suspend or revoke the authorisations for construction and operation of the nuclear reactor. If the reactor operation does not fulfil the operational limits and conditions or the operator does not implement safety measures satisfactorily, BAPETEN may recommend corrective actions or terminate the operation of the reactor.

6. PRIORITY FOR SAFETY

A. Safety Policy

BAPETEN has established policy that dictates that nuclear safety is the highest priority, as declared in BAPETEN's Nuclear Safety Statement. The objective of this policy is to establish a framework for regulatory staffs in controlling the use of nuclear energy, through effective communication with operators and observance of international standards, and to make nuclear safety its utmost consideration above the utilisation of nuclear energy.

The promoting body of nuclear energy (BATAN) has confirmed this policy by declaring that all units and individuals that operate under BATAN shall maintain safety as the highest priority in performing their work and duties using nuclear energy.

B. Commitment for Safety Culture

BAPETEN declares that nuclear safety should be at the highest priority in developing and utilising nuclear energy, and it shall be the prime concern of units and individuals at all managerial levels. The management shall put nuclear safety at high priority in using nuclear energy and shall make appropriate working conditions that support nuclear safety.

BAPETEN emphasises its commitment on nuclear safety through one of its missions: developing a safety culture through the education of energy users. A similar mission is also carried out by BATAN. In order to produce high safety requirements, BAPETEN adopts, as necessary, international standards and considers the latest developments in technology.

BAPETEN performs several activities that promote safety culture:

1. Communication with users on the implementation of safety requirements, especially during requalification training, and dissemination of information.
2. BAPETEN organises annual seminars on nuclear safety, as a meeting point between users and regulators, as well as scientists and workers in the field of nuclear safety.
3. Education for users to enhance understanding of nuclear safety.

BATAN promotes nuclear safety through:

1. Yearly self assessment on three research reactors according to safety regulations.
2. Promotion of safety culture through specially designed training and seminars.
3. Participation in regional activities on nuclear safety.

7. FINANCIAL AND HUMAN RESOURCES

The limited government budget is overwhelmed by putting high priority allocation for safety-related expenditures as well as by technical co-operation with various partners around the world, to ensure that safety of the reactors will never be compromised.

In order to ensure the operational safety of research reactors, BATAN endeavours to allocate sufficient resources, in line with BATAN's statement of safety culture. GA Siwabessy reactor retains 11 supervisors and 21 field operators, Triga Mark Reactor employs 13 supervisors and 9 operators, while Kartini reactor has 18 supervisors and 24 technician. All these supervisors and operators have acquired working permits from BAPETEN and passed the examinations and retraining courses designed for their respective positions. Qualification of reactor workers is outlined in Decree of Chairman of BAPETEN No. 17/99 on Qualification of Workers in Nuclear Installations.

8. HUMAN FACTOR

All tasks and duties performed by operators, supervisors, radiation protection officers, and radiation workers shall be in line with their operating procedures and guidelines. All these workers are qualified in their respective fields and certified by BAPETEN.

There shall be special consideration of the interaction between man and machine such that there is suitable arrangement between internal and external performing shaping factors. In order to achieve appropriate arrangement between man-machine factors, the following measures are taken:

1. The preparation of working instructions which convey clear messages and are easy to understand.
2. Daily meetings for planning and reporting of job status.
3. Access control to the working environment.
4. Shift-basis occupation.
5. Automation system.

9. QUALITY ASSURANCE

The requirements for each nuclear installation in Indonesia to establish and implement Quality Assurance Programs (QAP) were regulated in the Decree of Chairman of BAPETEN No. 07/Ka-BAPETEN/V-99 (1999). In this regulation, QAP is defined as “systematic and planned actions to ensure that structure, system and components of the nuclear installation will perform their functions satisfactorily”. To ensure safety, a grading approach is also utilised in the regulation. The Decree shall be applied throughout the life of nuclear installation, from siting to decommissioning, including the case of modification. In implementing this decree the operator is encouraged to apply relevant parts of the IAEA Safety Series No. 50-C/SG-Q (1996).

BATAN as promoting organisation for all research reactors in Indonesia established a Quality Policy Statement in 2001. The first statement of the Policy is “BATAN ensures and maintains quality in all implementation of the organisational function with safety as main consideration. BATAN also establishes:

1. A Standardisation and Quality Assurance Center to assist all nuclear installations in establishing and implementing QAP.
2. A quality manual which was adapted from the above safety series.

All reactors management established QAP prior to 2002.

On the other side, BAPETEN has performed regular inspections and audits of all nuclear installations each year since 1999. As QAP was successfully implemented, all research reactors could perform internal quality audits before 2003. Some improvements, indeed, should be made by the operators. For example, by performing a more consistent self-management assessment and by improving staff competency continuously under Quality Assurance Program.

10. SAFETY ASSESSMENT AND VERIFICATION

The authorisation for the operation of nuclear installations aims to ensure the safety of workers, public and environment and comprises four stages of the development of nuclear reactor: siting evaluation, construction, operation and decommissioning.

The certification program undertaken by a peer review committee evaluates and performs corrective actions for improvement of safety. In addition, assessment for the improvement of operational safety is carried out, especially on the issue of installation ageing. Several measures were taken to improve the safety and the function of research reactors, such as:

- Changes in the fuel of the RSG-GAS reactor
- Upgrades of power output and changes in instrumentation system, as well as seismic assessment for Triga 2000 Reactor
- Changes in the instrumentation system and consideration of component ageing in Kartini reactor

All these authorisation processes are preceded by the submission of a safety analysis report (SAR). The SAR includes deterministic analysis of accidents, which demonstrate better understanding of the installations' safety. Amendments in SAR are a result of recommendations resulting from inspection and monitoring programs. Verification in the field is carried out by staffs of BAPETEN to ensure the compliance with the recommendations.

11. RADIATION PROTECTION

In the issue of radiation protection, pursuant to Act No. 10 of 1997 on Nuclear Energy, Government Regulation No. 63 (2000) on the Provision of Health and Safety in the Use of Nuclear Energy provides some important arrangements such as:

- The principle of ALARA
- Radiation protection management and organisation
- Quality assurance and emergency preparedness program

As required by the above regulation, the dose limit of 50 mSv/year for radiation workers is regulated in the Decree of Chairman of BAPETEN No. 01 (1999), which was adapted from ICRP 26. Currently, this decree is being renewed thoroughly with a new concept from BSS-115. The release of radioactive materials from any nuclear installation is also stipulated in the attachment of the Decree. To ensure that radiation exposure is kept ALARA, the regulatory system requires the license holders to meet all radiation protection regulation, including installing personal, workplace and environmental monitoring programs. Under Article 8 of its statute, BAPETEN is authorised to regulate, license and inspect radiation and nuclear activities.

12. EMERGENCY PREPAREDNESS

Emergency response plans and preparedness in Indonesia are regulated in government regulations and the decrees of the chairman of BAPETEN. The scope of the regulation are the requirements and guidelines on on-site nuclear emergency preparedness for research reactors, medical and industrial practices. Off-site emergency preparedness is currently being drafted.

BATAN is responsible for four sites of nuclear facilities. Each of these areas has organisation of and a response unit for nuclear emergency. For example, Serpong nuclear facilities has four stages of emergency response: facility, site, off-site and local emergency response unit. Emergency response is exercised annually with the cooperation of the national armed forces.

13. SAFETY OF INSTALLATIONS

A. Site Evaluation

The government is currently formulating government regulations on the construction and the operation of nuclear reactors, which includes siting licenses of nuclear reactor. BAPETEN assesses the site evaluation for nuclear reactors based on the following aspects:

- Seismic
- Meteorology
- Radioactive dispersion and its impact on demography
- Hydrology
- Hazard of flooding
- External human induced events
- Ecology

Site evaluation for nuclear power plants has been undertaken at the proposed site, Muria area of Central Java. The first site evaluation was taken with NIRA in 1975. The second evaluation was performed in cooperation with Sofratom in 1986 with a project titled: Reassessment of Indonesia's Nuclear Energy Strategy. The last evaluation was carried out in collaboration with NewJEC in 1993 with the project title: Feasibility Study of the First Nuclear Power Plants at Muria Peninsula Region.

B. Construction and Design

In Indonesia, only reactors at the construction stage, not the design stage, require authorisation from BAPETEN. The requirements and conditions for the design of nuclear reactors will be imposed when the operator requests the authorisation for construction. In the proposal for construction authorisation, the operator must include relevant documents that ascertain compliance with safety requirements established by BAPETEN.

The authorisation process at the construction stage of the reactors is as follows:

- Along with the request for construction authorisation, the operator shall submit principal documents, such as: Preliminary Safety Analysis Report, Detailed Installation Design, Probability Safety Assessment for Nuclear Reactor Report, Construction Quality Assurance Program and the proposed construction timetable.
- BAPETEN will inform the operator about the evaluation result of its proposal within a fixed period of time.
- If the evaluation result indicates that the proposed installation fulfils safety requirements for reactor design, and the method, equipment and management to implement the construction conforms with the regulations, BAPETEN will issue authorisation for construction.
- A construction license is valid for a period of 8 years and can be renewed for one year at a time.
- The licensee shall begin construction no later than 18 months following the issuance of the construction license.

Legislation related to the design and construction of nuclear reactors is:

- Act No. 10/1997 on Nuclear Energy.
- Government Regulation on the construction and operation of reactor (under discussion).
- The decree of chairman of BAPETEN No. 05/1999 on reactor design requirements.
- Safety guidelines on the design and construction of nuclear reactor, which are being prepared.

C. Operation

As mentioned earlier, the operation of a nuclear reactor will only be authorised once the operator submits principal documents such as: Final Safety Analysis Report, commissioning program implementation report, personnel assessment and authorisation, emergency plan and preparedness and quality assurance program for the operation and maintenance of the nuclear reactor.

Legislations pertaining to the operation of nuclear reactors are:

1. The Decree of Chairman of BAPETEN No. 06/1999 on the construction and operation of nuclear reactors.
2. The Decree of Chairman of BAPETEN No.10/1999 on the safety requirements for the operation of nuclear reactors.
3. The Decree of Chairman of BAPETEN No. 01/1999 on Occupational safety requirements against radiation.
4. The Decree of Chairman of BAPETEN No. 02/1999 on the standard of environmental radioactivity levels.

5. The Decree of Chairman of BAPETEN No. 05-P/2003 on Emergency Plans and Preparedness.
6. The Decree of Chairman of BAPETEN No. 03/1999 on safety requirements on radioactive waste management.

BAPETEN performs evaluation on the authorisation proposal for the operation of nuclear reactors within a fixed period of time. If the proposal and its documents have satisfied the requirements, BAPETEN may issue a temporary operational license which can be used for commissioning activities and is valid for 24 months.

During the commissioning of a nuclear reactor, the operator must be able to demonstrate that the reactor is built in accordance with the approved design and safety requirements. A nuclear reactor's performance shall conform to operational limits and conditions approved by BAPETEN. BAPETEN may order corrective actions if conformity is not observed.

If the commissioning activities and operational limits and conditions are met satisfactorily, BAPETEN will issue an operational license for a nuclear reactor with a maximum validity period of 40 years.

During the operation stage of a nuclear reactor, the license holder must establish a quality assurance program, approved by BAPETEN, for the operation and maintenance. One of the requirements in the quality assurance program is that the license holder shall establish procedures and carry out operation, maintenance, inspection and tests based on these procedures. BAPETEN undertakes regular inspection and audits on the operator's compliance with the approved operational limits and conditions and quality assurance program.

The operator must establish a safety assessment committee with the following duties: performing safety assessment of nuclear installation regularly, assessing modification proposal on the design, structures, components and system which may have a bearing on safety, assessing the proposed changes in programs and procedures related to safety, performing regular safety audits and so forth.

The license holder is required to submit regular reports on the operation of the nuclear reactor to BAPETEN. Operational experience during the operation of the reactor shall be arranged and analysed, and the results are implemented. The results of analyses shall be submitted to BAPETEN and other stakeholders. The operator is also required to prepare an emergency response plan and exercise the plan at least once a year.

The operator should endeavour to minimise radioactive waste resulting from the operation of the nuclear reactor. The operator must collect, manage and store the radioactive waste before transporting it to the radioactive waste installation of BATAN for storage. For liquid radioactive waste, its discharge to the environment must comply with the requirements under the Decree of Chairman of BAPETEN No. 02/1999 on

Standards on Environmental Radioactivity Levels. For spent fuel, the license holder is required to have interim storage before transporting it to permanent storage or resending it abroad.

If it is considered necessary, BAPETEN can temporarily suspend the operation of a nuclear reactor until the operator can demonstrate that the operation of the reactor will not cause a danger to the safety and health of personnel, public and environment.

14. CONCLUSION

Indonesia has been a contracting party to the Convention on Nuclear Safety since July 2002. The Government of Indonesia supports the IAEA in promoting nuclear safety in the peaceful uses of nuclear energy.

The Nuclear Energy Act No. 10/1997 stipulates effective separation between the regulatory body, BAPETEN, and the promoting body, BATAN.

This policy highlights the endeavours of the Indonesian Government to fulfill its obligation under the convention on nuclear safety.

Although Article 2 of the Convention defines “nuclear installation” as a nuclear power plant and stipulates that contracting parties must possess at least one nuclear power plant, the Nuclear Energy Act of Indonesia stipulates that research reactors can be classified as nuclear installations, and requires the government to abide by nuclear safety standards. Indonesia does not currently operate any nuclear power plants but does have three research reactors and other nuclear installations, such as fuel fabrication, radiometallurgy, and experimental fissile fuel installations, as well as waste management and interim storage for spent fuel facilities.

In accordance with Act No.10/1997, four government regulations have been issued on Safety and Health for the Use of Ionising Radiation, Authorisation of the Use of Nuclear Energy, Safe Transport of Radioactive Materials and Radioactive Waste Management.

While a government regulation on authorising construction and operation of nuclear reactors is being drafted, BAPETEN has not established regulations that stipulate requirements or guides on the construction and operation of a nuclear reactor. For this reason, BAPETEN takes into account IAEA safety standards and standards developed by other countries.

BAPETEN issues licenses which corresponding to different stages of a reactor’s life, i.e. siting, construction, operation and decommissioning. Prior to authorisation of activities, BAPETEN evaluates the proposed

activities. BAPETEN may request additional information from the operators, as necessary.

BAPETEN inspects the construction and operation of a nuclear reactor during the authorisation process and operation activities. BAPETEN can revoke licenses granted to the operators of nuclear reactors for violations and other reasons.

The operating organisation has the prime responsibility for safety in nuclear installations. The license holder must fulfil the requirements under the regulations, from construction to operation and maintenance. He is also required to improve safety and reliability of the nuclear installation through education and training of personnel, preparation of operating procedures, planning for emergencies and establishing a radiation committee.

Nuclear safety is BAPETEN's highest priority, above the utilisation of nuclear energy, as declared in its Nuclear Safety Statement.

All workers are qualified in their respective fields and certified by BAPETEN.

The requirements for each nuclear installation in Indonesia to establish and implement Quality Assurance Programs (QAP) were regulated in a decree of the Chairman of BAPETEN. QAP is defined as "systematic and planned actions to ensure that structure, system and components of the nuclear installation will perform their functions satisfactorily". A grading approach is also utilised in the regulation. The Decree shall be applied throughout the life of nuclear installation, from siting to decommissioning.

The authorisation for the operation of nuclear installations aims to ensure the safety of workers, public and environment and comprises four stages of the development of nuclear reactor: siting evaluation, construction, operation and decommissioning.

In the issue of radiation protection, pursuant to Act No. 10 of 1997 on Nuclear Energy, Government Regulation No. 63 (2000) on the Provision of Health and Safety in the Use of Nuclear Energy provides important arrangements.

ATTACHMENT

LIST OF NUCLEAR INSTALLATION IN INDONESIA

Referring to Act on No. 10 of the Republic of Indonesia on nuclear energy, the meaning of nuclear installation is related to research reactor and other nuclear facilities. Currently, 3 research reactors and some nuclear facilities are in operation and operated by the National Nuclear Energy Agency (BATAN).

The list of nuclear installation in Indonesia is as follows:

No.	Installation
1	Multipurpose reactor, RSG-GAS, 30 MW, Serpong
2	TRIGA research reactor, TRIGA2000, 2 MW, Bandung
3	TRIGA research reactor, KARTINI, 100kW, Yogyakarta
4	MFR Fuel Fabrication Installation, Serpong
5	Radiometallurgy Installation, Serpong
6	Radioactive waste Installation, Serpong
7	Experimental Fuel Element Installation, Serpong
8	Interim Storage for Spent Fuel Facility, Serpong

Brief description of the research reactors are as follows:

1. The RSG-GAS Reactor

Facility Name	RSG-GAS reactor
Location	Serpong
Owner	National Nuclear Energy Agency (BATAN)
Operator	Center for Development of Research Reactor Technology (Pusat Pengembangan Teknologi Reaktor Riset)
Licensing Authority	Nuclear Energy Regulatory Agency (BAPETEN)
Construction started	01/01/1983
First criticality	29/07/1987
Status	Operational
Reactor Type	MTR-Pool
Steady State Power	30 MW
Moderator	Light Water
Coolant	Light Water
Reflector	Be, H ₂ O
Utilization	R&D, Radioisotope production, material testing

2. The KARTINI reactor

Facility Name	KARTINI reactor
Location	Yogyakarta
Owner	National Nuclear Energy Agency
Operator	Center for Research and Development of Advanced Technology (Puslitbang Teknologi Maju)
Licensing Authority	Nuclear Energy Regulatory Agency (BAPETEN)
Construction started	01/04/1975
First criticality	25/01/1979
Status	Operational
Reactor Type	Triga Mark II
Steady State Power	100 kW
Moderator	H ₂ O, ZrH
Coolant	Light Water
Reflector	Graphite
Utilization	R&D and training.

3. The TRIGA2000 Reactor

Facility Name	TRIGA 2000 reactor
Location	Bandung
Owner	National Nuclear Energy Agency
Operator	Center for Research and Development of Nuclear Techniques (Puslitbang Teknik Nuklir)
Licensing Authority	Nuclear Energy Regulatory Agency (BAPETEN)
Construction started	01/01/1961
First criticality	19/10/1964
Status	Operational
Reactor Type	Triga Mark II
Steady State Power	2 MW (up graded in 2000)
Moderator	H ₂ O, ZrH
Coolant	Light Water
Reflector	Graphite, H ₂ O
Utilization	radioisotopes production, R&D and training