

Legal and Regulatory Framework for Decommissioning of Research Reactor in Indonesia

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ABSTRACT

Decommissioning is one of important stages in construction and operation of research reactors. In Indonesia there are three research reactors in operation, one of which has reached more than 40 years old since its first criticality. The reactor will probably be decommissioned in the next ten years. The three reactors are operated by the National Nuclear Energy Agency (BATAN) under control by the Nuclear Energy Regulatory Agency (BAPETEN). As bases for controlling the construction and operation of the reactors, there are several regulations available. However, there is still lack of regulation specifically concerning the decommissioning of the research reactors.

INTRODUCTION

Currently, there are three research reactors operating in Indonesia. Those are Bandung Triga 2000 (2000 kW) at Bandung - West Java , Kartini Research Reactor (100 kW) at Yogyakarta – Central Java and Siwabessy Multipurpose Reactor (30 MW) at Serpong – West Java. These reactors are operated by the National Nuclear Energy Agency (BATAN). The age of the three research reactors varies from 19 to 42 years since the reactors reached their first criticality. Detailed data of the reactors are given below.

Regulatory control of the three reactors is conducted by the Nuclear Energy Regulatory Agency (BAPETEN). Controlling the reactors is carried out based on the Act No. 10/1997 on Nuclear Energy, Government Regulations and BAPETEN Chairman Decrees concerning the nuclear safety, security and safeguards. Nevertheless, BAPETEN still lack of the regulation, especially for controlling the decommissioning project. Therefore, in the near future BAPETEN has to prepare the regulations for decommissioning, particularly to anticipate the decommissioning of the oldest research reactors, which probably will be done in the next ten years.

OPERATING STATUS OF THE REACTORS

All the three reactors are in operation. However, they have different operating experiences, since they were built in different periods. Table 1 shows the data for the three reactors. As from Table 1, Bandung Triga 2000 reactor is the oldest among them.

Bandung Triga 2000 reactor has reached first criticality in year 1964, which means that the reactor has been operated about 42 years. Since its first criticality, the reactor has been modified several times. In the first time, the reactor was operated at a power of 250 kW. The reactor was then upgraded to 1000 kW power level in 1971, and to 2000 kW in 2000^[1]. During the last upgrading project, some important components were replaced or modified. The old core with a circular configuration has been modified to be that with a hexagonal one. In addition, a new aluminum tank was placed as a liner inside the old one. This new liner is then becoming a reference for the period of reactor operability. Referring to the liner, the reactor is predicted to be operable until 2015, after which the reactor shall be decommissioned.

Recently, the reactor operation is limited by the Regulatory Body to about 1250 kW maximum, due to some safety problems relating to heat transfer in the core.

Table 1. Operating data of the research reactors in Indonesia

Reactor	Bandung Triga 2000	Kartini Reactor	GA Siwabessy Reactor
Power [kW]	2000	100	30,000
Type	Triga II	Triga II	MTR
Fuel	UO ₂	UO ₂	U ₃ Si ₂ -Al (plate)
First Critical	Year 1964	Year 1979	Year 1987
Operator	BATAN	BATAN	BATAN
Application	Research, training and isotope production	Research and training	Research, training and isotope production
Location	Bandung, West Java	Yogyakarta, Central Java	Serpong, West Java

REGULATORY CONTROL

According to Act No. 31 Year 1964 on Atomic Energy, promotion and utilization, as well as controlling, of nuclear energy are performed by the National Nuclear Energy Agency (BATAN). Consequently, construction and operation of the reactors in Indonesia were conducted and also controlled by BATAN. However, in 1997 the Act No.31/1964 was amended and replaced by a new one, i.e. Act No. 10/1997 on Nuclear Energy, since then the function of control became independent of BATAN^[2].

By the new law on nuclear energy, any activity of research and promotion of utilization of nuclear energy is conducted by BATAN. On the other hand, regulatory control of the nuclear energy utilization is under authority of the Nuclear Energy Regulatory Agency (BAPETEN).

BAPETEN is a national authority on nuclear regulation, which was established in 1998 under Presidential Decree No. 76/1998^[3]. Based on the Act No. 10/1997 and the

Presidential Decree No. 76/1998, BAPETEN performs regulatory control of the use of nuclear energy, including operation of the three research reactors. For technical aspects, BAPETEN has provided several safety provisions in the form of BAPETEN Chairman Decrees (BDCs) and guidelines. Table 2 indicates the list of regulations relevant to the research reactor construction and operation.

Nevertheless, BAPETEN still lack of the regulation, specifically for controlling the decommissioning activities. In the near future, therefore BAPETEN has to prepare the more detail and specific regulations for decommissioning, particularly to anticipate the decommissioning of the oldest research reactors (Bandung Triga 2000 reactor), which will probably be started in the next ten years.

Table 2. List of regulations relevant to construction and operation of the research reactors

Hierarchy of Regulation	No.	Number/Year of Issue	Topics
Act	1	Act No. 10/1997	Nuclear energy
Governmental Regulation	2	GR No. 63/2000	Safety and health against the utilization of radiation
	3	GR No. 26/2002	Transport safety of radioactive materials
	4	GR No. 27/2002	Radioactive waste management
	5	GR No xx/200x	Licensing on nuclear reactor (final draft)
Pres. Decree	-	-	-
BAPETEN Chairman Decree	6	BCD No. 01/1999	Safety provision on working against radiation
	7	BCD No. 02/1999	Radioactivity limitation in the environment
	8	BCD No. 03/1999	Safety provision on radioactive waste management
	9	BCD No. 04/1999	Safety provision on radioactive transport
	10	BCD No. 05/1999	Safety provision on design of research reactor
	11	BCD No. 07/1999	Quality assurance of nuclear installation
	12	BCD No. 10/1999	Safety provision on operation of research reactor
Guidelines	13	Guide No. 01-P/1999	Safety guide on site evaluation of nuclear reactor
	14	Guide No. 06-P/2000	Safety guide on preparation of safety analysis report for research reactor
	15	Guide No. 04-P/2003	Guide for training the research reactor operator and supervisor
	16	Guide No. 05-P/1999	Guide for emergency response planning

CONCLUDING REMARKS

Currently, there are three research reactors operating in Indonesia. These reactors are operated by BATAN under control by BAPETEN. One of the three reactors has reached about 42 years old since its first criticality. This reactor will probably be decommissioned in the next ten years. To control all reactors, BAPETEN has provided several numbers of regulations in the form of act, governmental regulation, presidential decree, BAPETEN Chairman decree and guidelines. However, it is still lack regulation, specifically concerning the decommissioning of the research reactor.

REFERENCES

- [1] CRDNT, Safety Analyses Report of the Bandung Triga 2000 Reactor, Rev. 2, 2001
- [2] Act No. 10/1997 on Nuclear Energy.
- [3] Presidential Decree No. 76/1998 on Establishment of Nuclear Energy Regulatory Agency.