Regulatory Framework for Controlling the Research Reactor Decommissioning Project

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1. Introduction

Decommissioning is one of important stages in construction and operation of research reactors. Currently, there are three research reactors operating in Indonesia. These reactors are operated by the National Nuclear Energy Agency (BATAN). The age of the three research reactors varies from 22 to 45 years since the reactors reached their first criticality.

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[1]. 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. In this papers author give a list of regulations should be prepared by BAPETEN for the decommissioning stage of research reactor in Indonesia based on the international regulatory practice.

2. The Current status of Research Reactor in Indonesia

There 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 – Banten, West Java. 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.

Table 1. Current status of research reactor in Indonesia

Name of research reactors		RSG-GAS	TRIGA 2000	KARTINI
Reactor type		MPR	TRIGA	TRIGA
Start of operations		1987	1964 1971 2000	1979
Power		30 MW	250 kW 1000 kW 2000 kW	100 kW
Frequency of Operations		60 fpd	9 fpd	3 fpd
License	Type	Operating	Operating	Operating
	Valid	2020	2016	2010

As Table 1, TRIGA 2000 reactor is the oldest among them. TRIGA 2000 reactor has reached first criticality in year 1964, which means that the reactor has been operated about 45 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[2]. 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 BAPETEN to about 1250 kW maximum, due to some safety problems relating to heat transfer in the core [3].

Kartini reactor has reached first criticality at 1979, which means that it already operated for 30 years. Unfortunately, actually the ages of Kartini reactor almost 45 years like TRIGA 2000 reactor because some components/structures were provided from first upgrading of TRIGA 2000 reactor [4].

3. Regulatory Framework for Construction and Operation of Research Reactor

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 and guidelines in the form of BAPETEN Chairman Decrees (BDCs). Figure 1 shows the hierarchy of Indonesia regulatory framework.

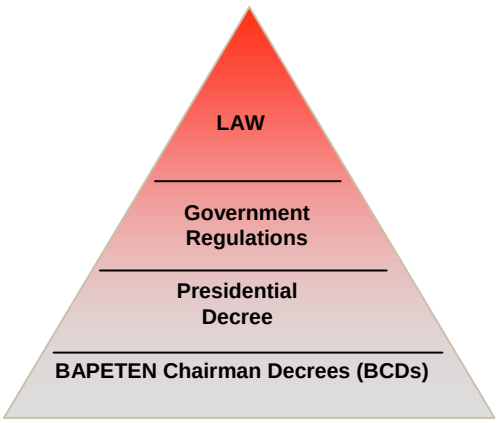

Fig. 1. Indonesia regulatory hierarchy

Table 1. Current regulatory framework for constructions and operations

Regulation	No.	Number/Year of Issue	Topics
Act	1	Act No. 10/1997	Nuclear energy
Government Regulations	2	GR No. 43/2006	Licensing of Nuclear Reactor
	3	GR No. 26/2002	Transport safety of radioactive materials
	4	GR No. 63/2000	Safety and health against the utilization of radiation
	5	GR No. 27/2002	Radioactive waste management
President Decrees	-	-	-
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
	13	BCD-Guide No. 01-P/1999	Safety guide on site evaluation of nuclear reactor
	14	BCD-Guide No. 06-P/2000	Safety guide on preparation of safety analysis report for research reactor
	15	BCD-Guide No. 04-P/2003	Guide for training the research reactor operator and supervisor
	16	BCD-Guide No. 05-P/1999	Guide for emergency response planning
	17	BCD No. 8/2008	Ageing Management Program for nuclear reactor

4. Regulatory Framework for Decommissioning of Research Reactor

According to GR 43/2006 on "Licensing of Nuclear Reactor" article 24 stated that The application for decommissioning approval shall be submitted within 3 (three) years before the operation license expires. Document requirement are (1) decommissioning program and (2) Quality assurance program. Upon completion of the decommissioning activities, the licensee may apply for release from the regulatory control for unrestricted use. Documents required are (1) Decommissioning Report ;(2) Radioactive Waste Management Report ; and (3)Radiological Survey Report. GR 43/2006 on "Licensing of Nuclear Reactor" article 27 stated that Decommissioning shall be started within 2 (two) years after Decommissioning approval is granted. If not, Chairman of BAPETEN has the authority to appoint third party to perform the Decommissioning on the operating organization's expense. [5]

Up to now, BAPETEN has not made the specific regulations and guidelines for the utility to make the decommissioning programs, decommissioning reports, etc. Therefore currently there is no regulation which requires the operator (BATAN) to prepare the decommissioning plan during operation phase.

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.

Therefore BAPETEN should and will be prepare the specific regulations such as:

a. Draft of Regulation on "Decommissioning of Nuclear Reactors" (can adopt IAEA Safety Guide No. WS-G-2.1, 1999) [6]
b. Draft of Regulation on Exclusion, Exemption & Clearance (can adopt IAEA Safety Series Guide No. RS-G-1.7, 2004 and IAEA Safety Report Series No. 44, 2005)

Even though BAPETEN still developing the specific regulations for decommissioning project, BATAN is now preparing the decommissioning programmes for the 3 research reactors.

5. Conclusion

Currently there is no regulation from BAPETEN which requires the operator (BATAN) to prepare the decommissioning plan during operation phase.

BAPETEN should and will be prepare the specific regulations for decommissioning project such as Regulation on "Decommissioning of Nuclear Reactors" and Regulation on Exclusion, Exemption & Clearance.

REFERENCE

[1] Act No. 10/1997 on Nuclear Energy, BAPETEN, Indonesia, 1997.
[2] Safety Analysis Report of TRIGA 2000 reactors, PTNBR, 2000.
[3] TRIGA 2000 License Conditions, BAPETEN 2007.
[4] Safety Analysis Report of Kartini reactors, PTAPB, 2007.
[5] Government Regulations No. 43/2006 on Licensing of Nuclear Reactors, 2006.
[6] Draft of BCD on "Decommissioning of Nuclear Reactors", 2009.