LEGISLATIVE FRAMEWORK FOR SPENT FUEL MANAGEMENT IN INDONESIA

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Abstract

Indonesia has been acquainted with nuclear energy utilization since the late 1950s, when President Soekarno, intended to acquire positive benefit from nuclear energy. After that, Institute of Atomic Energy was established in 1959, which was renamed into Nuclear Energy Agency (BATAN). The first research reactor (TRIGA 2000 Reactor) was built in Bandung in 1961 and was operated in 1965. During President Soeharto regime, two other research reactors have been built, a 100 Kilowatt Kartini Reactor in Yogyakarta (operated in 1979, and a 30 Megawatt Multipurpose Reactor, RSG Siwabessy in Serpong (operated in 1987). Until now, these three research reactors have been operating safely. The type of fuel of those reactors is Uranium Oxide for Kartini Reactor and TRIGA 2000 and Uranium Silicide for RSG Reactor. The operation from these three reactors produces approximately more than hundreds spent fuel or irradiated fuel. Based on the Government Regulation No. 61 Year 2013 on Radioactive Waste Management (GR 61/2013), the licensee should manage those spent fuel in the aspect of safety, security and safeguards. This Government Regulation is an implementation of some clauses in the Act No. 10 Year 1997 on Nuclear Energy. In this Act the spent fuel is classified as high level of radioactive waste management.Considering the commitment to this international convention and its consequences, Indonesia has developed infrastructures by strengthening legislation and regulation. In the near future, Indonesia is planning to build Nuclear Power Plants that will be owned and operated by private companies. Therefore, the Nuclear Energy Regulatory Agency (BAPETEN), as the nuclear regulator in Indonesia, must prepare to ensure this policy can also be implemented. This paper will examine the further challenges that will be faced by Indonesia, especially from BAPETEN's perspective, in order to ensure the spent fuel management policy can be implemented properly.

1. INTRODUCTION

The implementation of utilization of nuclear energy, in order to support the national development program, shall consider the safety, security, peace, and health of workers and the public and the protection of the environment, as well as the public prosperity. This consideration is stipulated in the Act Number 10 Year 1997 on Nuclear Energy, as the amendment of the Act Number 31 Year 1964 on Principles Legislation of Atomic Energy [1].

Indonesia has been acquainted with nuclear energy utilization since the late 1950s, when President Soekarno, intended to acquire positive benefit from nuclear energy. To implement this purpose, Institute of Atomic Energy was established in 1959, which was later renamed into Nuclear Energy Agency (BATAN). The nuclear program in Indonesia was started at 1965, commemorated by the operation of the first research reactor, TRIGA MARK II 250 kW at Bandung Nuclear Research Center. In 1971, the power of this reactor was upgraded to 1000 kW for routine production of radioisotopes, and then it was upgraded further to 2000 kW in 2000.

In 1979, TRIGA MARK II 250 kW at Yogyakarta Nuclear Research Center was commissioned, better known with its popular name; Kartini Reactor. In 1987, to perform BATAN's intention to step further, 30 MW Multipurpose Reactor, RSG Siwabessy, located at the largest research centre site in Indonesia - the Puspiptek Complex, Serpong, began to operate. Until now, these three research reactors have been operating safely. The type of fuel of these reactors is Uranium Oxide for Kartini Reactor and TRIGA 2000 and Uranium Silicide for RSG Reactor [2].

In 2014, BATAN launched its plan to build an 10 MW Indonesian Experimental Power Reactor (RDE) at the largest research centre site - the Puspiptek Complex, in Serpong, Southern of Tangerang, Banten - as a first strategic milestone for the introduction of large-scale nuclear power plant fleets into the country. The RDE is a very small sized pebble-bed high temperature gas-cooled reactor (HTGR) with low enriched uranium oxide TRISO fuel. BATAN began the pre-project phase in 2015 in cooperation with Russian-Indonesian consortium RENUKO as consultant for conceptual design. In 23 January 2017, BAPETEN has issued the siting license for the RDE Program [3].

2. LEGAL BASIS

The Act No. 10 Year 1997 on Nuclear Energy (the Nuclear Energy Act) has been enacted to anticipate the possible expansion of the nuclear energy application in Indonesia and in order to contribute to the global nuclear safety culture. This act stipulates various arrangements, including the establishment of Nuclear Energy Regulatory Agency (BAPETEN) as the nuclear regulatory body. The Nuclear Energy Act consists of 10 chapters with 48 articles. The provisions on the waste management consists of 6 articles. With regard to the waste management, the Act clearly stipulates that no part of the Indonesian territory could be used as sites for any foreign or other country radioactive waste repository [1].

The Nuclear Energy Act also stipulates some basic arrangements for radioactive waste management. In this Act the spent fuel is classified as high level of radioactive waste. Based on the Nuclear Energy Act, in 2013 the Government issued the Government Regulation Number. 61 Year 2013 on Radioactive Waste Management (GR 61/2013).

The GR 61/2013 has stipulated the national policy for spent fuel, i.e.: 1. return the spent fuel to the origin country; or 2. transfer the spent fuel to BATAN facility. Currently, there is no significant obstacle to perform this policy, because the three research reactors are owned and operated by BATAN itself. Indonesia has also ratified international instruments the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management with the Presidential Decree Number.84 Year 2010. Considering the commitment to this international convention and its consequences, Indonesia has developed infrastructures by strengthening legislation and regulation.

Based on the GR 61/2013, radioactive waste management is carried out by radioactive waste producers and BATAN. The GR 61/2013 oblige BATAN to serve as the leading organization that give guidance on radioactive waste management implementation [4].

From regulatory perspective, BAPETEN realized that the best strategy to deal with radioactive waste, including spent fuel, is by developing the radioactive waste management at an early stage before the physical construction of a nuclear facility. For example, a license application for a nuclear reactor must address storage of spent fuel at reactor. This regulation is stipulated in the GR Number 2 Year 2104 on Licensing Process of Nuclear Installations and Materials [5].

In general, a set of legislation and regulation has been published to control the nuclear activities in compliance with IAEA Basic Safety Standard and also by considering the current conditions and regulatory practice. Some regulations for the management of radioactive waste have been issued as indicated in list below:

(a) Government Regulation Number 2 Year 2014 on the Licensing of Nuclear Installation and the Utilization of Nuclear Materials;
(b) Government Regulation Number 61 Year 2013 on Radioactive Waste Management;
(c) Government Regulation Number 46 Year 2009 on the Liability of Nuclear Damages;
(d) Government Regulation Number 58 Year 2015 on the Radiation Safety and Security on Transport of Radioactive Materials; and
(e) Presidential Decree Number 84 Year 2010 on the Ratification to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

3. JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

As an embarking country on nuclear power programmes, a systematic approach to planning for radioactive waste and spent fuel management was considered to be an essential practice, from the very first stage. Indonesia signed the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (hereinafter the Joint Convention) on 6 October 1997. Indonesia ratified the Joint Convention about thirteen years later with Presidential Decree Number 84 Year 2010, and the Joint Convention entered into force on 30 June 2011.

Indonesia has determined at the time of signing the Joint Convention in 1997 that the safety philosophy, legislation and the safety work conducted by the licensees and the authorities in Indonesia complied with the obligations of the Joint Convention.

By the ratification of this joint convention, Indonesia has implemented in the national legislation and regulation ensure that during all stages of spent fuel and radioactive waste management there are effective defences against potential hazards so that individuals, society and the environment are protected from harmful effects of ionizing radiation, now and in the future, also prevent accidents with radiological consequences and to mitigate their consequences should they occur during any stage of spent fuel or radioactive waste management. Another consequence from ratification is submitting a national report at the state party meeting [6].

4. LICENSING PROCESS

Based on the Government Regulation Number. 61 Year 2013 on Radioactive Waste Management (GR 61/2013), the licensee should manage those spent fuel in the aspect of safety, security and safeguards. GR 61/2013 has stipulated the national policy for spent fuel, i.e: 1. return the spent fuel to the origin country; or 2. transfer the spent fuel to BATAN facility [4].

The licensee generating HLW or spent fuel shall be obligated to temporarily store those wastes during the period not less than the life time of the nuclear reactor. BATAN shall provide the final repository for high level radioactive waste. The siting of final repository shall be stipulated by the Government after getting an approval from the House of Representatives of the Republic of Indonesia.

Elucidation of prohibits the use of any part of Indonesian territory for any foreign or other country radioactive waste repository. The provisions for the HLW contained in Act Number. 10/1997 on Nuclear Energy are a legal platform, from which the Government Regulations and the decrees of the Chairman of BAPETEN on the management of HLW would be formulated. There are three important guides that have to be followed, including:

(a) HLW should be disposed of sometime later in a final repository
(b) Final repository should be provided by the Executing Body (BATAN)
(c) The radioactive waste from other countries shall not be allowed to be stored in Indonesia.

Before sending the spent fuel back to the origin country, Radioactive Waste Producers shall get approval from Chairman of BAPETEN. The evaluation time of approval from BAPETEN is 14 working days, and licensee submits receipt document at least 14 days after the date of acceptance.

Requirements and procedures to get approval for return back to the country of origin that must be submitted:

(a) Technical specifications of spent Fuel;
(b) Documents containing information about the identity of the recipient in the country of origin and sender of the carrier and mode of transportation from the port loading to the loading port in the country of origin.
(c) Physical protection system for Nuclear Material;

(d) Safeguards system which includes: inventory changes document - Nuclear Material transfer (inventory change document - material transfer); and inventory change report.

Any facility which is used for storing nuclear fuel and spent fuel In Indonesia which are called Interim Storage for Spent Fuel (ISSF) Facilities also must have license from BAPETEN.

The principle that applies to get approval and to the licensing process is [7]:

(a) Transparency and Information Openness
(b) Transparency and information openness is an essential characteristic of a democratic state that upholds sovereignty of the people to constitute good governance. These principles are stipulated in the Act Number 14 Year 2008 on Public Information Openness (the Public Information Openness Act) [8]. Before issuing the government regulations and state administrative, such as license and approval, the relevant government institution shall conduct public hearing process. To comply with the Public Information Openness Act, BAPETEN has been displaying all licensing procedures, requirements, and guidance in the official website (www.bapeten.go.id). Public are welcomed to give comments & suggestions through this official website. In this official website, BAPETEN also displays the national safety performance annual report.
(c) Accountability in the licensing process showed by annual accountability report; and annual performance and financial audit by the Audit Board of the Republic of Indonesia (BPK-RI).
(d) Licensing process are conducted through an information system called “B@LIS” (BAPETEN Licensing and Inspection System) by multi-tasking web based database system, which The B@LIS for Export/Import is on-line with the Indonesian National Single Window (INSW) connected with the Customs, with approval process can be done within 2 hours and licensing fees are paid through to a national bank (BRI).

5. INSPECTION SYSTEM

Inspection is other aspect of regulatory activities. During Inspection, BAPETEN verifies the data from licensee in the fulfilment of ISSF and transport requirements of spent fuel return the spent fuel to the origin country. The legal basis of inspection activities is the Nuclear Energy Act and its implementing Government Regulations. There are 2 types of inspections stipulated in act and regulations i.e: announced and un announced inspections to check and verify the fulfilment of the requirement and the license conditions required by BAPETEN.

Article 20 of the Nuclear Energy Act is the legal basis for Chairman of BAPETEN to assign an inspection team. If the inspectors find the incompatibility with regulations, they are allowed to perform law enforcement through an administrative sanction or report to the Police if there is a penal violation, perform either by the licensee or by the unauthorized person [1].

Scopes for inspection system for ISSF is [4]:

(a) Radiation safety,
(b) Nuclear safety: operation, maintenance, quality assurance program, emergency preparedness & response,
(c) Safeguards and physical protection: organization and personnel for physical protection system; design basis threat; physical protection plan; contingency plan; procedures or guidelines related to physical protection implementation.

Implementation of inspection for ISSF is:

(d) Regular announced with 1 – 2 times per years (risk based inspection), 4 inspector each team; one team leader (senior inspector), 3 – 5 days period of inspection / dispatch;
(e) Unannounced inspection; and
(f) Inspection for special case.

FIG. 1. ISSF in Indonesia [11].

6. CHALLENGES

Nuclear Energy Regulatory Agency (BAPETEN), as the nuclear regulator in Indonesia, prepare legislative framework by revision of Nuclear Act Number 10 Year 1997, develop national spent fuel regulatory infrastructure in Indonesia.

The goal of developing regulatory infrastructure is to increase or enhance nuclear safety and radiation by recommending sustainable storage locations for spent fuel by coordination with Ministry of Research, Technology & Higher Education; Ministry of Public Work; Ministry of Energy and Mineral Resources; Ministry of The Environment; Ministry of Health, and other releated Ministry.

7. CONCLUSION

Indonesia is very committed to carry out the management of safety and security of spent fuel from the operation of nuclear reactors in order to prevent the occurrence of radiation hazard effects on workers, society and the environment according to international standards and best practices [9].

In the aspect of spent fuel management, there are some issues that must be considered by the Government of Indonesia, as follows:

(a) Considering long timeframe of all fuel cycles, it is fruitful to generate robust technical solutions, covering the whole process, but keeping alternatives available to accommodate changes in future policies and plans and;
(b) To ensure this flexibility in future choices, it is important that research is conducted on both open and closed fuel cycles [10]. International cooperation is very useful for this purpose, including also the common development of fuel cycle and reactor facilities.

ABOUT THE AUTHOR

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