

Regulation of Transportation of Radioactive Material in Indonesia

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1. Introduction

1.1. Background

Indonesia is a biggest archipelago country with 17,508 islands in 33 provinces. In transportation Indonesia has large number of airports, railways, roadways, waterways, and merchant marines [1]. Since nuclear and radiation utilizations are expanding on whole country, the mobilization of these is usually placed outside of controlled facilities, in the public domain, and often entails movement between countries. The Indonesian Nuclear Energy Regulatory Agency (BAPETEN) is responsible for supervision and also authorization of the transport of radioactive material (TRM). TRM is the specific movement of a radioactive material consignment from origin to destination by public transportation (road or rail, water and air). This study aims to determine whether national regulation is harmonized with international practice in ensuring safety and security of TRM. The finding of this study will provide recommendation for enhancement of regulation on TRM.

1.2. Regulation of TRM in Indonesia

Government Regulation (GR) No. 26, 2002 on the Safe Transport of Radioactive Material is implemented pursuant to Act 10, 1997 on Nuclear Energy. This GR was repealed GR 13, 1975 on TRM. The GR 26 consist of 16 chapters and 39 articles, included licensing; authority and responsibilities; packaging; radiation protection programme; training; quality assurance programme; type and activity limit of radioactive materials; radioactive materials with other dangerous properties; emergency preparedness; administrative sanction; and penal provisions [2]. Principally, this GR adopted IAEA-TS-R-1, "Regulations for the Safe Transport of Radioactive Material", 1996's Edition.

2. Method

For this study, the existing Indonesian regulations on TRM are being reviewed thoroughly and compared with recommendations from International Atomic Energy Agency (IAEA). The analysis phase begins by identifying and defining the most important element of regulation to be investigated. A systematic table form is constructed using list of current and new element to be added to current regulation. This will enable comprehensive, cross-consistency assessment.

3. Result

TRM is one important role in determining the framework of nuclear safety. Clear operational regulation will support stakeholder to transport their radioactive material in safe and secure manner. From regulation aspect, the existence regulation as safety series and guidelines in transportation of radioactive material will ensure a clear legal certainty and operability for all parties. The recommendation of Agency was developed time by time, in here, TR-S-1, the new edition included recommendation of Type C, which was not regulated in Indonesian regulation and guidance. A comparison between international recommendations for TRM with existing Indonesia condition is summarized in Table 1.

4. Discussion

4.1. International Recommendation

IAEA is an international organization that seeks to promote the peaceful use of nuclear energy, and to inhibit its use for any military purpose, including nuclear weapons. For ensuring safety and security on TRM, IAEA published related recommendations

For safety TRM IAEA issued Safety Standards Series No. TS-R-1, 2009 on Standards Regulations for the TRM; several guidance on safe TRM that support TS-R-1 are IAEA Safety Series No. 113, 1994 on Quality Assurance for the Safe TRM; IAEA Safety Series No. 112, 1994 and TS-G-1.5, 2009 on Compliance Assurance for the Safe TRM; IAEA Safety Standards Series No. TS-G-1.1 (ST-2), 2002. Advisory Material for the IAEA Regulations for the Safe TRM; IAEA Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, 2002, and IAEA-TS-G-1.3, "Radiation Protection Programmes for the Transport of Radioactive Material", 2007. For security aspect IAEA published IAEA Nuclear Security Series No. 9, Security on TRM, 2007.

4.2. Other Countries Experience

4.2.1. Republic of Korea

For prevention and quick recovery of radiation source misplacement or theft, the Korean government has operated the Radiation Sources Location Tracking System (RadLoT). RadLoT which was installed by the Korea Institute of Nuclear Safety (KINS) consists of

mobile stations, a mobile communication network, and a central control system [3].

4.2.2. USA

Millions of shipments of radioactive material occur over US. To date, these concerns have been addressed in terms of numerically estimated risk in the form of numerous environmental assessments (EAs) and environmental impact statements (EISs). RADTRAN was first developed at Sandia National Laboratories. It is used to evaluate the collective radiological consequences of routine, or incident-free, shipments of radioactive materials, as well as risks from potential accidents that might occur during transport activities. RISKIND developed at Argonne National Laboratory in 1993 focuses on local, scenario-specific consequences and risk. The available version of these computer codes are RADTRAN 5 and RISKIND 1.11 [4].

4.3. Compliance in Practice

Until now, Indonesia does not have NPP, but it has several nuclear installations, they are three research reactors; radioisotope production installation; fuel element production installation; radioactive waste management installation; and radio-metallurgy installation.

In 2009, Center for Radiation Safety Assessment under BAPETEN conducted the assessment of TRM. In this activity, it performed surveys at an airport, a toll and a port. The study reported there is no indication of TRM. There is no application related with TRM in Indonesia for tracking and computer code of radioactive material.

5. Conclusion

Regulation of Indonesia on transportation of radioactive material as recommended in GR 26, 2002 and its derivatives have to be amended to adopt and to harmonize with international recommendation and follow the development of science and technology, both in term safety, security and standardization. Some particular guidance including the establishment of guidance for the quality assurance program and emergency response for the safe transport of radioactive material need to be developed to ensure the safe transport of radioactive materials, particularly in Indonesia. Good regulation will facilitate the TRM with confidence of utilization of nuclear technology, and will enhance public confidence toward the use of nuclear power that it is safe and provides friendly environment, and no harm for future generations.

BAPETEN shall improve capability of manpower and tools to adopt science and technology and improve the knowledge of manpower providing good system in IT and communications. As a country that lacks technology, Indonesia shall adopt this technology for improving the manpower and the utilities for better system of TRM.

REFERENCE

- [1] <https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>
- [2] Government Regulation No. 26 year 2002
- [3] KINS, Operation of Radiation Source Tracking System in Korea, Daejeon (2009).
- [4] Steinman, R.L., Kearfott, K.J., A Comparison of the RADTRAN 5 and RISKIND 1.11 Incident-Free Dose Models

Table 1 A comparison between international safety standards for safe TRM with existing Indonesian regulation

No	Item	International	Indonesian
1.	Safety TRM	IAEA Safety Standards Series No. TS-R-1.2009. Standards Regulations for the TRM 2009 Edition.	GR 26, 2002. Transport Safety of Radioactive Materials CD 04/Ka-BAPETEN/V-99. Safety Provision on TRM CD 05-P/Ka-BAPETEN/VII-00. Guide for Safety Requirement of TRM
2.	Guidance on Safe TRM	IAEA Quality Assurance for the Safe TRM. Safety Series No. 113, 1994.	Not adopted yet
		IAEA Compliance Assurance for the Safe TRM. Safety Series No. 112, 1994 and TS-G-1.5, 2009.	Not adopted yet
		IAEA. 2002. Advisory Material for the IAEA Regulations for the Safe TRM, Safety Standards Series No. TS-G-1.1 (ST-2).	Not adopted yet
		IAEA Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, 2002.	Not adopted yet
		IAEA-TS-G-1.3, "Radiation Protection Programmes for the Transport of Radioactive Material", 2007	Not adopted yet
3.	Security	IAEA Nuclear Security Series No. 9, Security on TRM, 2007	GR 33, 2007. Safety of Ionizing Radiation and Security of Radioactive Source.
4.	Technology	Radiation Sources Location Tracking System (RadLoT) by Republic of Korea	Not adopted yet
		Transportation risk analyses in environmental assessments (EAs) and environmental impact statements (EISs), by USA	Not adopted yet