

The Fundamental Study on Design of Regulatory Infrastructure for Industrial Use of Radiation Sources in Lao People's Democratic Republic

MOUAXIA Anitta (Ms.)^{a*}, Younhwan Park^b

^aKorea Advanced Institute of Science and Technology, 291 Daehak-ro, Yuseong, Daejeon 305-701, Korea

^bKorea Institute of Nuclear Safety, Gwahak-ro, Yuseong, Daejeon 34142, Korea

*Corresponding author: a_mouaxia@kaist.ac.kr

1. Introduction

1.1 Background

Lao PDR joined International Atomic Energy Agency (IAEA) in November, 2011. Department of Science in Ministry of Science and Technology is a national license officer and was appointed to coordinate and cooperate with IAEA. In 2016, It made Nuclear Science Division to initiate nuclear and radiation safety work.

Until now, some radiation sources have been using in medical and industrial sectors but it's almost impossible to get detailed information on those sources due to no regulatory infrastructure for radiation source. In other words, there has been no regulatory system and regulations to control import, distribution, use of radiation sources such as licensing, inspection, record keeping in Lao PDR.

The government has been considering seriously establishment of regulatory infrastructure to regulate radiation sources in the country. It is essential to make a plan for the establishment of regulatory infrastructure based on the fundamental study on review and analysis of regulatory system recommended by IAEA and being implemented effectively in advanced countries.

1.2 Objective

This study is to draw a basic concept for regulatory infrastructure to regulate sealed sources to be used in the field of industry in Lao PDR based on the result of review and analysis of regulatory system recommended by IAEA and being implemented in advanced countries.

2. Methodology

2.1 Current status of governmental structure in Lao PDR.

The current governmental structure dose not meets the all the requirements of establishing a stable regulatory infrastructure. However, In Lao PDR, the current governmental structure for radiation safety consists of four parts as shown in Figure 1.

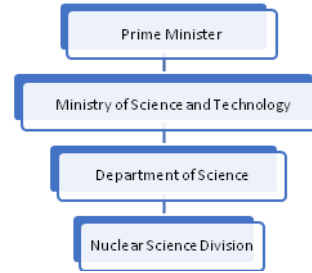


Figure 1: Governmental structure in Lao PDR

2.1.1 The roles of each constituent in governmental structure

The current Lao PDR regulatory infrastructure included: Prime Minister, Ministry of Science and Technology, Department of Science, and Nuclear Science Division.

Prime Minister has primary responsibility for government oversight and providing resources.

Ministry of Science and Technology aids the government in the development and management issues related to the work of science and technology, innovation, intellectual property, standards, and measurement, as well as nuclear and radiation safety in the country.

Department of Science is a department within the Ministry of Science and Technology (MOST). This department acts as a national license officer appointed to coordinate and cooperate with IAEA. This includes gathering information nuclear work of other countries and of the international organizations, so as to support the exchange of regulatory information.

The Nuclear Science Division works within the Department of Science. The role of this division is to engage in seaching and planing of technical-cooperation with related to safety management in nuclear and radiation activities. In addition, this division spearheads establishment of nuclear legislation, regulatory body and nuclear law related to radiation sources and activities.

Therefore, based on the current status of governmental structure above, it is necessary to setting up the following items to manage sealed sources safely in a territory of Lao PDR:

- a. Definition of sealed sources
- b. Determination process of sealed sources for regulatory control

- c. Budget for operation of regulatory system
- d. Legislation and enforcement of the law
- e. Regulation process of manufacture, import, Distribution, Transport of sealed sources
- f. Requirements of facilities and handling related to sealed sources
- g. Qualification of the person to do radiation safety management
- h. Appointment and management of radiation workers (Education and training, Medical check-up, readout of exposure, etc.)
- i. Management and disposal of disused sources
- j. Detection and measurement of radiation
- k. Leak test of sealed sources
- l. Emergency preparedness

This study drew basic concept of regulatory infrastructure that included the above-mentioned items based on review and analysis of regulatory system recommended by IAEA and good regulatory system under implementation in Korea.

2.2 Review and analysis of regulatory infrastructure recommendations from the IAEA

In this study, the review and analysis focused on the IAEA because IAEA regulatory infrastructure is an outline of the international requirements and recommendations for all of member countries for an appropriate and sustainable regulatory system for the control of radiation sources.

The IAEA safety standards have defined the key roles of the government and regulatory body that should be fulfil to ensure an effective regulatory infrastructure is established.

2.2.1 Major role of the government

- Establish a legislative framework to regulate the safety of radiation sources and activities;
- Establish and maintain an independence regulatory body which shall be separate from organizations or bodies charged with the promotion of nuclear technologies or responsible for facilities or activities. This is necessary so that regulatory judgements can be made, and enforcement actions taken, without pressure from interests that may compete with safety;
- Assign responsibility to the regulatory body for authorization, regulatory review and assessment, inspection and enforcement, and for establishing safety principles, criteria, regulations and guides;
- Provide the regulatory body with adequate notification, authority, power, staffing and financial resources to discharge its assigned responsibilities;
- Ensure that no other responsibility is assigned to the regulatory body which may jeopardize or

conflict with its responsibility for regulating safety;

2.2.2 Roles of the regulatory body

The regulatory body shall establish a regulatory system for protection and safety of worker, public and environment from radiation risk that includes:

- (1) Notification and authorization;
- (2) Review and assessment of the activities;
- (3) Inspection of the activities;
- (4) Enforcement of regulatory requirements;
- (5) The regulatory functions relevant to emergency exposure situations and existing exposure situations;
- (6) Provision of information, and consultation;
- (7) Ensure the application of the requirements for education, training, qualification and competence in protection and safety of all persons

2.3 Review and analysis of Regulatory infrastructure in South Korea

South Korea was considered in this study being one of the advanced countries that has an effective regulatory infrastructure as defined by IAEA.

For instance, the nuclear safety regulatory framework of South Korea establishes the Nuclear Safety and Security Commission (NSSC) to be a competent authority and Korea Institute of Nuclear Safety (KINS) as a technical institute:

2.3.1 Nuclear Safety and Security Commission (NSSC):

NSSC is in charge of all aspects of nuclear safety regulation. The authority to regulate nuclear safety and establish nuclear safety policies is clearly entrusted to the NSSC through relevant legislation including the Nuclear Safety Act.

2.3.2 Korea Institute of Nuclear Safety (KINS):

KINS is the regulatory expert organization per the Nuclear Safety Act to strengthen technical capabilities relating to nuclear safety regulation, because nuclear safety regulation requires considerable knowledge of specialized technology.

KINS is also entrusted by the NSSC to be in charge of technical aspects of nuclear safety regulation, including safety reviews, inspections, education, and safety research, based on technical knowledge and accumulated regulatory experience.

The regulatory infrastructure of South Korea requires radiation facilities to follow the licensing process as shown below:

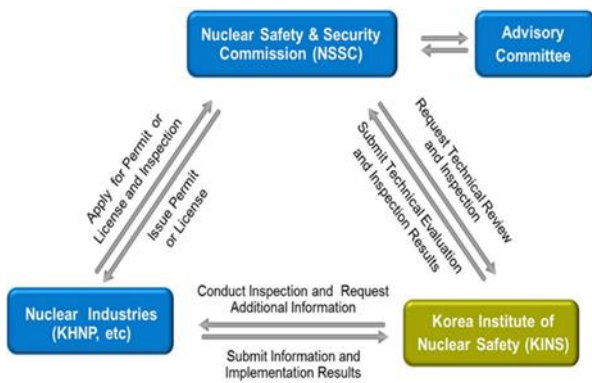


Figure 2: Licensing process in South Korea

2.4 Conceptual design of regulatory infrastructure for industrial use of radiation sources in Lao PDR

Based on review and analysis of IAEA and South Korea regulatory infrastructure it is clear that the previous governmental structure of Lao PDR has no effective mechanism of regulatory infrastructure. Therefore, this research is extracting some key factors to be a conceptual design regulatory infrastructure as below:

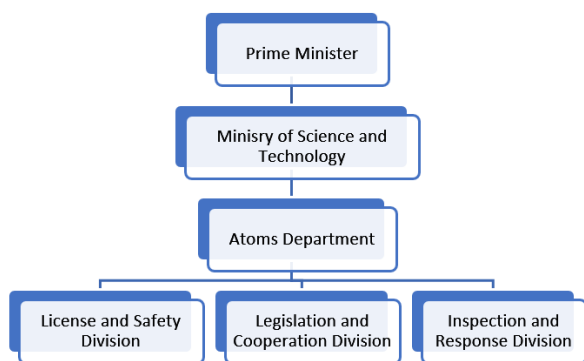


Figure 3: Conceptual design of Regulatory infrastructure for industrial use of radiation sources in Lao PDR

The conceptual design of regulatory infrastructure as shown in Figure 3, introduces the roles and the responsibilities of the competent authority and the technical support organization in this regulatory infrastructure which are outlined below:

2.4.1 Competent authority

A competent authority is a government authority designated as responsible for confirmation of and decision about radiation work. In addition to receiving and responding to issue, a competent authority is responsible for licensing for manufacture, import, transport, and use of radiation sources and activities.

The regulatory infrastructure establishes the Atoms Department as acting to be a competent authority with a role and responsibilities.

- Establish a requirement to establish legislation and nuclear law.
- Establish of a national inventory of radiation sources, national policy on radiation safety and radiation sources management at the government level.
- Establish advisory committee related to nuclear work.
- Regulatory decision-making processes or regulatory decision aiding processes. In addition, effectively independent, in making decisions relating to protection and safety, of persons and organization use of radiation sources.
- Receiving and responding to permit of licensing of manufacture, import, transport, and use of radiation sources and activities to the technical institute to be issue the license.

2.4.2 Technical Support Organization(TSO)

Technical Support Organization: The technical support organization is in charge of the technical aspects of nuclear safety regulation, including service of licensing, safety reviews, inspections, education, and safety research.

The regulatory infrastructure establishes a Technical Support Organization with a role and responsibilities for:

- Research and Presentation on safety and security, prevention and solve of national nuclear and radiation issues.
- Responsible for conducting legal action against radiation security violators.
- Cooperate with nuclear work with other countries and with international organizations as to promote and exchange of regulatory information.

There are three divisions within the Atoms Department as acting to be the technical support organization. Those divisions are the License and Safety Division, the Legislation and Cooperation Division, and the Inspection and Response Division. Each division has a different role and those roles are explained below:

a) Role of License and Safety Division

- Review and assessment of the applicant documents on the activities in the licensing process.
- Responsibilities of services and provide the license, keeping a record of any manufacture,

import, transportation and use by RAIS 3.3, as well as the center of international and regional security coordination.

- Responsibilities of research and announcement of radiation safety to publish.

Based on roles above, and Figure 3 shows the licensing process to be followed by licensee.

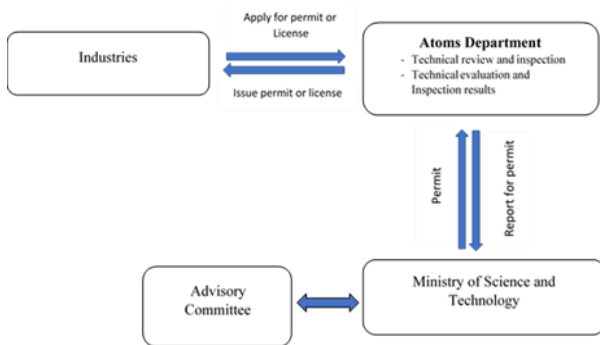


Figure 4: Licensing process

b) Roles of Legislation and Cooperation Division

- Research and propose the establishing the nuclear laws and any guidelines related to radiation sources and activities of the relevant sectors and national legislations.
- Responsibilities of research about the establishment and development of nuclear and radiation legislation.
- To promote and manage the use of radiation sources in relevant sectors in healthcare and in the socio-economic development of the nation.
- Responsibilities of provision and consultation with other organizations doing related nuclear work.

c) Roles of Inspection and Response Division

- Responsibilities of conducting inspections in order to maintain safety from radiation hazards.
- Promote the establishment of a technical team to examine and inspect the use and release of radiation and radiation waste to ensure the safety, livelihood, and safety of the nation, and report to the government regularly.
- Being the center of coordination, combining to solve the nuclear and radiation accident.
- Responsible for conducting security checks and conducting legal action against radiation-security violators.

3. Conclusion

The purpose of this study is to draw the concept of regulatory infrastructure for industrial use of radiation sources in Lao PDR. It is very important to review and analyze regulatory systems recommended by IAEA and being implemented in advanced countries. Therefore, two good systems have been selected for review and analysis (IAEA, Korea) and based on defining roles of constituents to consist of regulatory infrastructure in Lao PDR. The concept of licensing process is based on the process being successfully applied in Korea.

Conclusively, the conceptual design of regulatory infrastructure can be drawn as a result of review and analysis of regulatory system recommended by IAEA and Korean regulatory system.

This study can be utilized as a basis for a manuscript of regulatory infrastructure to secure radiation safety against use of radiation sources in Lao PDR.

REFERENCES

- Chemical and radiation emergency report, Lao PDR, in 2016.
- International Atomic Energy Agency (IAEA), Fundamental Safety Principles No. SF-1, IAEA, Vienna (2006).
- International Atomic Energy Agency (IAEA), Governmental, Legal and regulatory framework for safety No. GSR Part 1, IAEA, Vienna (2006).
- International Atomic Energy Agency (IAEA), Radiation Protection and safety of radiation sources: International Basic Safety Standards No. GSR Part 3, IAEA, Vienna (2014).
- <http://www.nssc.go.kr/nssc/index.jsp>