

Comparison of regulatory framework among bench marking countries for improving regulatory effectiveness in Malaysia

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1. Introduction

Nowadays some of developing countries in Asian region are announcing their planning to embark the nuclear power program. This progression are rising due to four factor: increasing political instabilities in fossil-fuel exporting countries; declining domestic natural energy resources; growing concerns about greenhouse gas emissions; and increasing demand for electricity [1].

This paper gives a study on the comparison between Canada, Republic of South Korea and Malaysia regarding to their regulatory framework as well as the licensing procedures in controlling the nuclear power plants establishment. Canada and Korea were selected to study because of both of the countries have different system in controlling the nuclear power plants in terms of its regulatory framework as well as the licensing process. The idea is to compare these countries along with the guidelines by the IAEA and to find out what Malaysia could be learn to start the nuclear power program and find out the best practice in nuclear licensing. Factors taken into consideration are the regulatory framework, especially the nature of the licensing authority, the licensing process and enforcement actions. Together, these give a way to evaluate the effectiveness of the regulatory body due to the licensing authorization of nuclear power plant.

2. Regulatory effectiveness

There are many elements that were considered as the indicators to be classified as regulatory effectiveness. The regulatory performance indicators might be measured in terms of direct performance indicators (which measure the activities of the regulatory body itself) and indirect performance indicators (which depend on the performance of the regulator's stakeholders, especially the licensees) [2]. The IAEA made guidelines to assess the effectiveness of regulatory body. The regulatory body is effective when it:

- i. ensures that an acceptable level of safety is being maintained by the regulated operating organizations,
- ii. takes an appropriate actions to prevent degradation of safety and to promote safety

- iii. improvements,
- iii. performs its regulatory functions in a timely and cost-effective manner as well as in a manner that ensures the confidence of the operating organizations, the general public and the government,
- iv. develops and maintains an adequate level of competence,
- v. strives for continuous improvements in its performance [3].

3. National backgrounds

Canada is one of the countries that have established its nuclear power plants in early stage of nuclear era. The first large-scale nuclear reactor in Canada, the NRX research installation at Chalk River, Ontario, started up in July 1947 and Canada's first unit of nuclear power was generated in 1962, at Rolphton, Ontario [4]. Meanwhile, TRIGA Mark-II is the first research reactor in Korea has operated since 1962. Currently, Malaysia is operating one research reactor facility called TRIGA Mark-II from year 1982 with 1 Megawatt (MW) power located at Selangor, Malaysia.

4. Comparison of Regulatory Framework

Various types of regulatory elements are being considered to improve the effectiveness and efficiency of regulatory body. Firstly, the **organizational structure** of the regulatory body also may be different depending on the national legal system and practices. The regulatory body shall be structured so as to ensure that it is capable of discharging its responsibilities and fulfilling its functions effectively and efficiently. In Canada, the authority responsible for the nuclear power activity is controlled under CNSC¹ whereas MEST² is the regulatory authority in Korea. Compared with Malaysia where the regulatory authority called AELB³ is under the MOSTI⁴. The level of power and independency is different. The CNSC is a quasi-judicial independent body that has jurisdictional authority over nuclear-related

¹ Canadian Nuclear Safety Commission

² Ministry of Education, Science & Technology

³ Atomic Energy Licensing Board

⁴ Ministry of Science, Technology and Innovation

activities in Canada. Korea has different style of management in controlling the nuclear activities and radiation application. MEST is the Korean Regulatory Authority in that area and supported by the technical agency named Korean Instituted of Nuclear Safety (KINS) as technical support organization. There is also the Atomic Energy Bureau under the jurisdiction of the Prime Minister, as the supreme organization for decision making on national nuclear policy.

Secondly, the **licensing process** in Canada has five (5) types of license compared to Korea where only has two (2) types of authorization for the life cycle of nuclear power plant. In addition, validity of an authorization in those countries is different also. Licenses are valid only for 2–5 years in Canada and each renewal again includes public participation in reviewing process.

Public hearing process is an essential procedure practiced in Canada. Similarly applied in Korea where the public can also involve in the licensing process. Even though there is no limitation for authorization period, the regulatory body can issued any directive action at any time. However, public hearing process is not implemented in Malaysia.

In Canada, enforcement is applied by using a **graduated approach**, where severity of the enforcement measure depends on the safety significance of the non-compliance and other related factors. Graduated enforcement tools include from written notices (recommendation, action notices or directives) until the prosecution action taken. In Korea, if any violation is found as a result of the regulatory inspection, the Minister of MEST may **order** the license holder to take corrective or complementary measures in accordance with the Atomic Energy Act. Secondly, the Minister can take an action to **revoke** the permit/license or **suspend** the business within a period of not more than one year. However in some case, **surcharges** also may be imposed to the licensee instead of suspension of the business. However in Malaysia, any offences done by the licensee regarding to their act in breaking the Act 304 or breaching the requirements set up under the conditions of license, the Board may at any time to **cancel** or **suspend** the license for such period. The comparison among Canada, Korea and Malaysia is summarized in **Table 1**.

5. Conclusion

Regulatory independence is the main factor to achieve the effectiveness for the regulatory body. In the licensing process, it shows that an involvement of the general public is one of the factors which can develop the confidence to the regulatory body. It also shows the transparency on the regulatory processes. Classification of license should be more realistic and easier to understand the procedure clearly. The regulatory authority should involve in all stage of the nuclear power plant's lifecycle by doing an assessment and inspection to ensure the safety of the facility. In addition, time-limited licensing provides key benefits because it ensures a high level of safety to the public, environmentalists and regulators, as it forces up-to-date best practice and close inspection of licensees. Second, the public may feel nuclear power to be more accountable if public input is required frequently during the lifetime of the nuclear power plant. Experts have found that a main reason for public anxiety about nuclear power is its perceived lack of controllability and reversibility. Lastly, the increasing of electricity demands required the government to find the best solution for supply electricity. The regulatory body that responsible for the nuclear safety matters needs to avoid for being in conflict between promoting and enforcing activities.

REFERENCES

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Table 1: Comparison of regulatory authorization for the operation of nuclear power plant

	Canada	Korea	Malaysia
Regulatory Authority	CNSC	MEST	AELB
Number of licence	5	2	1
Validation of authorization	2 – 5 years	Not specified	3 years
Public Hearing	Yes (2 times)	Yes (if necessary)	Not applicable
Other requirements	EA*	ESA** SDA***	License Class B (Nuclear Material)

Note: *Environmental Assessment, **Early Site Approval, ***Standard Design Approval