

Comparison Analysis of Nuclear Regulatory Body based on Characteristics of an Effective Nuclear Regulator

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1. Introduction

Nuclear regulatory bodies and the nuclear industry currently face significant challenges, which require new strategies and oversight. The key challenges and issues are the result of the following factors:

- Safety and regulatory challenges from existing nuclear facilities related to ageing and extension of their lifetimes;
- Renewed interest in introducing nuclear power plants to embarking countries;
- Increasing public concerns about potential nuclear accidents and growing need for information sharing and stakeholders' engagement associated with regulatory decision making;
- Ensuring the national safety regulations comply with the strengthened international safety standards and guidelines

To address these challenges, countries with existing nuclear facilities re-evaluate their regulatory framework to identify improvements whereas nuclear entrant countries strive to establish their robust and comprehensive regulatory infrastructure.

Although every regulatory body is uniquely designed based on its energy policy, national law and regulation, and existing types of nuclear power plants, they also have common attributes and fundamental objectives. In this context, much has been written by the international

organization, IAEA, to define basic requirements for legal, governmental and regulatory infrastructure. Furthermore, the IAEA provides international peer review service, Integrated Regulatory Review Service (IRRS) to assess all national regulatory aspects in the light of international guidelines for enhancing the effectiveness of national regulatory infrastructure. In 2014, the OECD/NEA CNRA (Committee on Nuclear Regulatory Activities) published a guidance booklet titled "The Characteristics of an Effective Nuclear Regulator". This report describes the characteristics of an effective nuclear safety regulator in terms of roles and responsibilities, principles and attributes. [1] It also serves as a unique resource to not only countries with existing, mature regulators for benchmarking, but also to those with new regulators in the process of establishing and developing an effective nuclear regulatory infrastructure.

In this paper, a comparison analysis is performed on the five nuclear regulatory bodies in the USA, Canada, France, Japan, and South Korea to describe their uniqueness and good practices, which can be lessons for the five countries to learn from one another. To compare and analyze the five regulatory bodies from a comprehensive and integrated view, upper level comparison items are extracted based on effective regulator's attributes from the OECD/NEA CNRA's guidance booklet, 'The Characteristics of an Effective Nuclear Regulator'.

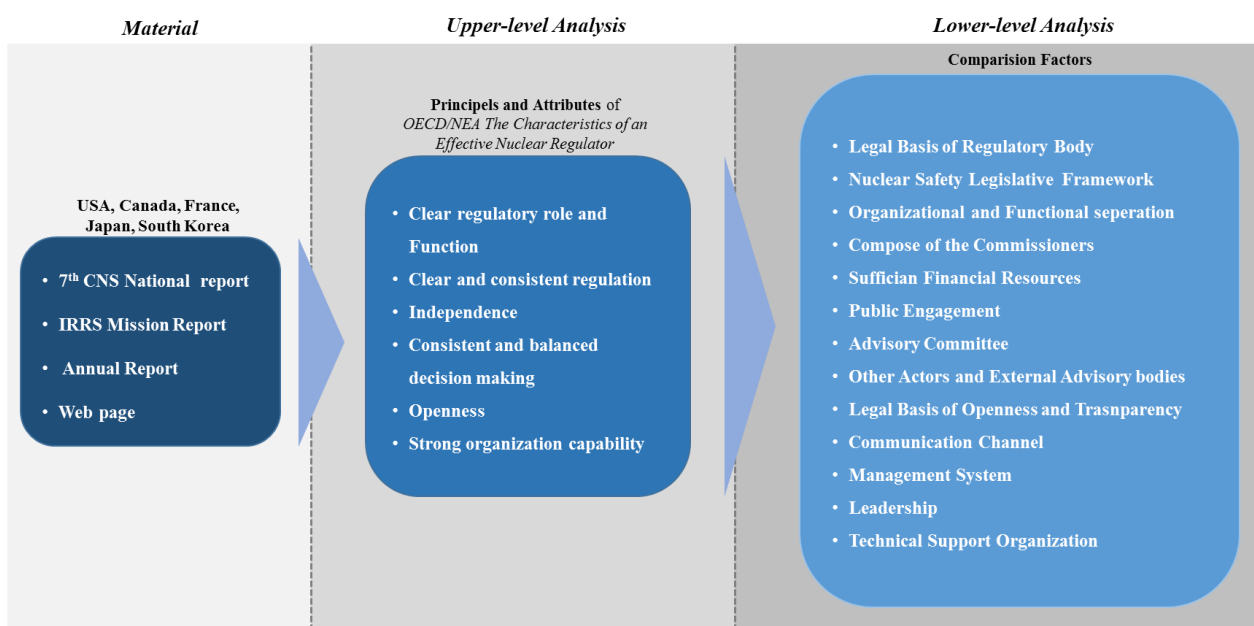


Figure 1 Diagram for Comparison Analysis

2. Methodology

Figure 1 shows the diagram for comparison analysis. In this paper, analysis is performed on the nuclear regulatory commission of the five countries (USA, Canada, France, Japan, and South Korea) by studying their national reports for the 7th Convention of Nuclear Safety, the latest IRRS Mission Report, annual reports and official webpage of each country's commission. Upper level comparison factors are extracted from the 'Principles' and 'Attributes' which described in the OECD/NEA CNRA's guidance booklet 'The Characteristics of an Effective Nuclear Regulator' In this guidance booklet, the following definition is used for 'Principles' and 'Attributes':

- Principles
 - Fundamental primary and accepted rules or the basis of conduct from which all action are derived
- Attributes
 - Qualities that identify or describe an organization that results from the actions of the organization [1]

This guidance booklet which provide fundamental requirements of an effective regulator is a proper standard material, which serves as reference for comparison analysis based on an integrated view point. Especially, considering that the guidance booklet was prepared and reviewed by senior regulators with long regulatory experience, composing the comparison factors based on the guidance booklet enhances both the reliability and applicability of the result of this paper. Comparison factors for lower level analysis are basically composed of the contents from the attributes of the guidance booklet, and they are further refined to compare each national difference. In this paper, six upper level comparative factors and thirteen lower level comparative factors were used as comparison items to analyze the nuclear regulatory commissions of the five countries.

3. Comparison Results

Clear Regulatory Role and Function: According to the OECD/NEA guidance booklet, laws, regulations, guides and licence conditions provide the framework for regulatory requirements and these requirements need to be kept clear, consistent, and comprehensive with predictable implications.

Commissions' clear regulatory role and function are described in their legal basis of establishment to fulfill their statutory obligation for the regulatory oversight of nuclear facilities and activities. In case of Japan, in light of the lessons learned from the Fukushima accident, the NRA has been established as an external bureau of the Ministry of the Environment by separating the functions of promotion and regulation for the use of nuclear energy to eliminate problems caused by the system in which one administrative organization simultaneously had both functions. [2]

Clear and consistent regulation: The OECD/NEA guidance booklet described that regulatory requirements and guides need to be kept clear, consistent, and comprehensive with predictable implications, reflecting

relevant operational lessons learnt and up-to date technological advances. [1]

After the Fukushima accident, the Reactor Regulation Act in Japan was amended and New Regulatory Requirements for Light Water Power Reactor was developed and introduced based on the lessons learned from the Fukushima accident, the latest technical knowledge, overseas regulatory standards including the IAEA safety standards and best practices found in other international organizations.

According to the recommendation of IRRS mission in 2011 and IAEA Vienna Declaration, Nuclear Safety Act was revised to clearly stipulate the responsibility for and the regulatory requirements of accident management including severe accident management in Korea. [3]

Independence: The OECD/NEA guidance booklet described that the function of the regulatory body shall be effectively separated from those of any other body or organization concerned with the promotion or utilization of nuclear energy or having other interests. Functional separation forms the background and the conditions for independent regulatory decision making without undue influence. This includes making and being seen to make independent, clear, balanced and unbiased regulatory decisions. [1]

The Canadian regulatory commission, CNSC, strengthened its independence to be a quasi-judicial administrative tribunal and its regulatory decision can be reviewed only by the Federal Court. Although most commissions have duty to report their activities to the Congress, Prime Minister, or President, they are not directed by their supervised authority in matters of regulatory and technical decisions.

Sufficient financial resources and clearly defined financing mechanism ensure the independence of regulatory bodies to properly and timely fulfill their assigned responsibilities. Since 2015, the Korean regulatory fee collecting and budget allocating system has changed to be more transparent and its execution process to be more independent. The NSSC imposes and collects from the licensee regulatory fees, which used to be imposed, collected, and executed by KINS. The collected fees are incorporated into a fund for integrated expense execution. Based on the secured financing source of the fund, the NSSC has established independent safety regulation projects and improved operation process to allocate the expense based on the purposes. [3]

Except the NSSC, other commissions consist of mostly permanent/standing commissioners against non-permanent/non-standing commissioners. Considering the independence and balanced regulatory decision making process of commissions with permanent/standing commissioners, it can be considered for the NSSC to spread the authority given to its Chairman's and convert to a standing committee system.

Consistent and Balanced decision making: The OECD/NEA guidance booklet emphasized that the regulator should make sure that its decisions are balanced and transparent, have a clear basis in law and regulations,

are based on facts and scientific grounds, and are viewed by impartial observers as being fair to all parties. [1] To assist public engagement in its balanced decision-making process, the CNSC runs a Participant Funding Program to give opportunities to members of the public and stakeholders requesting funding to support their participation in and submissions to the CNSC's regulatory decision-making process such as environmental assessments and licensing actions for major nuclear facilities. A good example case for active information sharing and public engagement of various backgrounds of stakeholders is the French Local Information Committees (CLI), which have general duties to monitor, inform and discuss nuclear safety, radiation protection and the impact of nuclear activities in France. The NSSC has operated 'Nuclear Safety Ombudsman', encouraging public engagement to receive tip-offs about corruption from in and outside the nuclear industry.

Openness and Transparency: According to the OECD/NEA guidance booklet, openness and transparency means adopting a policy of disclosure of information and of stakeholder involvement and ensuring the public are informed about the regulatory processes. [1] To respond increasing public concerns about potential nuclear accidents and growing needs for information sharing, nuclear regulatory bodies are trying to open information and regulatory activities through a variety of channel. In France, the Energy Transition for Green Growth Act (TECV) enacted 2015 takes even further the provisions regarding transparency by strengthening the roles of CLI. [4]

NSSC specified the subject and method of proactive information release recently added licensee's application documents for CP and OL to the list of information to be publicly opened in accordance with the Nuclear Safety Act. In addition, Safety Information Center was installed for comprehensive collection and release of safety information. [3]

Strong Organization Capabilities: The OECD/NEA guidance booklet explained the attributes of strong organizational capability are characterized by Management system, Leadership, sufficient and qualified staffing. Among them, leadership which means providing the clear and consistent view for purpose of organization and the staff can be developed and maintained by code and principles of each regulatory bodies. In Korea, based on Nuclear Safety Charter and Nuclear Safety Policy Statement, NSSC has developed Master Plan for Nuclear Safety to guide the mid-and long-term policy direction for better response to the environmental change of domestic and foreign nuclear industries. [3]

4. Conclusion

There are various nuclear regulatory bodies based on their national energy policy, legal and political system, nuclear facility types, etc. In this paper, we analyzed the regulatory frameworks of five different countries based on the attributes and principles exacted from the

OECD/NEA guidance booklet 'The Characteristics of an Effective Nuclear Regulator' to provide good practices to not only countries with existing, mature regulators for benchmarking, but also for countries with new regulators in the process of establishing and developing regulatory infrastructure.

In future studies, the targets of comparison analysis will be extended to different types of nuclear regulatory bodies, Such as the United Kingdom's Office for Nuclear Regulation (ONR), a standalone independent statutory public body with other attributes, such as competence, and independence peer review.

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