

A Study on the Revision of Korean Nuclear Safety Act under the Assuming the Introduction of Nuclear Ships: Reference to Russian Nuclear Safety Law

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1. Introduction

Efforts are being made to cope with climate change worldwide in the marine sector that accounts for an average of about 2.9% of greenhouse gas emissions per year and environmental regulations are tightened gradually. The introduction of nuclear ship shall be considered in order to respond to this from a long-term perspective [1,2,3].

Although South Korea is an advanced country in the field of nuclear power, they have no operational experience of a nuclear ship yet. Therefore assuming that we prepare to introduce a nuclear ship, related laws should be revised and related nuclear technologies shall be developed by referring to foreign cases [3].

Russia is not only the country that developed the world's first nuclear ship, but also the only country operating a nuclear ship now except for military purpose in table I. Therefore it was most reasonable to refer to Russian case, so Russian Nuclear Safety law was selected as the subject of study [3].

This study was conducted on the assumption that nuclear ships were introduced in South Korea. The contents related to nuclear ships among the objects of Russian Nuclear Safety Law and the matched contents of the Korean Nuclear Safety Acts are analyzed. The analysis items consisted of general(definition, objects, etc), support facilities and radiation, export and import and specified which items were applied to Korean Nuclear Safety Act.

Table I: List of Russian nuclear ships in operation [3]

Name	Launching	Reactor	Thermal power (MWt)
Rossiya	1985	20K-900A	2×159
Sevmorput	1988	KLT-40	135
Taimyr	1989	KLT-40M	171
Sovetskiy Soyuz	1989	20K-900A	2×159
Valgach	1990	KLT-40M	171
Yamal	1993	20K-900A	2×159
50 Lyet Pobyyedi	2007	20K-900A	2×159

2. Korean and Russian Nuclear Safety Act and Law

2.1 Korean Nuclear Safety Act

Nuclear Safety and Security Commission(NSSC) is a vice-ministerial administrative agency under the Prime Minister in accordance with the revised government organization amendment in March 2013. It is responsible for the inspection and regulation of nuclear facilities, radioactive materials and wastes, and nuclear security to prevent nuclear accidents in South Korea and other contries [4].

Nuclear Safety Act established by the NSSC was enacted in March 2013 to regulate safety management matters related to nuclear safety, its development, production and use. According to the Nuclear Safety Act, there are the Enforcement Decree of the Nuclear Safety Act, the Enforcement Regulations of the Nuclear Safety Act and 39 administrative regulations for delegation. Nuclear Safety Act consists of a total of 11 chapters and 121 articles and is continuously revised and utilized in accordance with changes in nuclear policy and technological development [4,5].

2.2 Russian Nuclear Safety Laws

The Russian Federation signed the Convention on Nuclear Safety 20 September 1994, the Nuclear Safety Laws was approved in 12 July 1996 and these became affective from 24 October 1996 [6].

Nuclear energy and fissile materials under the jurisdiction of Russia are subject to this laws and these consist of "On the Use of Atomic Energy," "On the Public," and "On the Environmental Protection," etc. These laws protect human life and health in matters related to the use of nuclear energy, protect the environment, promote the development of science and technology related to nuclear power in the future and contribute to international nuclear safety. These are constantly revised according to environment and technological advances in Russia and other contries [6].

"On the Use of Atomic Energy(170-FZ)" consists of total 16 chapters and 70 particles and this has composition and contents similar to Korean Nuclear Safety Act [7].

3. Revision of Korean Nuclear Safety Act

3.1 General(definition, objects, etc)

Nuclear installations is defined as ships and other crafts, spacecrafts, flying vehicles, other transportation and transportable facilities, and also critical and subcritical nuclear beds, structures, complexes, proving ground, plants device plants for these installations at table II (1).

The aim of Russian federal law is defined as the use of atomic energy for peaceful use, so utilization of nuclear power installations of a miliary nature shall not be within of this law at table II (2). This utilization is carried out on the basis of other laws.

170-FZ is a higher law than draft of federal laws and other legal acts applicable to individuals, for-profit and non-profit organizations at table II (3). 170-FZ also stipulate that this law has a slight advantage over other norms and rules. In case of conflict between this law and other norms and rules within the scope of atomic energy use, this law shall be endorsed by the Russian Government at table II (4).

Duties and functions of positions and organizations related this law are at table II (5). It is meaningless to explain because very different from Korea in this regard, but useful contents is article 26 when considering the matters related to the issuance of licenses between Nuclear Safety and Security and Korean Register in Korea. The permit(license) and its termination is right of Russian Government and the introduction of norms and rules for using atomic energy shall not involve directly the validity of permit(license) at table II (5).

Table II: Direction of revision

Content	170-FZ (Russia)	Safety Act (Korea)
(1) Definition of nuclear installations	Article 3	Article 2
(2) The application objects of the law	Article 1	None
(3) The level of the law	Article 2	None
(4) Conflict with others	Article 6	None
(5) Duties and functions	Article 7~27	None

3.2 Support facilities and radiation

The shipyard which build a nuclear ship shall follow suitable standards and rules of nuclear field and rules of the Sea Register. People who operate nuclear ship or use radiation sources shall have suitable training and hold suitable nuclear field certification. These pertinent

training and certification is the basic condition of nuclear ship's permit(license) at table III (1).

The list of port for nuclear ships shall be determined by the Russian Government and the port shall meet the standards about protecting the port workers, people and environment around the port at table III (2).

Releases of nuclear materials and radiative substances into environment from nuclear installations shall be discharged within the limits set by standards and rules. If the radioactivity from nuclear installations is higher than the fixed limits, the crew shall stop or limit the leak of radiative substances and infrom to safety regulation bodies and state bodies, other ships, nearby populated centres and ports. These situation shall be notified in accordance with the international treaties and agreements at table III (3).

Table III: Direction of revision

Content	170-FZ (Russia)	Safety Act (Korea)
(1) Shipyard requirement	Article 40	None
(2) Port requirement	Article 41	Article 31 Article 104
(3) Radiation protection	Article 42	Article 40

3.3 Export and import

The export and import of nuclear installations also apply 170-FZ law like any other act of nuclear activities at table IV (1). International work about nuclear may with Corporation Rosatom at table IV (2).

Table IV: Direction of revision

Content	170-FZ (Russia)	Safety Act (Korea)
(1) The export and import	Article 4 Article 63	Article 31 Article 94 Article 107
(2) International works	Article 45	Article 3 Article 107

4. Conclusions

The matters related to nuclear ships among Russian Nuclear Safety Law were analyzed in this study. I hoped that this study will help to present a direction for the future development of technology related to nuclear ships in South Korea

Unfortunately the research is limited because there are not many technical data related to nuclear ships because these are disclosed only in each country. Therefore the direction of future research related to nuclear ships will be the acquisition of technical data through cooperation with other countries along with the analysis of additional data that can be secured.

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