

Study on the Improvement of Regulatory Framework of LILW Transportation

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1. Introduction

In Korea, the transport of Low and Intermediate-Level Radioactive Wastes (LILW) from nuclear power plants (NPP), nuclear research reactor, and radioactive isotope storage facility to Gyeongju LILW disposal facility has increased since the operation license of facility was approved in December 2014.

As a result, there has been an increase in public anxiety and concerns over damage or social disorder with LILW transport. So the necessity of strengthened safety confirmation on LILW has been constantly raised. In August 2016, the Enforcement Regulations of the Nuclear Safety Act were amended in relation to the reporting and inspection of LILW transport.

2. Amendment of the Enforcement Regulations of the Nuclear Safety Act

In this section, it describes the domestic transport regulations including the recently revised contents.

2.1 Addition of Report and Inspection of LILW Transportation

According to the IAEA Specific Safety Requirements (No. SSR-6 "Regulations for the Safe Transport of Radioactive Material", 2012), the report and inspection for LILWs transport not subject to design approval are not required. There were no cases of carrying out individual report and inspection of LILW transports in Korea.

However, it was pointed out that it is a matter of approval when it meets the regulation on technical standards for radiation safety control, etc. to pack and transport of radioactive waste from 2014. The necessity of confirming the strengthened safety of the LILW transport has been constantly raised.

Accordingly, the Enforcement Regulations of the Korean Nuclear Safety Act have been revised as shown in Table I in regards to the report and inspection of LILW transport in August 2016. Even if the amount of radioactivity is small, LILW with more than 1.6 m3 are subject to report and inspection of transportation.

Table I: Revision of Enforcement Regulations of Nuclear Safety Act for transport

Article 98(Report of Transport)

① The "radioactive materials, etc., the quantity of which is prescribed by the Ordinance of the Prime Minister" provided

in Article 71 ① of the Act mean such materials, etc. that fall under any of the followings:

1. Type B(U) packages
2. Type B(M) packages
3. Type C packages
4. Fissile material packages
5. Large-sized machinery and equipment contaminated by radioactive materials that are inappropriate for packaging in a transport container.

6. LILW (only exceeding 1.6 m3) <revision>

Article 101 (Inspection of Packaging and Transport)

③ "Radioactive materials, etc. as prescribed by the Ordinance of the Prime minister" in

Article 111 ② of the Decree shall mean each of the following radioactive materials, etc. :

1. In case of packaging or transport by a person who must undergo periodic packaging or transport inspections in accordance with the foregoing Paragraph ①:

- a. Spent nuclear fuels
- b. Radioactive materials, etc. of which special transport is approved in accordance with regulations set by the Commission; and
- c. Radioactive materials, etc. to be transported of which radioactivity exceeds a 30-fold of the relevant A values as in accordance with regulations set by the Commission;

d. LILW (only exceeding 1.6 m3) <revision>

2.2 Regulation Experience of LILW Transportation

The Korea Institute of Nuclear Safety (KINS) have verified LILW transports through onsite inspection (classification, packaging, labeling and labeling of transported wastes, transportation documents, and transport plans including emergency response procedures) whether LILW transport satisfies the related regulations or not.

Check points according to the Regulations on technical standards were made for the transport of LILW, and some key check points and recommendations are as follows:

Table II: Check points of inspection of LILW transportation

a. Confirmation on Package Categories

Packages and over packs should be classified into Category I-white, Category II-yellow and Category III-yellow according to transport index and surface radiation dose rate

b. Confirmation on the satisfaction of radiation dose of transportation vessel

Shipping vessels should be maintained to meet the radiation dose limit for workers' zone (0.0075 mSv/hr), the public zone (0.0018 mSv/hr) and the surface of

vessel (2 mSv/hr).

c. Confirmation of Radiation safety-related facilities

Shipping vessels should be maintained to meet the requirements of the radiation measuring instrument, radioactive contamination measuring instrument, radioactivity concentration measuring instrument, personal dosimeter, etc. required by the Nuclear Safety and Security Commission Notification.

d. Confirmation of cargo zone temperature

Shipping vessels should be maintained at an average temperature of 55 °C below the cargo space in accordance with the Nuclear Safety and Security Commission Notification.

e. Confirmation of filter pressure

There are Pre-filter, HEPA filter and activated carbon installed in the gas exhaust system in a radiation control room. The filter pressure must be checked.

f. Confirmation on loading limit, marking, and labels of carrying container

Carriages should be marked and labeled in accordance with Article "Regulations on Technical Standards for Radiation Safety control, etc.", and other critical safety transport label, transport placards for vehicles, and UN No. must be attached appropriately.

g. Others (education for workers, etc.)

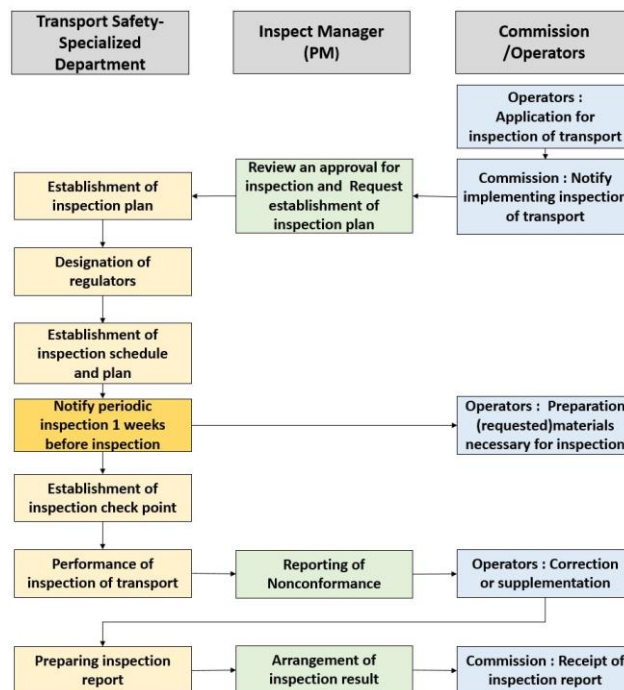


Fig. 2. Working procedures for (Individual/ periodic)

2.3 Procedure of Report and Inspection

According to the Nuclear Safety Act, the document of report and inspection no later than 5 days before LILW transport should be submitted to the Nuclear Safety Commission by operators. At this time, those submitted at the time of the previous report of transport will be excluded: Statement on the transport of radioactive materials, Explanatory statement on radioactive materials, Form of a packaging and transport checking record, Containers for packaging or transporting radioactive materials, Transport procedures, and Emergency response plan. Individual inspections are conducted by a regulatory body. An operator of a nuclear power reactor, installer of a nuclear research reactor, nuclear fuel cycle enterpriser, installer of disposal facilities, and producer/seller of radioisotopes should undergo a periodic inspection once a year. Periodic inspection is confirmed to be in compliance with related technical standards and ensures safety of transport of LILW; thus it is effective to prevent problems and repetitions.



Fig. 1. Examples for LILW transport by transport vehicles

3. Conclusions

As the LILW generated by nuclear power plants, etc. is transported to a permanent disposal facility, it is possible to secure enhanced safety through the reporting and inspection of LILW transportation of a certain size (more than 1.6 cubic meters).

Through the improvement of the regulatory system, the regulatory body is expected to confirm the safety of the large-scale transport of the wastes, thereby relieving public anxiety and reducing damage or social confusion in the event of a transportation incident. In addition, notification and inspection are carried out every time radioactive waste is transported, and it may be more advantageous to reduce the damage or confusion caused by the incident, as compared with the operator's additional work burden. By securing enhanced safety through preliminary confirmation of large-scale transport of radioactive waste, it is expected that it will help reduce the anxiety of citizens and reduce the damage in case of incidents through institutionalization of related matters (reporting and inspection).

It is expected the improvement of the system can be settled early through safety management efforts of nuclear related companies to ensure radioactive waste transportation safety.

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REFERENCES

- [1] IAEA Specific Safety Requirements No. SSR-6, "Regulations for the Safe Transport of Radioactive Material", 2012
- [2] NRC Inspection manual "Inspection of transportation activities", 2008