

# Regulatory Framework for the Safe and Secure Transport of Nuclear Material in Japan

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**Abstract.** Regulations for nuclear material transport in Japan are based on international regulations. Safety and security regulations, however, have sometime different aspects which have caused a conflict of operations. This paper aims to introduce framework of safety and security regulations for nuclear material transport in Japan, and shows some issues in cooperation of these regulations.

## 1. Introduction

Japan has a wide variety of nuclear facilities. They include fifty-four commercial reactors with more than 45,000 MW outputs providing one-third of national electricity, and other supporting facilities for front-end and back-end operations. They also include facilities to use Mixed Oxide Fuel (MOX), containing plutonium reprocessed from Supend Fuels (SF) in light water reactors. Thus, nuclear materials equivalent to approximately 1000 metric tons of uranium is transported a year as domestic and international shipments. With such a large amount of nuclear materials transported, achievement of nuclear fuel cycle, requires a robust regulatory scheme to ensure safety and security in transport of radioactive materials. In this context, Japan has national legislation in place incorporating IAEA's regulations.

The TranSAS for Japan in 2005 highly valued the effectiveness of our regulatory system, highlighting also more stringent maritime legislation than international regulations. We also maintain a high level of security in transport of radioactive material by putting in place national legislation equivalent to international instruments.

However, in some respects, safety and security regulations have different aspects which sometimes may cause a conflict of operations. This paper introduces outline of safety and security regulations for nuclear material transport in Japan, then shows the issues in cooperation of these regulations.

## 2. Frame work of regulations

### 2.1 Incorporation of International Standards into Domestic Laws

Japan has incorporated the IAEA Regulations for the Safe Transport of Radioactive Material (TS-R-1), and has implemented safety regulations since 1973 edition and its associated guidelines. The incorporation history is shown in Table 1.

Table 1. History of incorporation of TS-R-1 (ST-1) into domestic regulations

TS-R-1 (ST-1)	1973 edition	1985 ed.	1996 ed.	2003 ed.	2005 ed.	2009 ed.
domestic laws	1978	1990	2001	2005	2007	2011

For sea and air transport regulations, Japan has incorporated IMO SOLAS and ICAO Conventions respectively, via UN Recommendations on the Transport of Dangerous Goods. For road transport regulations, although Japan, an island nation, has never experienced international road transport, Japan has incorporated the TS-R-1 directly, to ensure consistency in modes of road, sea and air transport. These regulations are generally applied not only to the international transport but also domestic operation.

As for security regulations, Japan has incorporated the Convention on the Physical Protection of Nuclear Material (CPPNM) and the IAEA Recommendations INFCIRC/225/Rev.4, in addition to guidelines from Nuclear Bilateral Agreements with USA, UK, etc.

The safety regulation based on the TS-R-1 applies to both nuclear material and radioisotopes (RI). The security regulation based on INFCIRC/225/Rev.4, etc. applies only to nuclear material. For the purpose of the comparison of the two regulations, this paper covers nuclear material only.

## 2.2 Competent Authorities

Main Competent Authorities and their responsibilities in Japan are shown in Fig. 1.

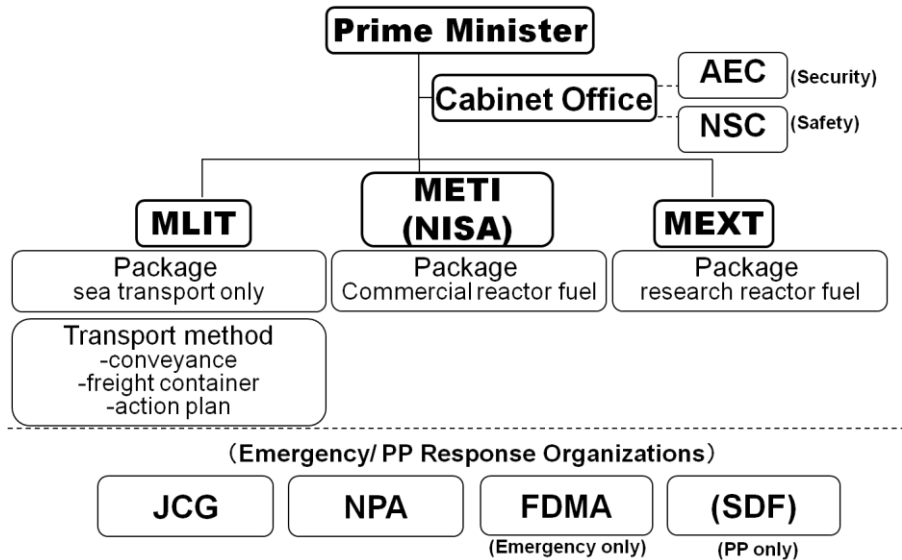


FIG. 1. Competent Authorities for Transport of Nuclear Material

Regulatory bodies, organizations responsible for the operation of nuclear reactors and nuclear facilities, etc. are: METI (the Ministry of Economy, Trade and Industry), MEXT (the Ministry of Education, Culture, Sports, Science and Technology) and MLIT (the Ministry of Land, Infrastructure and Transport). Supervisory bodies, organizations supervising the regulatory activities of each organization in charge are: AEC (the Atomic Energy Commission) and NSC (the Nuclear Safety Commission). First responder organizations responsible for emergency response and/or physical protection (PP) response, armed guards and response forces are: JCG, NPA (National Police Agency), FDMA (Fire and Disaster Management Agency) and SDF (Self Defense Force).

Regulations for nuclear material transport consist of Package Regulation and Transport Method Regulation. For Package Regulation, METI and MEXT are responsible for road transport. MLIT is responsible for sea transport in Package Regulation and for sea, land and air transport in Transport Method Regulation.

### **3. Frame work of approval**

#### **3.1 Main Requirements for Transport Safety and Security under INFCIRC/225/Rev.4**

Next, we mention about main requirements for nuclear material transport and practical approval procedure in Japan. For the Package, there are five safety (structural, thermal, sealing, shielding and critical) requirements; and locks and seals for security.

For the transport method, the safety requirements of conveyance, freight container etc., depend on the transport mode; for security, locks and seals, and additional PP measures for only Category I nuclear material are required. For the transport method action plan, the safety requirements include the Radiation Protection Programme (RPP) and Emergency Plan (EP); the Transport Security Plan (TSP) with emergency action. An armed guards are required only for Category I nuclear material.

Here, it is pointed out that this “emergency action” in TSP, is not a plan equivalent to “emergency plan” in RPP. The other security requirement is to protect the confidentiality of PP information.

#### **3.2 Safety Approval Procedure**

For safety regulation: The shipper must be approved for package/packaging at the package design and packaging fabrication stages, and must be inspected before the shipment stage. For each transport method, the shipper must have a confirmed RPP and EP, and must be inspected before the shipment stage. After approvals, the shipper may carry out transport with RPP and EP.

On the other side, the State must develop national emergency plans for emergency preparedness. National emergency plans are developed in accordance with the level of consequences associated with an incident/accident. For example, the national emergency plan for a low level incident provides that, if an unusual event occurs, a conference of competent authorities is to be held in order to instruct and order operator and transport companies via local headquarters.

#### **3.3 Security Approval Procedure**

For security regulations: First, the shipper files an application for DBT (Design Basis Threat) and attaches a shipping plan and a management manual for PP information. The State defines DBT considering the shipping plan, and notifies the shipper. The shipper develops the TSP including DBT assessment, and must get confirmation of TSP. Additional PP measures on package and transport method based on TSP must be inspected at before the shipping stage. After that, the shipper can carry out the transport according to the TSP. As mentioned above, this TSP does not include a plan equivalent to the “emergency plan” in RPP.

INFCIRC/225/Rev.5, published January 2011, provides for a “contingency plan” in TSP, and covers Category I and Category II nuclear materials as objects of regulation. PP measures for Category II nuclear material are added to requirements for package and transport method.

If INFCIRC/225/Rev.5 is incorporated into domestic legislation, the above security approval system for INFCIRC/225/Rev.4 will be changed and the shipper and the State must develop a Contingency Plan (CP) and a National Contingency Plan (NCP), respectively.

### **4. Future Issues in cooperation of Safety and Security Regulations for Nuclear Material Transport**

Future issues in cooperation of safety and security regulations are as follows;

- (1) Enhancement of PP Action and Response Plans;  
Additional PP measures for packages, freight containers and conveyance to satisfy both safety and security requirements. The enhancement of PP action and response plans by all operators and competent authorities are important for future reinforcement of security regulation.
- (2) Harmonization Contingency Plan and Emergency Plan;  
The contingency and emergency plans have different communication systems and response actions. To be able to execute both plans at the same time will require careful coordination of each plan’s procedures.
- (3) Transparency and Confidentiality of Transport related information;  
Safety information requires transparency, Security information requires confidentiality. Transport related information is classified according to procedures.

### **5. Conclusion**

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I introduced the outline of regulation for nuclear transport in Japan from the view point of safety and security. An approval procedure for transport of nuclear material has been established to ensure to satisfy TS-R-1 and INFCIRC/225/Rev.4. Under this framework, various transports were carried out in a safe and secure manner. Now, with some future issues to be discussed, we, the government as well as operators (carrier, consignor and consignee etc.), should continue our efforts to enhance safety and security level in nuclear material transport.

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