Good Practices Guide to Secure Railroad Transport of Civilian Nuclear Material

Nuclear Security Summit Transport Gift Basket

Lessons Learned from Railroad Tabletop Exercise and Sharing the Experiences based on INFCIRC/225/Revision 5 and its Implementing Guide

By France, Hungary, Kazakhstan, and
the United Kingdom

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1. Introduction

To fulfill its international obligations each State party to the Convention on the Physical Protection of nuclear material bears the responsibility to protect and secure nuclear material during their transport. To facilitate the implementation of the CPPNM, the International Atomic Energy Agency (IAEA) has issued guidance on the physical protection measures of nuclear material in the document *Recommendations on Physical Protection of Nuclear Materials and Nuclear Facilities* (INFCIRC/225/Revision 5).

On the occasion of the Third Nuclear Security Summit held in The Hague (March 24-25, 2014) the leaders of the participating States of the Transport Security Gift Basket[1] issued a Joint Statement to express their further commitment to work together for improving security in the transport of nuclear and other radioactive materials. In this Joint Statement, the participating States expressed their intention to consider conducting table-top exercises for all transport modes and proposed among other actions to share the good practices of above-mentioned activities with the IAEA and other States while protecting sensitive information in order to actively contribute to the IAEA's drafting efforts of the Nuclear Security Series.

In the context of the Nuclear Security Summit (NSS) 2016, Transport Security Working Group, chaired by Japan, four participating States volunteered as “mode leads” for four modes of transportation: Japan for the road transports, the United Kingdom for the maritime transports, Kazakhstan for the rail transports and the United States for the air transports.

These “mode leads” held four national tabletop exercises (TTX) each of which covered one transport mode. These exercises were based on Section 6 of INFCIRC/225/Revision 5[2] and the 30 September 2014 draft of the *Security of Nuclear Material in Transport: Implementing Guide*. They aimed at providing each mode lead’s national perception of how to implement the recommendations contained in INFCIRC/225/Revision 5 on the transport of nuclear material.

More specifically, these exercises were to highlight practical applications for the **protection of category I and II non-irradiated civil nuclear material** while in transport. Due to the sensitive nature of operations involving nuclear materials, the participants to this NSS transport gift basket agreed that documents produced in support of and resulting from the exercises contain only non-sensitive information.

As a preamble, it is assumed that obligations on States parties to the Convention on the Physical Protection of Nuclear Material (CPPNM) are fulfilled. An underlying principle to ensure the fulfillment of the CPPNM obligations is the establishment by each State of a legislative and regulatory framework to govern physical protection. The INFCIRC/225/Revision 5 provides guidance of the elements to take into consideration for establishing such a national framework.

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[1] France, Japan, Republic of Korea, United Kingdom and United States

[2] http://www-pub.iaea.org/MTCD/publications/PDF/Pub1481_web.pdf

2. The process of exercises

The TTX scenario is given in the Annex and is related to the security event during transportation of spent nuclear fuel – terrorist attack.

After introductory words of a director of the exercises and introduction of participants the TTX scenario was presented to the participants who were asked to react in their normal duties.

During the exercises the cooperation and interaction between governmental authorities bodies of the country during terrorist attack to the train had been simulated at all stages of the situation development, particularly:

– actions and cooperation between the railway company, law enforcement authorities, and emergency agencies;

– response of all enforcement agencies to the received notification, making a prompt decision to take appropriate actions including intelligence, elimination of terrorists, enclose and cordon off the area;

– interaction between governmental authorities on localization and mitigation of the consequences of the terrorist attack after end of the active phase;

– organization of radiological monitoring measures in the contaminated area and tracing the radioactive contamination level by relevant structural subdivisions of governmental authorities;

– organization of relief measures to the injured persons;

– rehabilitation of infrastructure;

– prompt information exchange between governmental authorities on localization and elimination of consequences of the incident.

Official information flow – data on the incident are brought into the report of the nuclear regulator which, in turn, produce a brief notification to the law enforcement authority and Ministry of Foreign Affairs (MFA). The MFA, in its turn, transfers official information to the IAEA about the incident.

3. Results of the Exercises

Participants of the exercises had shared the best practices in the field of prevention and elimination of different radiation accidents and incidents.

During the exercises some parts of the scenario had been complexified, which caused interaction issues between structures of governmental authorities:

1. during the terrorist attack the communication between a security guard of a train, driver and team was lost;

2. all members of security guard convoying the cargo were killed in short period of time;

3. significant radioactive contamination in terms of territory and activeness took place.

4. Recommendations

4.1. DBT and Contingency Plan

- In the national design base (DBT) threat it should be included threat of terrorist attack to railroad transportation of nuclear and other high hazard radioactive materials;
- Corresponding contingency plans are recommended to be developed for railway transport companies and first reaction law enforcement authorities;
- Detailed response procedures should be included into the contingency plans to provide reliable communication and coordination between the involved organizations, e.g. transport company, law enforcement and emergence agencies, train drivers and security team, local and national government responsible structures;
- DBT and contingency plans should be revised periodically in accordance with the changing threat environment.

4.2. Convoy and response

- Train security convoy team should be equipped, instructed and trained for effective response to terrorist threats, corresponding procedures should be developed;
- For the train convoy special protected railcar should be used;
- During transportation security forces should be located in such manner that provides good contact, communication and interaction with the train driver team in a case of a security incident;
- Train tracking systems should be used with provision of reliable communication channels between the train team and railway traffic control centers with a possibility of emergency communication;
- It is necessary to provide back-up liaison, which will ensure reliable communication between the train team, drivers and security guard;
- It is important to provide prompt arrival of response forces to emergency place (terrorist attack) as soon as possible and stipulate it in emergency plans;
- It is important to provide technical assistance to emergency rescue teams by all means in order to eliminate consequences of such incidents, including limitation and elimination of radioactive contamination;
- It is essential to practice procedures and actions of train drivers and train team in case of unexpected stops of a train during transit.

4.3. General recommendations

- Development and use of threat assessment and/or DBT in conducting the shipment;
- Review and approval of transportation security and contingency plans;
- Pre-shipment notifications to response forces along the route, the receiver, and other persons as required;
- Pre-departure searches of critical elements of the train (locomotive, guard cars, etc.);

- Determination of personnel trustworthiness;
- Utilization of exclusive-use trains to transport spent fuel;
- Utility and location of a control center;
- The need in having diverse and reliable means of communication;
- Use of train immobilization devices;
- Options for increasing survivability of train operators and guard forces (ballistic hardening, guard deployment tactics, etc.);
- Utility of guard performance testing (force-on-force exercises);
- Utility of using closed conveyances and locking devices to delay adversary access to spent fuel.

5. Conclusions

During the exercises an experience on interaction between different structures of governmental authorities was gained, however, there are issues in responding to and elimination of terrorist attacks, particularly which have led to radiological accident, and this demands an additional analysis and cooperation training measures between structures and subdivisions of the involved governmental bodies.

The main outcomes of the exercise have shown that it is important to enhance cooperation between different structures of governmental authorities during emergency situations, including security incidents, which can appear while transporting special cargo.

Annex

Scenario of the TTX -
Transport of nuclear materials of the 1st category by railroads

It is planned to transport spent nuclear fuel (category 1 nuclear material stored in the territory of the Republic of Kazakhstan) by railways in order to reprocess it.

A train departs from station “A” in the Republic of Kazakhstan to station “B”. The length of the route to the borders is 1,000 km. Security within the Republic of Kazakhstan is ensured by the Kazakh authorized agencies.

A terrorist group has set a task to seize the train in order to make use of the spent nuclear material to produce a “dirty bomb”. The terrorists are equipped with Small Arms, armored vehicles, and radio jamming equipment.

In 300 km the railroad takes a sweep, which causes poor visibility because of the coniferous forest. The train driver notices an obstacle through the forest – a wagon with horses which cannot pass the railroad. The driver tries to inform a security commander, but there is no connection with headquarters. The reason for lack of communication is under investigation. It is decided to stop the train and send a rail trolley with three security guards to clarify the circumstances. The trolley is not seen behind the sweep. After a while, communication with the trolley stops. The driver tries to contact with the headquarters, but it is impossible.

The terrorists get rid of the guards on the trolley. The driver and his assistant try to send a voice message about the situation to the security guards, but the terrorist sniper get rid of them too.

After assessing the situation, the chief of the security guard makes a decision to state-of-alert. Having no opportunity to connect with headquarters, a commander gives an order to launch emergency flares.

Terrorists meanwhile assault the train. Well trained team of a train stands up against them.

After noticing the launch of emergency flares and realizing that it is impossible to take the train pushily and seize the containers with spent nuclear fuel, terrorists make decision to attacking the train with shaped charge warheads.

In consequence of hit of shaped charge warhead, one of the containers with spent nuclear fuel falls, which causes the spill of its containment.