

**Good Practices Guide to Secure Maritime
Transport of Civilian Nuclear Material**
Nuclear Security Summit Transport Gift Basket

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

By France, Japan, the United Kingdom, and
the United States of America

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1. Introduction

1.1 Background

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 Basket¹ 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 5² 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.

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

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

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.

1.2 Contents

This practical guide offers general advice to safely and securely plan maritime transport of category I and II nuclear materials and reflects information discussed during the UK-led maritime TTX. The guide is broken down into main themes as follows:

- **Pre-operational planning, co-ordination and logistics**
- **Execution of transport**
- **Emergency response**
- **Post mission analysis**

The final version of the maritime TTX is provided at **APPENDIX I**.

2. Pre-operational planning, coordination and logistics

2.1 Threat

- The State should confirm the applicability of the design basis threat (DBT) to maritime transport or, in the case it is not applicable, develop a transport-specific DBT.
- A shipment-specific threat assessment should be carried out. This should consider and have access to all intelligence available to the state. The production of the threat assessment should be a precursor to approval of the transport security plan – assessment and approval of the plan should take account of all threat information.
- The state should have a mechanism to cancel the shipment, where necessary, in the event of certain threat information.
- Appropriate threat information should be provided directly to the response force commander and the ship's Master.

2.2 Readiness

- The competent authority should be empowered to require any aspect of the movement to be exercised.
- Independently-observed exercises should be held with the objectives including:
 - a. testing the effectiveness of the transport security plan, including contingency plans
 - b. verifying that all personnel, including the seafarers, know their part in such plans
 - c. demonstrating the interoperability of separate organisations, such as the response force and the seafarers
 - d. consideration of the use of national Navy / Coastguard or equivalent as an independent assessor of the effectiveness of interoperability of ship's officers with the response force.
- Exercises should include all relevant organisations which may have a part to play in normal operations and contingencies.

2.3 Record of Discussion

- In the case of weapons grade nuclear material being transported between two different States, clear agreements between those States should demonstrate their compliance with the CPPNM and should be reached on:
 - a. the security responsibilities of consignor, consignee and (if different) carrier
 - b. how and when those security responsibilities pass between States
 - c. how the vessel will be protected when approaching the limit of territorial waters, on passage through the limit and when in territorial waters and ports
 - d. where appropriate, the arming / disarming of response forces / escorts and the security of weapons and explosives.
- Meetings to reach such agreements provide an opportunity for armed responders from different states to agree operational level detail in conjunction with the ship's Master.
- Signatories should be authorised to make such agreements on behalf of their State.
- The detail of the agreements will be very sensitive and will need to be protected according to the information security requirements of both states, including the sharing of information between the States.

2.4 Information Protection

- Protecting information relevant to the movement is a key component in the protective security system and a vital layer of defence in depth.
- The competent authority should issue guidance on the level of protection necessary to different types of information relevant to a shipment.
- Suitably robust and protected codes or other means of providing partial information should be developed to enable sharing of information at a lower classification level.
- Sharing sensitive information relevant to the transport with third parties, potentially including other States, will be necessary. It should only be produced and stored in a secure manner, and shared by secure means and with personnel who have an absolute need to know it for the shipment to proceed.
- Certain third parties will have a need to know limited amounts of sensitive information. The predetermination of trustworthiness of personnel with a need to know may not always be possible. Examples of such organisations include shipping agents, crane operators, pilots and tugs etc. In these cases the information should be compartmentalised and organisations should be given the absolute minimum information necessary for the shipment to proceed, as late as possible.

3. Execution of Transport

3.1 Vessel

- The vessel should follow the limited access area, protected area and inner area method of a nuclear site – holds containing Category I nuclear material should be protected to the same standard as that contained in an inner area, Category II as if contained in a protected area. Procedural measures recommended for these areas in IAEA NSS13, e.g. the two-person rule for inner areas, should be enforced.
- Access control within the vessel should be rigorously enforced; the hold(s) and engineering spaces should only be accessible to a very limited number of people with a fundamental need to access them in the course of their duties.
- Predetermination of trustworthiness for the crew and response force should be conducted to a standard specified by the competent authority.
- Vessels should have a hardened and ergonomic Command, Control and communications hub for the use of the response force. This should be equivalent to the central alarm station (CAS) for a nuclear site and capable of operating during an emergency.
- The capability of weapons and ammunition should ensure protection against the design basis threat.

- Vessels should have distant surveillance and target acquisition capabilities for the sole use of the response force.
- The State's competent authority for SOLAS should be consulted with a view to minimizing information, related to destination, position, course, speed and details of the load, that is broadcast by the vessel using standard equipment such as Automatic Identification System (AIS) or Long Range Identification and Tracking (LRIT).
- Vessels, and embarked armed responders, should have multiple redundancy of communications for securely communicating over an encrypted system with a transport control centre located in the flag State of the vessel.
- The transport control centre should be located in the flag State of the vessel and staffed at all times during the shipment by members of the response force.
- The vessel should be equipped with a system which enables the transport control centre to monitor the location of it at regular intervals and on request.
- Domestic arrangements (ie logistics on board the vessel) for an embarked response force should ensure its continued effectiveness for the duration of the journey.
- All security systems should be rigorously tested and confirmed as fully operational before loading nuclear material.
- If escorted by a separate vessel or vessels, their interoperability, including command, control and communications, clear lines of authority, arcs or lines of fire etc should be implicitly understood by the armed response force and the ships' officers, and rigorously tested.
- Any escort vessels should have security systems of equivalent capability as the loaded vessel.
- The vessel (and any escorting vessels) should make no stops between the start and end points of the journey. Hence it should be self-sufficient for the entire voyage in respect of fuel and provisions etc.
- Communications on the bridge and in the CAS equivalent response force hub should be capable of being recorded in extreme circumstances for the purpose of evidence gathering.

3.2 Vessel INF-Class

- The International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on board Ship (INF Code) is important in respect of the security of weapons grade nuclear material in international maritime transport.
- The INF Code is administered by the International Maritime Organisation, a UN organisation equivalent to the IAEA.

- The Code gives expected safety features at the three Classes under the Code (INF 1, INF 2 and INF 3).
- The safety features for the highest Class, INF 3, help mitigate the effects of a sabotage attack. Examples include:
 - b. Double hull and collision-resistant structure around the entire cargo carrying area of the vessel;
 - c. Additional stiffening in the wing ballast tanks;
 - d. Redundancy of crucial features including engines, gearboxes, screws and rudders;
 - e. Vessel remains seaworthy in the event of one or more holds being flooded.
- Only Class INF 3 vessels should be used for the international maritime transport of Category I and II nuclear material. For any other civil nuclear material category, INF codes are to be implemented accordingly.

3.3 Armed Response Force

- Security should be designed from the inside out and, in compliance with CPPNM, an armed response force onboard the ship is essential in order to prevent a situation where the response force is 'chasing' those with malicious intent towards the ship. However, the use of additional escort vessels may be beneficial.
- The nature of operating in the maritime environment is unique. The armed response force should be dedicated to the role, this enables them to be:
 - a. used to working onboard ship in close cooperation with the Master and ship's officers;
 - b. completely familiar with the internal spaces of the vessel;
 - c. experts in the tactics of operating in confined internal vessel spaces;
 - d. experts in the larger calibre weapons used to defeat small craft ;
 - e. experts in the potentially different rules of engagement.
- Any authorisation of lethal force should take full account of the International Convention for the Safety of Life at Sea (SOLAS) and other general international law requirements. The armed response force should have knowledge of these laws in advance of shipments. The Master, or their representative, should be consulted to ensure there are no objections on safety grounds to the use of lethal force. However, in the case of a right to self-defence scenario, armed responders should be appropriately authorised.
- Rules of Engagement for the response force should be agreed by the relevant government department so that the response forces can act decisively, within the law.

- Rules of Engagement may need to take account of differences between legal authority in territorial waters, international waters and another State's territorial waters.
- The armed response force should have lethal and less-lethal options available.

3.4 Security surrounding the vessel when in or approaching port

- Prior to loading nuclear material searches should be conducted of the vessel, the berth, any personnel boarding the vessel and any other vessel drawing alongside (eg pilot boat, tug etc).
- The destination berth and any further vessels (pilot boats, tugs etc) should be searched shortly before the vessel arrives.
- Vessels and berths should remain sterile after searching. Guards should ensure that no person or material enters the vessel or berth unless searched and authorised to enter.
- Given the specific nature of the vessels and berths, it is beneficial to establish relationships with the authorities who will conduct the searches. Thus every search can build on a previously-understood picture.

3.5 Media and Public Information

- Transports may be in the full view of the public and, given the specialist nature of vessels, it may be obvious that nuclear material (although not necessarily the security Category) is being transported.
- Responses to questions from the press and the public should be pre-prepared and broadly agreed by all parties.
- Response to such questions should divulge no sensitive nuclear information.
- All states involved in the transport should agree the amount of information that may be shared at any particular stage.
- It is recommended that no positive confirmation of the material being shipped or the exact route is ever divulged – such routes may be used again for future shipments.

3. Emergency Response

- The approved carrier should have an international response capability which is frequently exercised in order to be assured of its effectiveness.
- This should contain specialists in areas such as health physics and material container engineers, able to deploy anywhere around the world on the route of the transport. This can be quicker to deploy if arranged via specialist sub-contractors around the world.

- Speed, and therefore effectiveness, of response is improved if arrangements are in place before the shipment for fixed and/or rotary winged aircraft to deploy teams to the scene of an incident.
- Speed of response is also improved if appropriate equipment is pre-deployed along the route of shipments. Such equipment should be checked for functionality as it is likely to lay dormant for extended periods.
- The approved carrier should have staff of an appropriate seniority on duty who can receive an incident notification and coordinate an appropriate response.
- The staff on duty should have access to specialists, such as package licensing, material container engineers, media, legal and security.

4. Post mission analysis

- ‘Hot’ debriefs should be conducted by all relevant organisations immediately after a shipment in order to identify good practices and areas for improvement.
- ‘Cold’ debriefs should be conducted to collate the lessons identified and share them in order that good practices are embedded and improvements are made for future transports.

APPENDIX I: 2016 Nuclear Security Summit Transport Security Gift Basket Maritime TTX