

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.

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

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

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

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 non-irradiated 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 category I and II non-irradiated 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.
- It is recommended that vessels 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.
- Consideration should be given about ensuring the capability of weapons and ammunition to ensure protection against the design basis threat.
- Consideration should be given as to whether vessels 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.
- 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, consideration should be given as to ensuring their interoperability, including command, control and communications, clear lines of authority, arcs or lines of fire etc be implicitly understood by the armed response force and the ships' officers, and rigorously tested.
- Consideration should be given as to escort vessels having 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 category I and II non-irradiated 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).
- It is strongly recommended that Class INF 3 vessels should be used for the international maritime transport of Category I and II nuclear material.
- For any 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 on board 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.
- It is recommended that the armed response force have lethal and less-lethal options available if the situations anticipated according to the DBT so require.

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.

4. Emergency Response

- According to the frequency and size of the transports they carry out, it is recommended that the approved carriers have an international response capability which would be frequently exercised in order to be assured of its effectiveness.
- If this carrier operates round the world, it is recommended that this response capability contains specialists in areas such as health physics and material container engineers, able to deploy anywhere around the world on the route of the transport.
- Speed of response, and therefore its effectiveness, is improved if arrangements and appropriate equipment are in place before the shipment for fixed and/or rotary winged aircraft to deploy teams to the scene of an incident. 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.

5. 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

Exercise 'Barracuda' Planning Document

1. Introduction

These table top exercises form the crucial and critical aspect of any planned transport. The scenarios represent a real assessment of potential threats and as such are designed to ensure attending players display the correct competence to give reassurance of their ability to successfully command and manage an event. Responses to the scenarios will be presented within realistic and achievable timeframes, it is essential exercise response mentality reflects an actual deployment of resources.

2. Planning Assumptions

Times are indicative of current planning operations and assumptions. Times for injects will reflect this. Players will use their current and up-to-date plans/policies and procedures. Gold will not be exercised during these TTXs, an assumption will be made that they would convene. Silver need to reference Gold and this will be accepted as an exercise objective being met. Directing staff will ask the question if players do not make reference to Gold.

The overarching Aim is;

To exercise CNC, PNTL and INS in a collaborative response to a maritime transport related event, requiring the implementation of their response arrangements. This is to contribute to the Japanese Security Giftbasket in support of the Nuclear Security Summit.

3. Key Objectives for the Scenarios are;

- To verify a coordinated and joined up response to all the scenarios, to ensure the continued security of NM in transport.
- To verify that those in key operational/tactical roles are competent and experienced to fulfil that role.
- To identify areas for improvement, through reaction, behaviour and results.
- To gain a broad understanding of all responders plans and procedures
- To verify where required effective handover of responsibility
- To exercise the tactical and operational decision making process.
- Ensuring that a method is in place to create and communicate a Common Recognised Information Picture (CRIP) across all responders.
- That the response to the exercise scenarios is clearly documented and that an appropriate audit trail and log of decisions made is maintained.

4. Scenarios

SCENARIO 1

PNTL Vessel has departed Germany for the USA

INJECT 1A: Fed into Silver Command Cell from Bronze at approx 1000hrs

1hr 45 minutes into sea voyage. The master, first officer, SEG Silver and bronze commanders all complain of severe stomach cramps and nausea.

INJECT 1B: Fed from CNC to CCC

All are deteriorating fast and one has passed out.

INJECT 1C: Fed from PNTL to Report Centre

Advanced medical treatment is required, conditions of the 4 are beyond medical capabilities of the PNTL crew and escort group.

SCENARIO 2

The Vessel, (carrying a Cat 1 cargo) has departed port en route for USA and is 15 miles out of Loading Port in Sweden. When the officer of the watch notices 2 high speed RIBs approaching on identical courses.

There appear to be 6 persons on board each RIB all wearing balaclavas. Both RIBs appear to be carrying large amounts of un-identifiable equipment.

At a range of 2 miles the RIBs alter course adopting a course parallel to the Vessel and alter speed to match the vessel. The RIBs alter course to match any course changes of the Vessel.

RIBs then make radio contact with the vessel. They confirm they are representatives of Greenpeace. They unveil a Greenpeace Banner.

INJECT 2:

There is no further response to Radio communications.

INJECT 2A: Fed to SEG Escort Commander at approx. 1040hrs

The RIBs then approach the vessel, one to port, one to stbd.

INJECT 2B: Fed to Silver Command Cell

One of the RIBS then issues a MAYDAY, their RIB has taken on water and they are in difficulty. They pull alongside.

One female crew member throws a grappling hook onto the side of the Vessel and locks herself onto the railing. The other RIB then holds off and starts to film.

INJECT 2C:

Protester is taken on board after being released from handcuffs

SCENARIO 3

INJECT 3: Fed to Sliver from Master of the Vessel at approx. 1100hrs

Vessel is underway in the Indian Ocean

Master reports a fire alarm actuating from the engine room. An investigation reveals a minor fire which is quickly extinguished, however smoke from burnt oil remains.

The vessel is able to continue on her passage

INJECT 3A

Chief Engineer undertakes a scene investigation and becomes apparent that the malicious ignition cannot be ruled out. The scene of the fire is not close to any source of ignition and a small amount of rags appear to be the material involved, cause of fire is concluded as a malicious act.

INJECT 3B:

Chief Engineer reports his findings to Master and SEG Commander

INJECT 3C:

PNTL and CNC undertake investigation, outcome reveals the suspect is John Doe

INJECT 3D:

To discuss the full implications of an insider threat and what to do with John Doe

SCENARIO 4

Vessel is mid Atlantic en route to the USA

INJECT 4A: Fed into Master from SEG at approx. 1330hrs, Message from RS to Captain, an unidentified vessel is approaching fast. The vessel is ID as a large fishing boat but not responding

INJECT 4B: Fed from Bronze to Silver

A RIB is deployed from the fishing boat carrying 4 persons

Vessel is going through avoidance action, the RIB is tracking ship movements and closing in fast from aft.

UMPIRE FEED 3

The vessel is continuing with avoidance manoeuvres and awaiting further information/intelligence from CNC

INJECT 4C: SEG Silver to PNTL Master

To carry out command discussion on the rules of force and what other deterrents can be deployed.

INJECT 4D (IF REQUIRED DEPENDING ON TIME)

Fed From CCC via Northwood

Message: "We've got a major issue down here. Fishing boat is reported missing, 2 crew taken hostage by approx. 4 unknown individuals.

4.5 SCENARIO 5

The scenario is a direct attack on board a PNTL K class vessel by four attackers.

Once at sea, they will arm themselves with G36 carbines, which they have secreted on the vessel over the previous day.

Two attackers gain access to the bridge to take control of the vessel with the intention of sailing the vessel into the main shipping lanes before scuttling it and causing major disruption to shipping.

The other two attackers will position themselves Deck 6, with the intention to stop any CNC officers responding to any alarms raised on the Bridge Deck.

The CNC SEG officers will be located as per operational Posture Charlie, with one officer located on the Bridge Wing, one officer on patrol and two officers in the Vessel Alarm Station.

The remaining CNC SEG officers (Off Watch/Stand-by Watch) will be located on the Upper Deck within the designated accommodation areas.

All CNC weapons for 'Off duty' or 'Stand-by' watches will be located within the Vessel Alarm Station, for issue as required.

The CNC SEG officers will deploy resources in line with established protocols to neutralise the threats and to contain any identified location.

Aim

The aim of the attackers is to gain access to the Bridge Deck at the start of the exercise with the help of the insider. En route they are to engage CNC officers.

Once the Bridge Deck is secured by the attackers, they will attempt to use the Upper Deck as a stronghold position to deny access by the CNC SEG officers to the decks above

The attacker's primary target is the Bridge Deck, once in control of the vessel the intention is to sail into the shipping lanes and scuttle the ship.

At this point, two attackers will engage the CNC SEG officer on Bridge Wing duties and any other CNC SEG officer in the immediate vicinity.

They are successful in securing the Bridge Deck and remain in situ to engage the CNC until neutralised.

The other two attackers remain on Deck 6 to intercept CNC.

5. GENERAL FOR ALL SCENARIOS AND INJECTS

MAPS TO BE PROVIDED BY EXERCISE STAFF

ROLE PLAY WILL BE USED TO IMPLEMENT ANY RESPONSES FROM
EXERCISE PLAYERS

Common Questions for each Scenario during the hot debrief session.

- A. Given the nature of this incident, what stakeholders are likely to be mobilised or will likely become involved in the incident response?
- B. What could each of the following have done in advance of the incident, to ensure they are prepared to adequately manage the scenario?
 - INS
 - CNC
 - PNTL
- C. How will the responders Incident Command System/NDM be utilised in this scenario? Who is the most appropriate incident commander? Is either Tactical or Strategic command appropriate for this incident?
- D. What are the primary responsibilities of the incident commander in the initial response?
- E. Is this an event that will likely involve mutual aid partners? How would exercise players improve the integration of mutual aid partners into the incident response?
- F. What information will the incident commander likely require to manage this event? How can communications be improved across all responding agencies and organisations? (Common Recognised Incident/Operating Picture) CRIP or CROP
- G. What can the incident commander do, to ensure that they have sufficient operational and tactical support.

Expected Actions

Outcomes from each scenario

1. Mobilise appropriate assets to the scene
2. Define the information needs of the scenario, and communicate accordingly.
3. Establish a commonly recognised operating picture.
4. Establish interoperable communications
5. For INS, activate silver/Gold command
6. Advise all response agencies about the dangers associated with the transport.
7. Notify local, national and international agencies
8. Are resource allocations adequate (human and equipment)
9. Order and acquire resources that cannot be obtained locally
10. Establish incident command, and mobilise command personnel
11. Use common terminology (JESIP)
12. Identify and validate response requirements
13. Establish incident response objectives
14. Perform incident action planning

6. Assessment methodology

The measures will be Subjective (knowledge/experience/background of exercise staff) and Qualitative. The specific measurements of competency will be based on the scoring matrix in the INS document (F/551/28, attached as separate document for ref purposes) and using the above to determine and underpin learning.