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**Methodology to Detect Illicit Trafficking  
of Nuclear and other Radioactive Material across Borders**

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**ABSTRACT**

Technological measures to detect and respond to the illicit trafficking of nuclear and other radioactive materials are being developed. However, some concern has arisen regarding the need to have guidance on detecting the movement of illicit material that may be concealed in otherwise legal shipments. Effective identification of quantities and qualities of nuclear and other radioactive material crossing borders would contribute to both domestic and international control over such materials.

Experience in different countries has shown that authorized shipments have contained quantities, isotopes and forms of radioactive material that differed from those claimed on related authorizing documentation. The risk of illicit trafficking disguised as a legal shipment requires a technological and procedural response that needs to be addressed in the Nuclear Security Series.

The objective of this guidance document, as a future Nuclear Security Series publication, is to close a potential gap in nuclear security and to provide national authorities, particularly Customs officials, with a risk-informed methodology to detect, across borders, illicit trafficking of nuclear and other radioactive material within shipments, whether declared or not declared as radioactive material shipments.

The document defines the methodology to detect illicit trafficking of nuclear and other radioactive material across borders and includes the following components:

- A description of illicit trafficking of nuclear and other radioactive material;
- The international and national legal framework for detection of nuclear and other radioactive material by Customs officials and other key stakeholders, e.g. industry and regulatory bodies;
- The risk-informed approach comprises:
  - the selection process for threat and risk assessments;
  - the screening and targeting processes for a graded approach to detecting illicit trafficking; and
  - the control process. This may include document examination, visual and physical assessments, and other types of confirmation techniques, on suspicion of illicit trafficking of nuclear and other radioactive material as part of a shipment.
- As appendices, additional information on performing radiation measurements and confirmation techniques.

## **BACKGROUND**

Shipment of radioactive material for peaceful purposes such as applications in medicine, industry, research and power production is on the increase. The national and international legal instruments have established procedures for assuring safety and security of radioactive material shipments. These legal instruments and procedures limit the potential for tampering with the nuclear and other radioactive material. The term tampering refers to actions including (a) the introduction of nuclear and other radioactive material into a shipment *not declared* as such and (b) the removal and/or the substitution of nuclear and other radioactive material from or into a shipment that is *declared* as such.

Illicit trafficking of nuclear and other radioactive material during shipment of such material is an area that needs to be addressed. The International Atomic Energy Agency (IAEA) devotes considerable attention to assist States in combating illicit trafficking of nuclear and other radioactive material and has been promoting the development of technological means, and the establishment of guidelines<sup>1</sup>, for implementation at border crossings. The Agency has brought out several publications addressing various aspects of nuclear security<sup>2 3 4 5 6 7 8 9 10 11 12 13 14 15 16</sup>.

## **CHECKING AT BORDER CROSSINGS**

Illicit trafficking of this type of material represents a threat to international peace and security in view of the possible consequences of a successful attempt to use nuclear and other radioactive material for criminal or other deliberate unauthorized acts.

Customs administration plays a significant role in curbing illicit trafficking of nuclear and other radioactive material. The World Customs Organization (WCO) has defined a Framework of Standards<sup>17</sup> that serves as the basic guidelines in the arrangement of State's activities by its Customs officials. Customs officials check qualitative and quantitative aspects of goods being transferred across the border for consistency with information on declared shipments. Thus a synergy exists in the Agency's efforts to mitigate illicit trafficking and the Customs' role. The Agency appreciates that guidance needs to be provided to the Customs officials that would help in the detection of such illicit trafficking.

## **TECHNICAL GUIDANCE**

From the experience reported by some Member States, it is recognized that, although the movement of nuclear and other radioactive material is highly regulated and well-controlled, there is potential for trafficking of this material even within a legal shipment. For example, the shielding in radioactive material packages and / or the presence of nuclear and other radioactive material provides scope for concealing a radioactive material in the shipment (in the package or within the conveyance) and evading detection. Authorized shipments can be used for transporting radioactive and other nuclear material that differs, in form, isotopic composition and quantity, from that declared in the documentation. Falsification of documentation may also disguise illicit trafficking as a legal shipment.

Technological measures to detect and respond to the illicit trafficking of nuclear and other radioactive material have been developed and are being constantly updated. Verification of quantities and qualities of nuclear and other radioactive material crossing borders can contribute to both domestic and international control over such material. Member States need technological and procedural guidance on detecting the movement of illicit material that may be concealed in otherwise legal shipments.

Recognizing that there exists a need to close a potential gap in nuclear security and to provide national authorities, particularly Customs officials, with a risk-informed methodology to detect, across borders, illicit trafficking of nuclear and other radioactive material within all shipments, whether or not declared as radioactive material shipments the Agency has prepared a Technical Guidance document entitled, "Methodology to Detect Illicit Trafficking of Nuclear and Other Radioactive Material across Borders". The term 'illicit trafficking' as used in this publication covers all instances of nuclear and other radioactive material that is not declared in a shipment, whether or not declared as a radioactive material shipment. This methodology is part of a larger process to identify any high risk shipment through the Customs transaction process.

## **CONTENTS OF THE TECHNICAL GUIDANCE**

### **Structure of the Technical Guidance**

This Technical Guidance focuses, in particular, on illicit trafficking during the phase of transport at border crossings where the Customs administration is empowered by national laws to control the movement of goods. The Technical Guidance has six sections outlining regulatory framework, scenarios of illicit trafficking and a risk-informed graded approach to

be adopted by the Customs in this connection. The two annexes elaborate some technical details in simple language.

### **The role of the Customs administration**

Customs administration is the primary authority charged with the responsibility of verifying that all import, export, trans-shipment and shipments are required to be made in accordance with applicable national laws and regulations. As specified under the national legislation, Customs officials *are responsible for checking compliance with Customs and other regulatory requirements*. They have the authority to request documentation or information relating to goods/packages that cross the border.

Each State creates its own Customs laws and requirements based on its own needs and increasingly base these laws on the World Customs Organization's Framework of Standards<sup>17</sup>. States are encouraged to become parties to the legally binding international instruments and to indicate their commitment to non-binding international instruments to address illicit trafficking of nuclear and other radioactive material. To harmonize laws, regulatory frameworks and practices, States are encouraged to implement the obligations and political commitments arising under these instruments. This set of conventions and instruments is complemented by the non-binding IAEA Code of Conduct on the Safety and Security of Radioactive Sources (2004)<sup>8</sup> and the companion publication on Guidance on the Import and Export of Radioactive Sources (2012)<sup>9</sup>.

### **Some scenarios of illicit trafficking**

The Technical Guidance briefly describes different scenarios of illicit trafficking which include the following:

- a) Within a shipment *not declared* as a radioactive material shipment:
  - Addition or substitution of radioactive material content(s)/package(s);  
Illicit trafficking may be conducted without the awareness of the shipper (equivalent to 'consignor' as defined in Ref. <sup>16</sup>) who would suffer the consequences for the illicit activities (e.g. damaged reputation, economic and financial penalties). The shipper may not be aware that the material is a radioactive material or a nuclear material (e.g. stolen cargo). In some cases, the transport may be operated directly by a trafficker.
- b) Within a shipment *declared* as a radioactive material shipment
  - Within the package:
    - Substitution, addition and/or removal of declared nuclear and other radioactive material;
  - Within the conveyance/container:
    - The addition or the removal of package(s) containing nuclear and other radioactive material;
    - The substitution of package(s) containing nuclear and other radioactive material:
      - Replacement with empty radioactive material package(s), e.g. scams;
      - Replacement with other radioactive material package(s) having different radioactive content(s) (within the same external packaging);

All these illicit trafficking activities may be carried out by the trafficker or at the expense of the shipper.

- c) Intentional falsification of documents leading to erroneous declaration (potentially allowing substitution, addition and/or removal of declared nuclear and other radioactive material / package(s) containing nuclear and other radioactive material).

Erroneous declarations addressed in this Technical Guidance essentially relate to the radioactive content (e.g. radionuclides; activity; enrichment for uranium) and not to non-compliance with safety requirements such as labelling and placarding requirements.

Some common examples of unintentional erroneous declarations are:

- Radioactive source or contaminated object among bulk material (e.g. the presence of radioactive material incorporated into scrap metal and semi-finished products of the metal recycling industries);
- Underestimated specific activity of naturally occurring radioactive material (NORM) (e.g. the specific activity in excess of the exemption values specified in the Transport Regulations<sup>18</sup>);
- Minor discrepancies in paper work and declared activities.

Some incidents involving false representation of nuclear material or radioactive material may be assessed with the same rigor as episodes involving the actual diversion of nuclear and other radioactive material. Many such cases consist of hoaxes or ‘scams’ (as in Customs’ parlance) that either falsely claim the presence of radionuclides that do not exist or misrepresent the nature or quantity of trafficked material. When reported, these cases require careful investigation to determine their authenticity, which may divert resources away from actual case investigations. Examples are given in the literature<sup>15</sup>. Unlawful scams or hoaxes with nuclear security implications are considered criminal offences (para. 3.6 of Ref. <sup>10</sup>).

### **Combating illicit trafficking**

Several international organizations have developed a response to combat all kinds of illicit trafficking, including nuclear and other radioactive material<sup>15</sup>. A graded approach (The term ‘graded approach’ is comparable with the term ‘layered approach’ as defined in WCO standards).allows all States to implement this response mechanism judiciously depending on the resources available. States seeking to combat illicit trafficking of nuclear and other radioactive material can benefit by establishing a comprehensive nuclear detection architecture that integrates many elements into a national strategy. This strategy involves both technical and non-technical detection methods. The Customs guidance provided in this document, contributes to a larger, national framework, aimed at detecting the illicit trafficking of nuclear and other radioactive material and mitigating the related risk<sup>16</sup>.

The approach suggested in the Technical Guidance enables Customs officials to prioritize and focus on those shipments that have the potential for containing illicitly trafficked nuclear and other radioactive material while facilitating legitimate shipments. This approach needs to take into consideration the mitigation effects of robust regulatory regimes and other security requirements (e.g. security trade programmes). Implementation of this Technical Guidance would also be a deterrent to illicit trafficking of nuclear and other radioactive material within a shipment whether or not it is declared as a radioactive material shipment.

A security trade programme is a programme developed to address all security issues in supply chain. These programmes are complementary to Customs systems. The partners to these

programmes volunteer to be committed to compliance with the requirements of these programmes and are audited by the relevant authorities in charge of the development of these programmes. Examples of security trade programmes: United States Customs–Trade Partnership against Terrorism (C-TPAT); Known Shipper; Authorized Economic Operators (AEOs); Partners in Protection (PIP).

### **Risk-informed approach**

Risk management is “the systematic application of management procedures and practices which provide the Customs administration with the necessary information to address movements or consignments which present a risk”<sup>17</sup>. The Customs administration uses this approach and these tools to allocate resources to focus its effort on the higher end of the risk continuum.

The on-going increases in cross-border flows and limitations in human and technical resources have led the Customs administration to increasingly implement risk-informed approaches in their operations.

### **Screening and targeting based on threat assessment and risk assessment**

Threat assessment<sup>11</sup> provides inputs to the selection process. Threat assessments may:

- be government wide exercises;
- target a certain sector of the government (e.g. border sector);
- be agency specific; or
- involve some form of assessment at all these levels in a cascading manner. For example, if the possibility of a malicious act using nuclear material or radioactive material is identified as a threat at the governmental level, then cross-border illicit trafficking of nuclear and other radioactive material would be a risk that would need to be managed by Customs administration and regulatory bodies.

The threat assessments may also take into account an activity necessitating heightened awareness and the related social disruption factor.

### **Risk assessment**

Through the risk assessment process, the Customs administrations make targeted decisions about the allocation of control resources at the operational level. The process includes identification, analysis, and evaluation of risks and forms the basis for risk treatment.

Participation in well-defined and well-established Customs Trade Partnership programmes often indicates a reduced risk as members of these programmes have made significant investments in securing the integrity of their supply chains. In addition to different Customs Trade partnership schemes, there are also other indicators that can guide Customs officials in deciding that a consignment or transaction poses a lesser risk. These can include, but are not limited to, factors such as:

- Regular business from known shippers to known recipients (The ‘recipient’ is equivalent to the consignee as defined in Ref. <sup>10</sup>);
- High quality supply chain partners;

- Reliability regarding import and/or export permits; and
- Reputable producers.

Following the risk identification phase, risk analysis systematically uses available information to determine how often defined risks may occur and the magnitude of their likely consequences. After analysing and evaluating the information, priorities can be defined and profiles developed to guide operational decision-making in relation to individual shipments.

Risk indicators and search parameters are developed following the completion of the risk assessment process. Risk indicators flag potential problems with a particular shipment and can be used individually or be built into profiles that are used when selecting individual transactions for Customs scrutiny. The WCO Customs Risk Management Compendium<sup>19</sup> elaborates more on risk indicators and profiling practices and provides a substantive reference material for these topics.

### **Graded approach**

The graded approach described in the Technical Guidance consists of a sequence of actions on the part of the Customs administration, viz.:

- inspection of document;
- visual and physical assessments;
- radiation measurements; and
- confirmation techniques.

The Technical Guidance suggests a methodology for shipments which are not declared as radioactive material shipments since the possibilities are that the shipment contains:

- No “radioactive material” as defined by WCO or in IAEA Transport Regulations<sup>18</sup>;
- NORM;
- Radioactive material, as defined by WCO or in IAEA Transport Regulations<sup>18</sup>.

All these possibilities should be investigated adopting the graded approach. The Technical Guidance cites the responsibilities of the industry and the national regulatory body and identifies the scope for interfacing and cooperation among the regulatory bodies and the Customs administration.

### **A simple algorithm for making decisions to suspend or release a shipment**

The Technical Guidance suggests a simple algorithm (See Figure 1) for the Customs officials as outlined below:

- Document examination  
(It provides a preliminary opportunity to identify any scope for illicit trafficking);
- Visual examination of the shipment and physical assessments  
(Radiation measurements and checking the seal taken together with the results of document examination would provide more information about the shipment);
- Confirmation techniques, if required  
(They include weighing the package, an X-Ray examination, neutron measurements and gamma spectrometry).

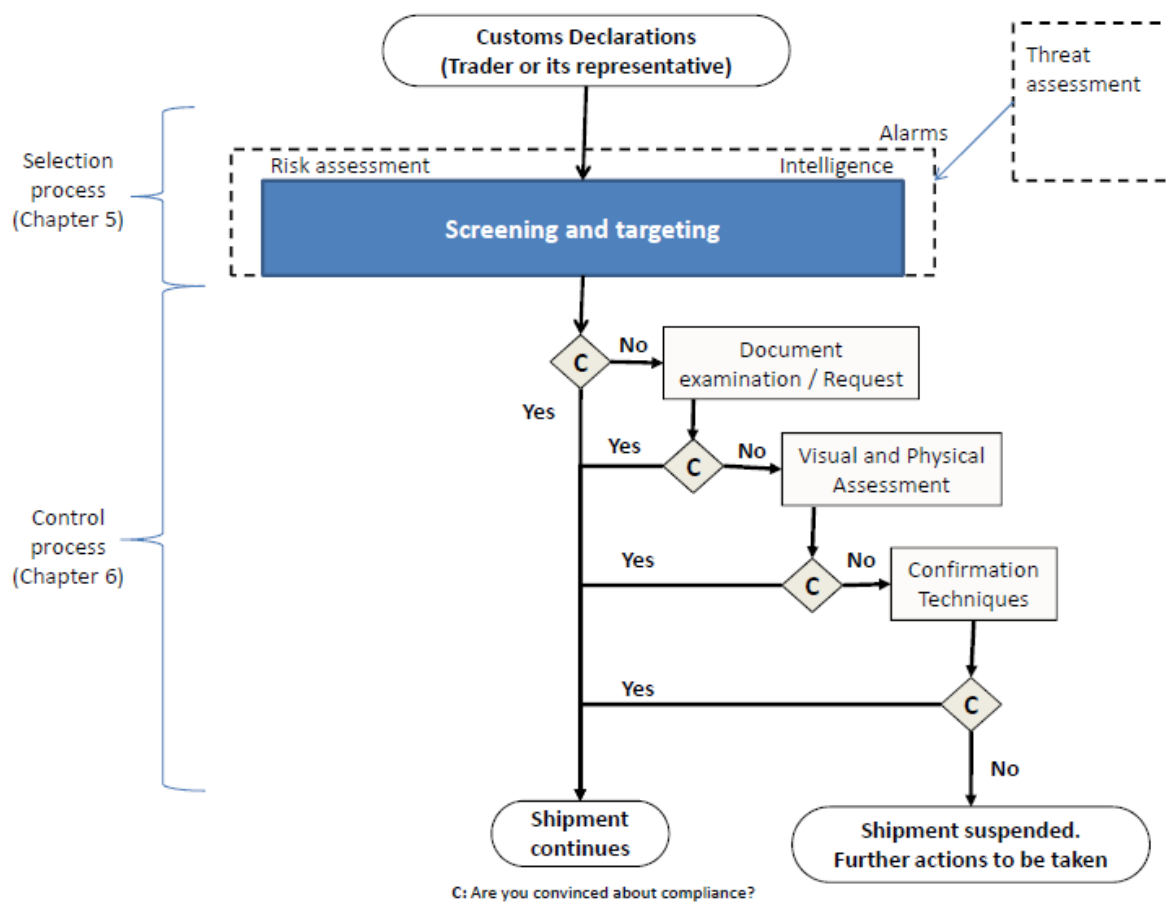


Figure 1: simple algorithm for making decisions to suspend or release a shipment

The Technical Guidance cautions the user as to the possible limitations in the measurement techniques.

## Preparation of the Technical Guidance

The preparation of this publication benefitted from the methodology developed by the Russian Federation and from the Customs transaction process developed by the World Customs Organization. This publication is intended to be cosponsored by the WCO. Therefore the language used in this publication is largely consistent with WCO terminology. The preparation of this publication in the IAEA Nuclear Security Series has been made possible by the contribution of a large number of experts from IAEA Member States.

During the development of the Technical Guidance, industry expressed concerns about the transport sustainability and the possibility of delay and denial of shipments occurring due to the implementation of this methodology. Thanks to the active participation of industry and representatives of Customs administrations in the Agency's effort to develop the document, all concerns were addressed.

The Agency strove to develop a consensus among regulatory bodies, Customs and industry without compromising the efficacy of detection of illicit trafficking. For this purpose an extensive consultation process was set in motion. A technical meeting with a large



representation of Member States was convened. The draft Technical Guidance document was then circulated to all Member States for 120 days to solicit further comments and suggestions. The comments received from the Member States and the comments that arose from a detailed review of the draft document by experts within the Agency were examined and resolved by consultants.

## **FOLLOW UP**

It is recognized that while it was necessary to develop Technical Guidance document for Customs administration and officials it would not be sufficient unless Customs officials were given training in implementing the Technical Guidance. Accordingly the Agency is planning to develop a suitable training material for regulatory bodies and Customs officials. Measures for the preparation of training material are underway.

## **CONCLUSION**

The Technical Guidance provides information to Customs about a suitable methodology to detect illicit trafficking based on their risk-informed approach and aims at promoting co-operation among concerned regulatory bodies. The proposed training programme for the Customs officials to explain the finer practical aspects of the methodology would make it easier for the trained officials to implement the methodology effectively. The methodology using modern technology developed by the Agency in tandem with the World Customs Organization would improve detection of illicit trafficking and serve to curb such trafficking.

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