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Material Out of Regulatory Control: Facilitating Trade While Preventing Nuclear Smuggling

On 13 November 2019, the VCDNP organised a panel discussion on "Material out of Regulatory Control: Facilitating Trade While Preventing Nuclear Smuggling". Twenty-eight diplomats and technical experts from nine International Atomic Energy Agency (IAEA) Member States and four UN agencies attended the event. The panel comprised experts from Nigeria, Sri Lanka, Thailand and the IAEA.

The experts shared their experiences in the development of effective and efficient border control strategies, as well as in the strengths and weaknesses in their national capacities to prevent material out of regulatory control (MORC) from being smuggled across land and sea borders. They shared success stories and highlighted the support provided by the IAEA and other international partners. Mr. Charles Massey, IAEA Nuclear Security Officer, provided an overview of the range of services the Agency provides, including coordinated research activities and the publication of guidance documents.

The discussions framed MORC as an issue of global concern and demonstrated the delicate balance between preventing illicit trafficking of nuclear materials and facilitating expeditious trade activities. The discussions highlighted the challenges to effective border control as they relate to MORC, which include developing detection equipment that responds to the end user's needs, sustained capacity building and national coordination. The panel also demonstrated that the IAEA's Coordinated Research Projects (CRPs), where States work on issues and develop solutions and tools, build capacity and networks that improve nuclear security, as well as facilitate trade. The panel concluded that international cooperation and the use of science and technology are essential to keep up with evolving threats and challenges.

The panel discussion was organised with the generous support from the International Science and Technology Center (ISTC) in Kazakhstan.

Discussion

The Role of the IAEA

Mr. Charles Massey, a Nuclear Security Officer at the IAEA division for Nuclear Security, gave **an overview** of the risks related to MORC. He also provided information about the Agency's activities in support of nuclear security measures taken by States at their land and sea borders to prevent illicit trafficking without encumbering trade.

The risks associated with MORC are related to the malicious use of the material in a radiological dispersal device (RDD) or so-called dirty bomb that can result in loss of life or injury to health, economic loss (clean-up, loss of use of area) psychological impact and increased security costs. Radioactive material can also be out of regulatory control due to improper disposal, ending up in, for example, scrap yards, where it is processed with other trash.

Preventing the illicit trafficking of MORC is a key responsibility of a State and Mr. Massey emphasised the importance of striking a balance between the desire for shipments to reach their destinations in a timely fashion and the implementation of proper border monitoring practices. The measures used to prevent the smuggling of radioactive material can slow down trade. The IAEA provides its Member States with equipment to detect radioactive material and is working closely with States to find ways in which these tools can be used most effectively.

The IAEA's activities supporting nuclear security measures at borders to prevent illicit trafficking include: the facilitation of research on issues central to Member State needs; the development of capacity and tools; and the publication of guidance documents.

The science and technology projects to provide tools and capacity building are called **Coordinated Research Projects** (CRPs). CRPs bring together researchers from Member States that share a common interest in a specific area of the IAEA's work and are awarded to a network of 10 to 15 research institutions that work collaboratively for three to five years on a given issue. The IAEA takes ideas for CRPs from technical meetings, feedback from Member States, specific CRP proposals and research coordination meetings. The ideas are then checked against

the IAEA's mandate, the available resources and those that would be required for the IAEA to facilitate the project's implementation.

Examples of CRPs related to detecting and preventing the unauthorised transport of MORC include:

- "**Improved Assessment of Initial Alarms from Radiation Detection Instruments**," the objective of which is to enhance Member States' ability to make high confidence assessments on whether or not MORC is, indeed, present when an alarm is triggered. The alarms in monitoring equipment are extremely sensitive. Many different materials that have low levels of radioactivity are not nuclear materials. As a result the alarms are often triggered by material that is not hazardous. Reducing the time for alarm resolution is a major challenge at ports and other borders.
- "**Advancing Radiation Detection Equipment for Detecting Nuclear and Other Radioactive Material out of Regulatory Control**," which should result in improvements in equipment that contribute to Member States' effectiveness in nuclear security detection.
- A CRP is being developed on "Facilitation of Safe and Secure Trade Using Nuclear Security Detection Technologies," through which researchers will glean more information on how the detectors currently calibrated for nuclear material can provide insights into other material passing through borders.

The IAEA also publishes technical guidance documents to assist Member States in **radiation detection equipment and techniques**, as well as best practices in **radiation detection at borders**. There is currently a guidance document under development for release in 2020: "**Guidance and training on implementation of effective and efficient border controls**" (NST 016 – 2020 release).

Concluding his presentation, Mr. Massey noted that the IAEA spends considerable effort in optimising the way in which it offers assistance to Member States, always endeavouring to match resources with needs in the face of evolving threats and evolving technology.

Material Out of Regulatory Control in Thailand

Ms. Yanapan Hao, chief of X-Ray Sub Division II at the Laem Chabang Port Customs Office in Thailand, brought **her perspective** on some of the challenges that Thailand faces in radiation detection its ports. She observed that the balance between customs control and facilitating trade is delicate and that a well-developed risk management policy is critical.

A key detection tool being used at ports are radiation portal monitors (RPM), provided through the United States (US) Megaport Initiative. These monitors are very sensitive and do not discriminate between nuclear material and material that has a low level of radioactivity. Ms. Hao named four categories of material that might set off an alarm: (1) those that contain radionuclides of natural origin; (2) those which require regulation; (3) those that have been contaminated by another source, but are not themselves radioactive; and (4) those that are dangerously radioactive. The customs official must decide when an alarm goes off whether the cargo is harmful, requiring a secondary inspection, or harmless and can be allowed to proceed.

The Laem Chabang port is the busiest in Thailand which has an estimated cargo handling capacity of 8 million TEU (twenty-foot equivalent unit – an inexact unit of measure used to describe the capacity of container ships and container terminals) and customs officials deal with approximately 500 alarms per day. Ms. Yanapan noted that each alarm that sounds can require a secondary inspection of the cargo. When cargo is checked, it is often done with hand-held equipment, which provides low confidence. Customs officers have limited knowledge of radioactive material so they need technology that will assist them in making the decision to inspect or to release the cargo. Ms. Hao explained that there have been cases, especially with naturally occurring radioactive material, where cargo triggering an alarm was unnecessarily delayed for up to five days, due to examination requirements on the part of the regulatory body.

The IAEA has supported Thailand to improve this situation through capacity building, training and sharing of best practices, including through a **cross-border exercise** conducted between Thailand, Malaysia and the IAEA in November 2016. During the exercise, approximately 100 customs officials, police officers and radiation detection experts from the two countries came together to test the

effectiveness of their nuclear security systems and discern where there were weaknesses.

Thai customs participated in the development of IAEA smart phone application, **Tool for Radiation Alarm and Commodity Evaluation** (TRACE) through a Coordinated Research Project (CRP) J02005 "**Improved Assessment of Initial Alarms from Radiation Detection Instruments**". Launched in 2017, TRACE helps customs officials determine whether alarms sparked at borders are due to naturally occurring radioactive materials, such as fertilizer, or whether the alarm could indicate hazardous material.

Material Out of Regulatory Control in Sri Lanka

Mr. Indunil Liyanage, assistant superintendent of customs in Sri Lanka, helped to **further characterise** the challenges that customs officials face in maintaining the balance between preventing unauthorised transport of materials and facilitating trade. For most customs officers, radiation detection is a small part of a much larger job. In addition, Sri Lanka is one of the largest transit hubs in the world. The Port of Colombo, the largest and busiest port in Sri Lanka, has an estimated cargo handling capacity of 7 million TEU.

Against that backdrop, customs officers must decide quickly when an alarm is triggered whether to allow the cargo to continue or to stop it for a secondary inspection. Sri Lanka has been working with RPMs for 13 years. There are 2000 alarms on average per month. In some cases wooden cupboards and tyres have set off the alarms. To increase their efficiency with the processing of cargo whilst maintaining the highest security standards, Sri Lanka requested the IAEA's support with capacity development and with technology development.

To improve alarm assessments, Sri Lanka joined IAEA CRP J02005 and assisted in developing TRACE. Objectives achieved through the CRP included the identification of bottlenecks at the ports and development of a decision support network as a quick reference for the officers when making the decision to release the container without further examination or not. Training was also given to system users in order to increase their efficiency in container release processes and to increase their awareness on importance of control in MORC.

A time study was conducted as part of the CRP to determine effectiveness of improved assessment processes. The average time taken to release an alarmed cargo container in 2019 was recorded as 38 minutes. This is reduction of 20 minutes in alarm processing efficiency. Over the course of a year, this translates into a savings of over 6,000 man-hours (or 3 man-years) of efforts that can be used for other customs and trade duties. This is a clear example of improved trade facilitation with effective nuclear security.

As there is a six-month rotation of customs officers, Sri Lanka has introduced train-the-trainer programmes and is now conducting its own training programmes. The IAEA and Sri Lanka will soon open a Nuclear Security Support Centre (NSSC) to strengthen the sustainability of nuclear security in the country.

Material Out of Regulatory Control in Nigeria

Ms. Ethel Ofoegbu, deputy manager at the Nigerian Nuclear Regulatory Authority, **explained** that terrorism is a recognised threat in Nigeria. Understanding that a nuclear incident would have devastating consequences not only in Nigeria but also globally, the Nigerian government is committed to improving border control practices and preventing the misuse of nuclear and other radioactive material.

Nigeria lost radioactive sources in the early 2000s, partially as a result of incorrect declarations. The IAEA conducted a nuclear security upgrade mission in 2005, which concluded that RPMs were required. When one RPM was finally installed at the Murtala Mohammed International Airport Export Terminal in 2009, Nigerian authorities could not use it due to problems with inconsistent power supply, disagreements about which government body had jurisdiction over it and high turnover of frontline officers (FLOs).

Following the discovery of radioactive sources in shipments of scrap metal in 2018 and 2019, Nigeria requested assistance from the IAEA. A mission was conducted in June 2019, providing advice on strategies to prevent further occurrences of

such events. The team was composed of experts from the IAEA, the Netherlands, Germany and the United Kingdom

Ms. Ofoegbu characterised Nigeria's challenges as relating to a lack of capacity, a lack of a national detection strategy, high turnover in FLOs and a large border that authorities have difficulty controlling.

The IAEA and the US Department of Energy cooperate actively with the Nigerian government to improve this situation. With the support of the US, Nigeria is conducting a threat and risk assessment for nuclear and other radioactive material out of regulatory control. The expected outcome is the development of a national-level nuclear security detection strategy.

The IAEA is also engaged in capacity building activities in Nigeria, including relevant training and workshops to enhance the country's nuclear security architecture. The IAEA cooperates with Nigeria in the development and implementation of an Integrated Nuclear Security Support Plan (INSSP), which provides Nigeria with a systematic framework for reviewing nuclear security arrangements and identifies area for improvement. The last INSSP review mission took place in 2019. On the sidelines of that mission, the IAEA held an Awareness Raising Workshop on nuclear security for relevant officials.

A future CRP will also provide Nigeria with a systematic approach to training FLOs on radiation detection equipment. While work in Nigeria is ongoing, the Nigerian government has prioritised radiation security.

Discussion

The discussions focused on the importance of a national detection strategy and networking. Nigeria, Sri Lanka and Thailand are all working on developing a national detection strategy. The participants shared their challenges in this regard. Sri Lanka noted that different agencies have different interests and it is very difficult to get them onto one common platform. In Thailand the agencies are working together to develop a national strategy and to improve regulations. Regarding a question of who typically has ownership of such a strategy, Mr. Massey noted that it depends on the national security structure of a given country. In Nigeria the national security advisor owns the strategy.

Thailand also emphasised the importance of international cooperation on the identification of potential illicit shipments entering the territories of another countries. The sharing of intelligence between countries facilitates a rapid response by countries with large ports such as Thailand. The panellists agreed that the networks they have developed, especially through the CRPs, support their detection and prevention efforts.

Conclusion

The panel concluded that, whilst there are many challenges related to the detection and prevention of illicit trafficking of nuclear material, international cooperation, national coordination and the use of science and technology are essential to keeping up with evolving threats and challenges.

As demonstrated by the panellists, the IAEA's CRPs provide vital support to States. Through these projects States are finding their own solutions, developing capacity, networks and user-friendly tools that are not only improving nuclear security, but also facilitating trade.

In addition to having a detection strategy in place that coordinates the activities of all relevant national stakeholders, it was agreed that detection and prevention of nuclear trafficking requires a collective effort. Through sharing intelligence, experiences and the development of regional and international networks, States can find collective solutions and respond better to threats that have a global impact.