Nuclear Security Summit Enhancing the Security of the Maritime Supply Chain Gift Basket: Best Practice Guide for Removing Nuclear and Radiological Materials that are Out of Regulatory Control from the Global Maritime Supply Chain

March 2016

Practical guide to address MORC removal from the maritime supply chain, based on key best practices identified at the Maritime Supply Chain Security Workshop at the Wilton Park Conference Centre in the United Kingdom in November 2015

Table of Contents

Glossary

BMWG	Border Monitoring Working Group
CINS	Cargo Incident Notification System
EC	European Commission
EU	European Union
GICNT	Global Initiative to Combat Nuclear Terrorism
IAEA	International Atomic Energy Agency
INSEN	International Nuclear Security Education Network
ITDB	Incident Trafficking Database
ITRAP+10	Illicit Trafficking Radiation Detection Assessment Program
ISPS	International Ship and Port Facility Security
JRC	Joint Research Centre
MOU	Memorandum of Understanding
MORC	Material Out of Regulatory Control
NORM	Naturally Occurring Radioactive Material
NSDD	Nuclear Smuggling Detection and Deterrence
NSS	Nuclear Security Summit
SOP	Standard Operating Procedures
WCO	World Customs Organization

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1. Introduction

The 2014 Nuclear Security Summit (NSS) Gift Basket on Enhancing the Security of the Maritime Supply Chain Gift recorded the intent of Australia, Belgium, Canada, Georgia, Germany, Israel, Lithuania, Kazakhstan, Netherlands, Spain, United Arab Emirates, United Kingdom, and the United States to seek enhanced measures to permanently remove nuclear and radiological materials out of regulatory control (MORC) from the global supply chain, while effectively deterring, detecting, and responding to trafficking of nuclear and other radioactive material and weapons through the maritime shipping network.[1] To fulfill this commitment, the United Kingdom and the United States co-sponsored a 16-18 November 2015 workshop focused on promoting radiation detection in the maritime supply chain and developing enhanced measures to permanently remove MORC. Attendees were drawn from 15 countries, nine international organizations, three terminal operators, and academia.

Participant presentations, panel discussions, group exercises, question and answer sessions, and a plenary review of workshop findings were used to synthesize a joint statement containing key best practices and recommendations to share with the larger NSS community (Appendix A). This Best

[1] https://www.whitehouse.gov/the-press-office/2014/03/25/enhancing-security-maritime-supply-chain-gift-basket.

Practice Guide expands on the findings from the workshop and offers detailed methodologies, procedures, and techniques, that can be used as countries deploy and sustain radiation detection systems and work to remove MORC from the maritime supply chain. Drawing on the practical experiences of the workshop participants, it explores the following main themes:

Developing and Sustaining Radiation Detection Systems

Legal Frameworks

Establish a comprehensive "end-to-end" regulatory framework that provides the necessary framework and authorities to all stakeholders involved in the detection, notification, and response to materials found out of regulatory control

Sustainability Planning

Plan for long-term sustainability of systems early in the process of developing and deploying radiation detection programs

Training and Exercises

Implement and institutionalize regular training and adaptive exercises that address evolving threats, operational challenges and security strategies of detection systems to verify that roles and responsibilities are clearly understood and that all relevant stakeholders maintain a state of readiness

Stewardship Responsibilities for MORC

Control at Point of Origin

Take appropriate national-level measures at the material's origin, in accordance with the International Atomic Energy Agency (IAEA) Code of Conduct on Radioactive Sources, to ensure that radiological materials are controlled at the point of origin and are prevented from entering the maritime supply chain

Detection Stewardship

Take appropriate measures to ensure that detected nuclear and other radioactive materials are placed back under control in either the country responsible for the detection event or the country of material origin, as appropriate

Incident Reporting

Report incidents involving MORC to the IAEA Incident and Trafficking Database (ITDB) in a timely manner and seek other formal and informal mechanisms to share information on detections, trends, and challenges in addressing MORC with regional and international partners

2. Best Practices

Best practices share knowledge and experience regarding what has worked well in specific situations and what can be adapted to develop and implement solutions in other contexts. The term "best practices" does not necessarily denote "gold standards," but are examples of practical solutions and lessons learned that have assisted nations in deploying and sustaining radiation detection systems and in removing nuclear and other radioactive MORC from the maritime supply chain. Each of the six best practices identified in the Gift Basket joint statement includes a definition of the issue that is being addressed before outlining recommended steps, identifying key stakeholders and resource implications, as applicable.

2.1 Developing and Sustaining Radiation Detection Systems

States deciding to deploy radiation detection systems must consider many factors necessary for long-term success and sustainability including: developing the required legal framework that outlines roles, responsibilities, and authorities; selecting appropriate equipment; ensuring adequate staff to operate the system and respond to alarms; institutionalizing both training and maintenance programs; and planning for changes to installation configuration and equipment lifecycle. These topics can be organized into three overarching themes:

1. Legal frameworks
2. Sustainability planning
3. Training and exercises

2.1.1 Establish a comprehensive "end-to-end" regulatory framework that provides the necessary framework and authorities to all stakeholders involved in the detection and response to materials found out of regulatory control

Many stakeholders, including customs officers, port authorities, terminal operators, regulators, and response agencies are typically involved in the operation of detection systems and in the response to radiation alarms. Due to the number of stakeholders, it is important to ensure that roles, responsibilities, and authorities are documented and well understood. For these reasons, establishing a comprehensive framework that considers international, national, and local requirements is crucial to the success of a radiation detection program. It is recommended that states developing or revising their legal frameworks consult regional and international counterparts who have developed such frameworks to exchange ideas and lessons learned.

The implementation of an effective regulatory framework should directly address the following key issues:

1. Jurisdiction and legal authority in terms of both safety and security to enable MORC stewardship
2. Clear framework at the national, regional, and port level
3. Technical standards for detection
4. Complexities associated with implementing a detection program across a wide range of public and private stakeholders
5. Program staffing and funding

A comprehensive framework should consider the following topics and best practices:

1. Determine the scope of the detection program. It is recommended that all nuclear and other radioactive MORC that is detected in the maritime environment be addressed regardless of whether it has a safety or security nexus. This recommendation stems from both the technical capability of detection equipment and the definition of MORC stewardship and associated responsibilities given in the International Atomic Energy Agency's Nuclear Security Series15 and 21.[2] The guidance documents[3] used by the United States Department of Homeland Security's Customs and Border Protection (CBP) domestic radiation detection program serve as an example for creating a uniform implementation approach.

2. National legislation should bestow authority and responsibility for detection and response activities to the appropriate agencies and provide details of how the MORC response teams are authorized to handle removal and disposal. This is important so that roles and responsibilities are clear and that responsible agencies have a legal basis to perform their work and request continued funding for detection programs.

3. The jurisdiction, roles and responsibilities of key stakeholders at the national, regional, and local level should be clearly defined. One method that has been successful in defining roles and responsibilities at the national level is the development of a Memorandum of Understanding (MOU), or similar agreement, among all coordinating agencies. Spain has shared a template of their internal protocol with other European Union (EU) member states. It is also recommended that periodic coordination meetings be held to verify that roles and responsibilities are understood and that all agencies are maintaining a level of readiness. At the port level, it is recommended that standard operating procedures (SOPs) be drafted and regularly updated to reflect the day-to-day operations of the detection system and the roles of the local stakeholders. Port authorities and terminal operators should be included throughout the design process to limit the impact of radiation detection on commercial operations while leveraging local experience and knowledge (e.g., identifying chokepoints to reduce the quantity of equipment).

4. States procuring detection systems should define clear equipment specifications, enabling them to understand the technical detection limits of the system and to have a basis for testing and confirming system performance. Regional, national, and local threat assessment and detection strategies may inform this decision, alongside making a determination of what volumes and types (import, export, and/or transshipment) of traffic to scan. Early specification of technical requirements supports consistency of equipment detection capabilities across all sites. This is important if multiple vendors are used.

[2] "Nuclear Security Recommendations on Nuclear and Other Radioactive Material out of Regulatory Control" (2011) (NSS-15) and the related implementing guide "Nuclear Security Systems and Measures for the Detection of Nuclear and Other Radioactive Material out of Regulatory Control" (2013) (NSS-21) http://www-ns.iaea.org/security/nss-publications.asp.

[3] Homeland Security Act of 2002 http://www.dhs.gov/homeland-security-act-2002, National Security Presidential Directive/Homeland Security Presidential Directive 7 of 2003 http://www.dhs.gov/homeland-security-presidential-directive-7 and Security and Accountability for Every (SAFE) Port Act 2006 https://www.congress.gov/bill/109th-congress/house-bill/4954.

2.1.2 Plan for long-term sustainability of systems early in the process of developing and deploying radiation detection programs

The threat of nuclear and other radioactive smuggling remains a serious security concern and it is anticipated that states will continue to deploy and use detection systems well into the future. Well-maintained detection systems are capable of functioning for more than ten years. With these factors in mind, sustainability is a crucial determinant of the success of radiation detection programs. Without due consideration at the outset, the effectiveness of such programs will degrade significantly over time. Planning for long-term sustainability should address the following key issues:

1. Program advocacy
2. Equipment and human resources
3. Operational requirements and technical capabilities
4. Roles, responsibilities, and relationships
5. Information sharing

Discussions of long-term sustainability should take into account the following topics and best practices:

1. All agencies have multiple competing priorities and resource limitations. To ensure that radiation detection remains a priority, it is recommended that a "champion" in a senior leadership position be identified to convey the importance of this work at a national level and build support for continued funding of operations and maintenance.

2. Decisions regarding procurement of detection equipment should consider long-term sustainability and mission requirements, ensuring that sufficient capability is in place to meet objectives which may evolve over time. Systems should have the flexibility to exploit advances in technology and best practice. Equipment and human resources should be integrated to match mission requirements across the lifetime of the program. As an example, the United Kingdom's Program Cyclamen was explicitly designed with these considerations in mind, creating a capacity that includes information technology, engineering, and science that is optimized by the deployment and use of trained and motivated staff, with the ability to adapt to changes in the threat landscape.

3. A key element of equipment longevity is proper maintenance. It is recommended that states determine early on whether they have technicians within their organizations that can be trained to assume responsibility for maintenance or whether this work should be contracted externally. With regard to lifecycle, each component of a detection system (e.g., computer hardware and radiation portal monitors), will have an average expected lifespan. States should incorporate this information into forward planning and budgeting for equipment repairs, replacements, and upgrades. The United States Department of Energy (DOE)/National Nuclear Security Administration (NNSA) Nuclear Smuggling Detection and Deterrence (NSDD) office has developed modeling tools as part of their technical exchange program that can be used to assist states with lifecycle predictions.

4. States may be faced with a number of changing circumstances over the lifetime of a detection program including an evolving threat landscape, port reconfiguration, staffing, or other resource constraints. These changing circumstances require significant flexibility. It is recommended that states develop a process to regularly evaluate the status and goals of their detection programs. The financial and organizational impact of these changes should be addressed appropriately. Change management should include all relevant stakeholders, particularly private entities including terminal operators, port authorities, and shipping lines whose role cannot be underestimated. System effectiveness relies on developing and maintaining positive working relationships among these stakeholders, both formally and informally.

5. The practicalities of operating radiation detection systems center on human resources and alarm rates. It is important to consider how many personnel will be needed to adjudicate and respond to radiation alarms and whether this will be a principal or auxiliary duty. Adjudication should take place for all alarms and resources should be provided for this to occur. Alarm rates are largely determined by the number of innocent alarms, caused by naturally occurring radioactive material (NORM), which can impact officer morale and alarm assessment resources. Managing alarms without reducing the ability to detect MORC is a critical and perennial challenge. A number of states manage this issue using tailored technology and software to reduce the number of NORM alarms. Other countries provide operators with NORM guidelines, which indicate expected types of radiation by commodity, and some, such as Belgium, have gone further by creating a NORM database to track site-specific commodities in relation to types and levels of radiation. The IAEA is working on a Cooperative Research Project on limiting the impact of innocent alarms, which provides an opportunity to coordinate and expand upon individual efforts. Increased collaboration and technical discussions are widely desired within the user and vendor communities. Examples include the European Commission (EC) Joint Research Centre (JRC)-led Illicit Trafficking Radiation Detection Assessment Program (ITRAP+10). This is designed to evaluate and compare commercially available detection equipment against standards, and has culminated in the active promotion of detection standards across EU member states.

6. Establishing and maintaining timely technical assistance for front line officers is crucial. This assistance includes providing technical support with alarm adjudication (e.g., assisting to determine if a shipment is legitimate or MORC) and regulatory determinations (e.g., assisting to determine if a shipment is a legitimate industrial source or MORC with fraudulent papers). In some countries this function is carried out by the competent authority that is tasked with responding to MORC detections (e.g., confirming, isolating, classifying, packaging and documenting MORC as part of the process to place it under regulatory control), while others use laboratory support from government, academia and the private sector.

7. Opportunities for information sharing between states and international organizations are invaluable resources for sustainability. Decades of experience has been gained by

countries and organizations involved in radiation detection programs within the maritime domain. Efforts of new entrants can be supported through the dissemination of non-sensitive information via international forums (e.g., Global Initiative to Combat Nuclear Terrorism [GICNT]). Widely distributed technical guidance documents also serve as a means of sharing best practice. The United States' DOE/NNSA NSDD technical exchange documentation and Knowledge Management Website[4] and the joint European Commission-United States-IAEA Border Monitoring Working Group (BMWG) training materials are some examples.

2.1.3 Implement and institutionalize regular training and adaptive exercises that address evolving threats, operational challenges, and security strategies of detection systems to verify that roles and responsibilities are clearly understood and that all relevant stakeholders maintain a state of readiness

Effectively trained personnel are essential for radiation detection programs. The human element of radiation detection is supported by regular training and exercises that are necessary to create and promote a "culture of readiness." In developing a training program, states should consider training approaches for detection system operators and maintenance personnel, development of an exercise program, and use of international resources. Countries developing radiation detection training and exercises should address the following key issues:

1. Support for ongoing training related to both maintenance and operations
2. Identification and leveraging of expertise within the broader radiation detection community
3. Development of multi-agency and stakeholder exercises

Important considerations for a robust training and exercise program include:

1. Both initial and refresher training are needed for those personnel, such as operators, maintenance workers, and port staff that work directly with the radiation detection system. It is recommended that basic radiation awareness course modules be incorporated into established training curriculum, where applicable, in agencies that operate or support radiation detection programs. Operator motivation is crucial to system effectiveness. Providing informal and formal feedback, additional training opportunities, unannounced red team exercises, or incentives have proved successful to increase motivation, awareness, and readiness. States should also consider the tools available to them for training. For example, training can be delivered through classroom lessons, e-learning modules and videos, and on-the-job training from another staff member or mentor.

2. Trainers should receive education in curriculum development, teaching, and assessment methods. This knowledge base can be maintained and facilitated through "train-the-trainer" programs, which can be developed at subnational, national, or international levels in partnership with other countries and international organizations. "Train-the-trainer" can be valuable at locations with high turnover or reassignment rates. At the international

[4] NSDD Knowledge Management Website https://nsddkmw.energy.gov/

level, the World Custom's Organization (WCO) has established training on nuclear and radiological materials in their Strategic Trade Control Enforcement (STCE) Implementation Guide.[5] Bilaterally, China partnered with the United States to develop the Customs Radiation Detection Training Centre which now uses national and local experts to design and implement the training of new radiation detection officers. At the sub-national level King's College London, through the IAEA administered International Nuclear Security Education Network (INSEN) has partnered with universities in Sub-Saharan Africa, the Middle East, and South East Asia to provide "train-the-trainer" courses across a range of nuclear security topics. To assist with planning, it is recommended that states conduct periodic training-needs assessments to identify the appropriate content, frequency, and duration of training. These assessments can support determination of appropriate training tools and developing budget requests.

3. Tabletop and field-based drills and exercises are an excellent tool for assessing performance of both equipment and personnel, verifying the readiness of all stakeholders. Exercises should be held regularly and feedback from exercises should be documented and used to improve policies and procedures. Exercises hone skills needed for effective radiation detection by reinforcing SOPs, particularly roles and responsibilities. SOPs should be tested periodically and holistically, from initial detection to the end of the response phase, to ensure they are appropriate and comprehensive. Exercises also act as local information sharing activities and informal opportunities to build relationships among stakeholders. International guidance on establishing an exercise program is available from high level plans for exercising nuclear and radiological emergency response exercise from the IAEA[6] to detailed exercises from the GICNT. At the national level, Canada's ValidEx exercise series consisted of activities of increasing scope and complexity, beginning with a tabletop exercise, emergency management workshops, and a command post exercise, before escalating to a full scale simulation focusing on integration of all stakeholders. At ports, the International Ship and Port Facility Security (ISPS) Code requires annual exercising of the Port Facility Security Plan for all relevant stakeholders, including terminal operators and port security officers. Past exercises have included a "hot box" scenario centered on a container carrying unsecured radioactive material at a port facility.

4. A vast amount of subject matter expertise on training can be found at the international, national, and local levels. For example, front line officer training is available to all states from the BMWG. Online resources are available from the IAEA's Radiation Detection e-Learning platform[7], and the DOE/NNSA NSDD Knowledge Management Website.

[5] WCO Strategic Trade Control Enforcement Implementation Guide http://www.wcoomd.org/en/topics/enforcement-and-compliance/instruments-and-tools/guidelines/wco-strategic-trade-control-enforcement-implementation-guide.aspx.

[6] IAEA Preparation Conduct and Evaluation of Exercises to Test Preparedness for Nuclear or Radiological Emergency http://www-pub.iaea.org/books/IAEABooks/7258/Preparation-Conduct-and-Evaluation-of-Exercises-to-Test-Preparedness-for-a-Nuclear-or-Radiological-Emergency.

[7] IAEA e-Learning http://www-ns.iaea.org/training/security/e-learning.asp?s=9&l=76.

Several states have also developed Centres of Excellence that are used to train radiation detection personnel and to host workshops for the exchange of best practices and lessons learned. It is recommended that states seek to leverage these resources to support their indigenous training programs.

2.2 Stewardship Responsibilities for MORC

States implementing radiation detection programs have detected both nuclear and other radiological materials of concern, alongside other non-threat materials. This includes orphan sources and contaminated goods. While these materials may not pose a security threat, they can pose serious health and safety risks to the public and, therefore, should be removed from the maritime supply chain.

To ensure that materials out of regulatory control are properly addressed, states that possess radiological material should implement the proper safety and security measures to prevent these materials from being lost or stolen. Further, states that detect MORC should take proactive steps, which include establishing a disposal disposition plan to safeguard the orphan materials to ensure that these materials are placed back under regulatory control. Finally, states should share information on detections and best practices in returning material to proper control where appropriate.

2.2.1Take appropriate national-level measures at the material's origin, in accordance with the IAEA Code of Conduct on Radioactive Sources, to ensure that radiological materials are controlled at the point of origin and are prevented from entering the maritime supply chain

Experience has shown that detection of radiological materials can cause significant disruption to port operations. Detection response can also be time-consuming and costly. States possessing radiological materials should take steps to ensure that radiological materials are properly protected. Controlling radioactive materials at their origin can prevent or reduce the occurrence of these issues:

1. Serious disruption and financial costs caused by MORC to public and private stakeholders in the increasingly global maritime supply chain
2. Time-consuming jurisdictional and regulatory challenges involved in regaining control of MORC

A robust radiological source control program should consider the following topics and best practices outlined within the IAEA Code of Conduct:

1. Every state should "take the appropriate measures necessary to ensure: (a) that the radioactive sources within its territory, or under its jurisdiction or control, are safely managed and securely protected during their useful lives and at the end of their useful lives; and (b) the promotion of safety culture and of security culture with respect to radioactive sources."[8] Radiological material can be prevented from entering the maritime

[8]IAEA Code of Conduct on the Safety and Security of Radioactive Sources, 2004 http://www-pub.iaea.org/MTCD/publications/PDF/Code-2004_web.pdf.

supply chain through the application of strong safeguards in public and private sectors. Detecting and responding to these issues within the country of origin greatly reduces the resources and complexity associated with cross-border detections.

2. National strategies for safely regaining control over orphan sources in a timely manner are required. These strategies should foster ongoing communication between the regulatory body and radioactive source users.[9] Effective control of orphan sources limits the impacts of contamination in terms of cost, disruption to operations, and health and safety.

3. Management responsibilities of the state include administrative and operational activities associated with the "manufacture, supply, receipt, possession, storage, use transfer, import, export, transport, maintenance, recycling, or disposal of radioactive sources."[10] The breadth of management responsibilities underscores the comprehensive end-to-end nature of best practice MORC stewardship.

4. Individuals and bodies that are likely to encounter orphaned sources, such as customs officers, should implement appropriate detection programs and disposal disposition plan to control these sources.[11] Operating radiation detection programs at scrap yards and seaports are excellent means to meet this Code of Conduct best practice.

5. "The IAEA should: (a) continue to collect and disseminate information on laws, regulations and technical standards relating to the safe management and secure protection of radioactive sources, develop and establish relevant technical standards"[12] providing a common knowledge base within and beyond the maritime radiation detection community.

2.2.2 Take appropriate measures to ensure that detected nuclear and other radioactive materials are placed back under control in either the country responsible for the detection event or the country of material origin, as appropriate

Nuclear or radioactive material detected in the maritime supply chain may have originated either from within the detecting state or in another third-party state. Regardless of origin, states should take responsibility for all materials identified by their radiation detection program. States should either take possession of this radiological material and ensure proper disposition in line with established guidance, or take steps to coordinate with the state of origin to ensure effective repatriation and disposition and prevent recirculation of this material. Applying systematic procedures to MORC control addresses the following issues:

1. Difficulties arising from coordination, notification, and feedback challenges among government bodies during MORC transfer and disposal
2. Variation in radiation acceptance limits by country

[9] IAEA Code of Conduct on the Safety and Security of Radioactive Sources Section III.8.
[10] IAEA Code of Conduct on the Safety and Security of Radioactive Sources Section I.1.
[11] IAEA Code of Conduct on Safety and Security of Radioactive Sources Section III.13.
[12] IAEA Code of Conduct on the Safety and Security of Radioactive Sources Section III.30.

3. Inadequate reassertion of control leading to recirculation of MORC in the maritime supply chain

Placing MORC back under control requires effective coordination, taking into account the following topics, and best practices:

1. Communication is vital when MORC is transported between countries. States should establish protocols to confirm MORC is returned to regulatory control based on notifications and feedback between regulatory bodies and relevant stakeholders. MORC stewardship does not end at the border. Returning MORC to the commercial owner without involving the recipient country's regulator early in the process can lead to recirculation of that MORC as a consequence of poor oversight. This action may have security and safety implications and cause additional financial burdens on public and private stakeholders.

2. Difficulties often arise when the country of detection has inadequate guidance detailing responses to MORC events (e.g., when radiation levels exceed a national regulatory threshold or require specific radiation transport requirements).[13] Issues can arise when a detecting state lacks clear guidance on the appropriate removal of MORC from the maritime domain, particularly outside the country of origin. Lack of clear guidance can strain resources. Some countries, including the Netherlands, prefer to separate contaminated items from regular shipments, regardless of origin, and dispose of or store the confirmed MORC rather than returning the entire shipment or material to the country of origin. This allows for constant oversight and stewardship. Some countries do not have the ability or legal authority to provide disposal or storage of MORC of foreign origin. These countries should have clear processes in place to maintain control during the return. Other countries cannot accept the financial responsibility associated with disposal or storage of foreign origin MORC and, consequently, bond shipments, holding associated private stakeholders responsible for disposal or storage costs.

3. National policies regarding limits on the amount of radiation that can be present in NORM cargo vary. However, clear policies defining what constitutes a legal or illegal shipment provide useful guidance when determining the appropriate course of action to place detected material back under control when more than one country is involved. Some countries use legal frameworks to establish and share this information.

2.2.3 Report detections to the International Atomic Energy Agency (IAEA) Incident and Trafficking Database (ITDB) in a timely manner and seek other formal and informal mechanisms to share information on detections, trends and challenges in addressing MORC with regional and international partners

The IAEA uses the ITDB to analyze reported incidents of nuclear and other radioactive MORC based on input from over 130 participating member states. Findings regarding trends and event

[13] Safe Transport of Radioactive Material, Edition 4 http://www-pub.iaea.org/MTCD/publications/PDF/TCS-01_4th_web.pdf.

characteristics are disseminated to IAEA member states and a small number of international organizations. This helps to improve nuclear security by supporting efforts to prevent the misuse of nuclear or radioactive material. All countries involved in radiation detection should report incidents to the IAEA to increase the accuracy and robustness of the ITDB data set. The analysis of the IAEA's ITDB can inform national radiation detection programs. Voluntary reporting of these detections to the IAEA's ITDB addresses the following issues:

1. Limited and delayed reporting makes it difficult to identify patterns regarding the origin of MORC incidents and the commodities involved
2. Reporting can help identify cases of recirculating MORC

Discussions of reporting and information sharing activities should take into account the following topics and best practices:

1. The IAEA-operated ITDB is a confidential source of information detailing instances of nuclear and other radiological materials detected outside of regulatory control. Access to such information is extremely valuable in understanding the evolving threat landscape faced by radiation detection programs as well as potential gaps in the global radiation detection architecture. Countries should–through national points of contact–report all instances of nuclear and other radioactive MORC to the ITDB in a timely manner so that a clear and contemporary global picture of the problem can be determined. This activity is increasingly important as supply chains are globalized.

2. Information sharing directly supports the effectiveness of detection architecture, particularly at a regional level. The State of Play report produced for the Maritime Security Gift Basket highlighted that over 80% of respondents felt enhanced information sharing arrangements would be the most beneficial change that could be made to their radiation detection programs. This is of particular importance at a regional level, where countries often face similar threats arising from MORC in the maritime supply chain. Sharing non-sensitive information can support detection system procurement and benchmarking, offering opportunities to share lessons learned through system operation. Countries should seek to enter into or develop such mechanisms when possible.

3. Many stakeholders have an interest in sharing information on incidents of nuclear and radiological MORC in the maritime supply chain. In particular, private operators engage in such activity to identify commonly experienced difficulties across their respective industries. For example, the Cargo Incident Notification System (CINS), maintained by a consortium of shipping companies–including five of the world's largest container shipping lines–records, analyses, and shares information on, inter alia, incidents involving radioactive cargo including MORC. Countries should recognize this activity and interface with these organizations when appropriate.

3. Conclusion and Next Steps

The NSS Maritime Supply Chain Security joint statement identifies six best practices contained in this document alongside six recommendations to enhance measures to permanently remove MORC from the maritime supply chain. The findings of the gift basket workshop emphasize the need to:

1. Encourage international cooperation to foster the capacity of countries to build and sustain robust radiation detection programs to protect and safeguard the maritime supply chain through bilateral, regional, and international cooperation
2. Engage with all stakeholders whenever possible, including public and private sectors
3. Expand involvement with international organizations, including the IAEA, WCO, and INTERPOL, to promote information sharing and to improve radiation detection capabilities
4. Institute holistic policies and procedures to enable supportive regulations that enable long-term sustainability and capacity to return detected MORC to regulatory control on a permanent basis

Appendix

Appendix A - 2016 Nuclear Security Summit Maritime Supply Chain Security Joint Statement

Over the past decade, many countries have deployed radiation detection systems at their seaports as a key component of their national approach to combating nuclear and radiological smuggling. These systems have detected numerous nuclear and other radioactive materials out of regulatory control (MORC) - some that pose security risks and others that just pose risks to public health and safety, or are of regulatory concern (e.g. contaminated goods and orphan sources). Due to the complexity of the maritime system and the many stakeholders involved, it is clear that national, regional and international coordination in both the public and private sector is needed to secure this vector and enable the permanent removal of these materials from the maritime supply chain.

With this in mind, 15 countries, nine international organizations, three terminal operators, and an academic representative participated in a workshop from 16-18 November 2015, co-sponsored by the United States and the United Kingdom, focused on promoting radiation detection in the maritime supply chain and developing enhanced measures to permanently remove materials found out of regulatory control. This workshop was in fulfillment of a commitment made at the 2014 Nuclear Security Summit in a joint statement on maritime supply chain security. Workshop participants acknowledged that detection systems are an important tool in a nation's approach to locating and securing MORC and identified a set of best practices and recommendations.

[These countries] endorse the following best practices and recommendations identified at the November 2015 workshop:

Best Practices:

Nations with detection programs have agreed to continue to share technical advice, lessons learned and best practices with one another and with those nations seeking to implement and sustain detection systems. Specific examples of best practices include:

1. Plan for long-term sustainability of systems early in the process of developing and deploying radiation detection programs;

2. Establish a comprehensive "end-to-end" regulatory framework that provides the necessary framework and authorities to all stakeholders involved in the detection, notification and response to materials found out of regulatory control;

3. Implement and institutionalize regular training and adaptive exercises that address evolving threats, operational challenges and security strategies of detection systems to verify that roles and responsibilities are clearly understood and that all relevant stakeholders maintain a state of readiness;

4. Take appropriate national-level measures at the material's origin, in accordance with the International Atomic Energy Agency (IAEA) Code of Conduct on Radioactive Sources, to ensure that radiological materials are controlled at the point of origin and are prevented from entering the maritime supply chain.

5. Take appropriate measures to ensure that detected nuclear and other radioactive materials are placed back under control in either the country responsible for the detection event or the country of material origin, as appropriate; and

6. Report incidents involving MORC to the IAEA Incident and Trafficking Database (ITDB) in a timely manner and seek other formal and informal mechanisms to share information on detections, trends, and challenges in addressing MORC with regional and international partners.

Recommendations:

1. Seek opportunities and mechanisms to enhance communication between public and private stakeholders regarding the responsibilities and obligations associated with the removal of MORC from the maritime supply chain and to ensure feedback mechanisms for all parties in the ultimate resolution of MORC cases, as appropriate;

2. Develop technical and operational solutions to reduce alarms from innocent, naturally occurring radioactive material ("NORM") to protect commerce and to focus resources on detecting materials of concern;

3. Request that the IAEA continue to study technical and operational issues related to detection operations through cooperative research projects and other mechanisms as appropriate;

4. Request that INTERPOL continue and enhance current efforts to ensure that threat information flows from law enforcement to front line officers (i.e. Customs and Border Protection) involved in detection operations;

5. Request that the World Customs Organization (WCO) expand its efforts to deploy a common communication platform between customs organisations, which could be leveraged to facilitate

timely information sharing in member states on detections, trends and challenges in addressing MORC; and

6. Investigate whether the WCO or other appropriate organisations could expand their efforts to facilitate information sharing that goes beyond customs organisations to regulators or other applicable organisations in order to allow all those organisations involved in the detection and removal of MORC to share timely information, ensure that material is permanently removed from the supply chain and correctly disposed of.

The United States and the United Kingdom will document and share these and other best practices and recommendations with the international community.