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Using Exercises to Enhance the Nuclear Security of Nuclear and other Radioactive Material in Transport.

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Abstract

Exercises are a way of testing, training, evaluating and demonstrating capabilities in a particular subject area. Participants and participating organizations should be knowledgeable in their roles and responsibilities as well as their established procedures for dealing with the topic of the exercise. The exercise provides an opportunity for those procedures and decision making processes to be applied in a realistic manner. When multiple organizations and agencies are involved in the exercise, their ability to coordinate and collaborate is also demonstrated.

Results of the exercise can be: reinforcement of good practices; and, identification of gaps, overlaps or other areas for improvement in the subject area.

The International Atomic Energy Agency (IAEA) with support from its' Member States works to build the national capacity for strengthening a Member State's nuclear security regime in the transport of nuclear and other radioactive materials. One recent area where this assistance has grown is in the conduct of exercises to support the training, validation and enhancement of Competent Authorities and many other stakeholders within a State to help ensure that nuclear and other radioactive materials are transported safely and securely.

Because of the many different types of exercises, a State can tailor its exercises to meet the State's desired objectives while acknowledging its level of resources it has available to invest. It allows planners and security professionals the chance to thoughtfully consider how

the malicious actor may attempt to attack a nuclear or radioactive material shipment and present that scenario for the security regime to operate against. Exercises are an efficient and effective tool to examine how well the entire nuclear security regime's structure, sections, or even subsections may respond to many different scenarios and conditions. While the intended outcome is to strengthen and better prepare the State's nuclear security regime for protecting the lives of its citizens, the benefits of exercises can be detailed in many different areas: enhanced protection, more reliable equipment, better trained forces, quicker responses, reduced vulnerability to consequential release, etc.

The IAEA, with the support of Sweden in 2015, piloted type types of exercises a tabletop exercise followed by a nuclear spent fuel transport security field exercise. Later that year, again with support from the IAEA, the Kingdoms of Spain and Morocco conducted the "Gate to Africa" exercise program based on a maritime shipment of radioactive material between the two countries in the Strait of Gibraltar. This paper describes benefits and challenges to exercises, critical planning methodology used in designing transport security exercises, and IAEA resources available to support the incorporation of exercises as part of a robust nuclear security regime.

Introduction

Since transport security exercises represent significant investments of effort, financial resources, and people in order to yield maximal benefits they should be well organized, professionally conducted, and their evaluation must focus on constructive improvement potential.

Along with Member States' support, the International Atomic Energy Agency's (IAEA) strategy for strengthening a Member State's nuclear security regime in the transport of nuclear and other radioactive materials is to conduct exercises that support the training, validation, and enhancement of the State's Competent Authorities and its many other stakeholders. For example, relying on support from Sweden in 2015, the IAEA piloted a tabletop exercise followed by a nuclear spent fuel transport security field exercise (PILOT 2015). Similarly, with support from the IAEA, Spain and Morocco conducted the "Gate to Africa" exercise program based on a maritime shipment of radioactive material between the two countries in the Strait of Gibraltar in late 2015. This paper explores benefits and challenges to exercises, critical planning methodology used in designing transport security exercises, and IAEA resources for incorporating the exercises as part of a robust nuclear security regime.

Effective tool

Exercises are a tool that effectively and efficiently enable facilitators to gauge how a nuclear security regime's structure, sections, or even subsections may respond to many different scenarios and

conditions. And there are many different exercises to choose from, allowing you to decide what your purposes are, and choose your exercises from the available resources. See Table 1 below for examples of different types of exercises.

Table 1 Exercise Types and Purposes

Exercise Types	**Purposes**
Drills	• Training • performance testing
Tabletop exercises	• training • interagency coordination • performance testing • testing and evaluating command and control structures
Games	• training • decision making
Battleboard	• training • validate vulnerability assessment • decision making • testing new concepts, procedures, physical protection measures
Partial exercises	• training • training under real time and environmental conditions or simulated • training a subset of units • coordination with a subset of stakeholders • evaluation of capabilities and proficiencies
Full-scale exercises	• training • training under real time and environmental conditions or simulated • coordination with all stakeholders • training of all units • evaluation of capabilities and proficiencies • testing and evaluating command and control structures
Field exercises (may be partial or full exercises)	• defined by location (in the field) • training • training under real time and environmental conditions • evaluation of capabilities and proficiencies • testing and evaluating command and control structures

Test your training

Just as exercises represent excellent evaluative tools for nuclear security regimes, they can also be used

to test and evaluate many different aspects of transport security. Furthermore, realistic scenarios illustrate how the planning, people, and systems would perform to protect radioactive material from malicious forces. As mentioned above, different types of exercises can have a limited focus or a broad focus depending upon the intent of the exercise director. According to their scope and objectives, these exercises can be used to test a variety of elements that include the following: adversary capabilities, performance of physical protection systems, contingency plans, protection and response organization effectiveness, and the preparatory efficacy of the prescribed level of training for responding to malicious events against a shipment.

IAEA support

In 2014, the IAEA Transport Security Technical Secretariat decided that there was a need to assist its' Member States with developing, planning, and conducting exercises focused on Transport Security. The first effort focused on nuclear material transport, but it was later modified to include radioactive material. The intent of this effort was to create a technical document that provided the necessary information to the Member State. Using this information, Member States could then develop an exercise program that would support planning and conducting transport security exercises. Where emergency management exercises focus on consequences, transport security exercises would help a Member State prepare for malicious events against the material both prior to an attack as well as soon after. The goal of this exercise guide was to help a Member State prepare to protect material during transport, identify how they would initially react to an attack, and predict the actions they would take to address the threat so as to regain State control.

Tailor exercises

Nuclear material transport security exercises are part of a comprehensive nuclear security regime. Thus, exercises allow opportunities for operators and/or regulators to examine the multiple aspects of the security of the material, examine their integration, and analyze their interoperability. Similarly, a State can tailor its exercises to meet the desired objectives, allowing it to also work within the limits of its available resources.

Exercises vary in scope and in scale, ranging from small drills focused on training to large-scale exercises aimed at testing overall command, control, coordination, and communications arrangements. Bear in mind that the purpose of exercises is not to "demonstrate" the quality of the arrangements; rather, it is to identify weaknesses and areas where improvements can be made. Hence, exercises are an integral part of a sustainable and continuous improvement program for nuclear transport security. Exercises can also be used to assess and validate existing transport security arrangements prior to regulatory approval of actual transport operations or transport campaigns.

As the scope and objectives of an exercise are developed, the planners define the objective. With this

information, they can establish the testing and evaluation parameters. For example, in a simple drill, one may perform a limited-scope performance test to see if the introduction of a new physical protection technology performs to the required standard and doesn't conflict with existing systems. As you increase the scope and objectives, the parameters can become very broad and encompassing. For example, in a multi-agency field exercise, interagency command systems, coordination, strategic national emergency plans, and national communication infrastructure can be tested to determine if they successfully meet the needs of the responsible organizations. Of course, these types of exercises can be quite large, resource heavy, and time consuming.

In sum, it is critical for exercise discoveries to be included in a quality control feedback system so that the lessons learned can be then properly addressed. Similar to training, the desired end-state is improved performance, critical weaknesses identified, enhanced interagency coordination, and interface.

Benefits

The benefits of exercises can be detailed in many different areas for different stakeholders. For example, the operator might get enhanced protection and more reliable technology by exercising their capabilities; the regulator could gain increased confidence in the planning and conducting of the transport mission as the operator demonstrates their planning process; a State's security service would benefit from exercising the different security units in responding to a malicious event.

Conducted exercises

PILOT 2015

The IAEA, with the support of Sweden in 2015, piloted two types of exercises; a tabletop exercise and a field exercise based on a maritime nuclear spent fuel transport. These exercises were planned by representatives of the Swedish regulatory agency SSM, and the operator SKB. The intent of this program was to first use the TTX to get all the stakeholders in one room, and work thru multiple scenarios. After the exercise, there was enough data and value for the State to support a full field exercise using an adversary force against SKBs nuclear transport vessel.

The table top exercise was held in February 2015 in Stockholm, Sweden. There were approximately 50 participants and representatives of the different organizations that support secure transport of nuclear materials in Sweden that included: Swedish Radiation Safety Authority, national police, the coast guard, transport vessel operators, the national security committee, and the Swedish Nuclear Fuel and Waste Management Company. The exercise lasted six hours, and it was facilitated by representatives of SKB and the Swedish Police. The exercise explored the many different roles, responsibilities, and response actions to six different scenarios ranging a broad spectrum of events from simple unusual behaviors of locals to mechanical failure to a preplanned assault. Senior managers

that were representing the above organizations were challenged in their knowledge and understanding of the situations, their organizations responsibilities, and the interactions with others based on the scenario. The dialogue among the participants allowed everyone to explore a given situation from their organization's perspective but also consider and appreciate how differently others would approach the same circumstance. This lead to a better appreciation and understanding in the event these organizations had to deal with a security event. One participant noted how the exercise opened his mind to look at simple, day-to-day mechanical issues from a security standpoint and challenged his commonly held assumptions.

The field exercise followed 3 months later and focused on just one scenario – a malicious assault against the M/S Sigrid the nuclear transport vessel. The adversaries, members of a Swedish counter terrorism unit were tasked with planning and conducting the attack using online open source information. They conducted the assault in the Swedish archipelago.
Based on the previously discussed and exercised plans and training, key personnel from the Swedish Radiation Safety Authority, national police, the coast guard and the Swedish Nuclear Fuel and Waste Management Company worked together to regain control of the vessel. Their plans were carefully designed around national regulations and training as well as IAEA nuclear transport security guidelines and preparatory exercises.

With close coordination and quick thinking, authorities successfully overcame the attacking group and regained control of the vessel. Throughout the day, real-time progress updates from the field were sent to observers from the IAEA and 15 countries who gathered in a nearby facility on shore to follow and discuss the exercise. The more than 40 international participants had a chance to learn about these types of exercises, to see the resources involved, and to hear first-hand accounts about the exercise and its preparation process.

This exercise was facilitated under fairly realistic conditions, depending on the close cooperation between the different response organizations in order to plan the operation and to successfully regain control of the vessel.

After the exercise, several follow-up meetings for key stakeholders were held to discuss the results and lessons learned from these exercises. Some of the key points included:

- The need for joint management of the incident.
- That each organization has their own sub-objectives, and it is incumbent upon them to clearly articulate and communicate those objectives to the commander of the incident.
- There is a need for a follow up on agreed actions and milestones.
- During the course of the event it is critical that organizations make timely reports, on a regular

basis, to their highest level.

- That the exercises evaluation plan needs to be developed early in the exercise planning process.
- The role of the media cannot be forgotten and has to be planned; it is critical to "sell your message".

Gate to Africa

In May 2012, Spain, Morocco, and the International Atomic Energy Agency (IAEA) jointly organized a Technical Seminar on the risk of nuclear terrorism. This led to the adoption of a Joint Action Plan that provided an adequate framework for conducting exercises for nuclear security events and radiological emergencies. The "Gate to Africa" exercise program on transport security is an implementation of the Joint Action Plan between Morocco and Spain in cooperation with the IAEA.

The "Gate to Africa" exercises built on a series of previous exercises organized by Morocco and Spain in cooperation with the IAEA, which was included in the framework of the Global Initiative to Combat Nuclear Terrorism (GICNT). Exercises consisted of the "REMEX-2013" in Madrid on 25-26 April 2013, and the Moroccan-hosted exercise ConvEx-3-2013 in November 2013, and a large-scale exercise named "Bab Al Maghrib," with 59 participating member states and 10 international organizations.

Within this dynamic, the Kingdoms of Morocco and Spain with the cooperation of the IAEA, agreed to organize a maritime transport security exercise of radioactive material by the end of 2015. The program called for national-level tabletop exercises followed by a joint bi-lateral tabletop exercises (TTXs). The exercises then progressed as a joint field exercise (FEX) conducted in the Straits of Gibraltar named "Gate to Africa". The context of the exercise program was driven by the following elements:

- The political instability in the Sahelo-Saharan region that requires a mutualisation of the efforts on bilateral and regional levels due to a marked, terrorism threat
- Recent intelligence reported the risk of the terrorist groups' interest in acquiring and using radioactive materials for malicious acts
- The commitment of Morocco and Spain to strengthen their national capabilities in nuclear security according to the international standards and to contribute actively to uphold nuclear security worldwide together with IAEA and other voluntary international initiatives such as the Nuclear Security Summit (NSS) and the Global Initiative to Combat Nuclear Terrorism (GICNT).

The exercises successfully demonstrated the national capabilities, interaction, and coordination to handle a malicious act against a transport of radioactive material. The capabilities of Spain and Morocco to successfully resolve a future malicious radiological event were greatly increased.

The exercise evaluation of the Gate to Africa included a detailed analysis of the results with key lessons learned as follows:

- The "Gate to Africa" enhanced the national capabilities and bilateral cooperation between Spain and Morocco, which is necessary for the secure transport of radioactive material.
- These joint exercises highlighted the need for improved international support and coordination in order to enhance the security regime for international shipments.
- The exercises allowed for the practical application of security tactics and radiological response procedures of security and other response forces that participated in the exercise.
- The exercises provided for a better understanding of the complex nature of these types of shipments as well as for the necessary planning and coordination needed for an effective radioactive material shipment.
- The exercises highlighted additional areas of concerns, such as radiological consequence management or materials outside of regulatory control that might be studied and addressed in future joint activities.

Conclusions

The intended outcome is to strengthen and better prepare a State's nuclear security regime for protecting the lives of its citizens.

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References