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RADIOLOGICAL SECURITY: ENABLING EFFECTIVE RESPONSE FOR PROTECTION, CONTAINMENT, AND PURSUE AND RECAPTURE

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Abstract

Sites that possess radioactive sources implement enhanced security measures that aid in detecting, delaying, and enhancing responder effectiveness with timely notification of security incidents. Many of these security systems are designed with the objective of containing the material to the site. However, additional state and national responders must be prepared to activate and dispatch resources as well as execute policies, processes, and procedures that would assist responders to pursue and recapture the radioactive material if containment fails. A situation like this could quickly exceed local response capabilities to recapture stolen radioactive material.

1. INTRODUCTION

The use of radioactive isotopes has provided numerous useful purposes in medical, research, and commercial applications, ranging from cancer treatment to sterilization of food, medical equipment, and blood. Due to these isotopes' physical characteristics and energy, these materials can be used for malicious intent by criminal and terrorist organizations.

The risk to radioactive material is considered "low likelihood"; however, the consequence would be "high consequence" if a criminal or terrorist group obtained material and used it for a malicious act. Stakeholders of these materials, operators, and regulators implement protection programs intended to deter an adversary and protect the sources from theft. The combination of physical protection equipment, process and procedures, and security plans work in unison to prevent theft of sources. No security system is one hundred percent effective. Therefore, radiological sites and first-responders need to collaborate and prepare response capabilities to contain material or pursue/recapture material if containment fails". Most sites using or storing radioactive material do not have the onsite response to stop an adversary's actions. Developing a relationship between operators/licensees and local Law Enforcement (LE) is essential for protecting radioactive sources. Collaboration and partnership with Law Enforcement agencies will better prepare the response capabilities to interdict and stop an adversary's action. It is crucial that Law Enforcement understands the threats to material and how changes in the adversary attack plan can drive response strategies.

2. PROTECTION OF MATERIAL

The primary intent of the physical protection system and supporting plans and procedures is to protect radioactive sources from theft. This involves a balanced physical protection system that evaluates the physical protection timeline against an adversary timeline to confirm that a combination of protection and response measures can arrive in time to stop the adversary's actions before the theft of material. It is essential that operators/licensees understand that adversary actions determine Law Enforcement actions. An example illustrating how an adversary's actions determine the strategies in a radiological theft scenario could be when an adversary decides to breach a source device to remove the material from shielding. The initial response would have implemented a containment strategy to prevent the adversary from leaving the facility with the material. Once the adversary took action to breach the device, the response would have to change the strategy to deny the ability for the adversary to breach the source, possibly creating a radiological contamination scenario.

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The relationship between Operators/Licensees and Local Law Enforcement is crucial for protecting radiological sources. Law Enforcement needs to understand that these sources are in constant use in our communities. This awareness should include these types of materials and devices used and ask the risk if an adversary were to successfully steal the material. Malicious use of materials could consist of a Radiation Exposure Device (RED), or Radiological Dispersal Device (RDD), commonly known as a dirty bomb. Law Enforcement should understand the protection measures used to include how the physical protection system implements the concepts of detection and delay and how the response is integral to protecting the material.

Licensees/Operators should understand what information needs to be shared with Law Enforcement to determine what type of strategies Law Enforcement would implement based on the adversary's actions. To protect radioactive sources, four basic strategies can be used by LE. The primary strategy used to prevent material theft is "Containment." This is the strategy implemented to avoid the theft of radioactive sources.

2.1. Containment Strategy

A containment strategy allows LE to establish a perimeter around a facility to ensure the adversary cannot leave the facility with the device or material. Operators/licensees should relate the following information to Law Enforcement to assist in their response:

- Size of the facility.
- The layout of the facility.
- Location of devices and materials.
- Number of Adversaries.
- Adversary capabilities (Tools, weapons, and equipment).

Containment can start from the facility's exterior but is often reduced to a location that places law enforcement as close to the sources as possible. Once the material is contained, Law Enforcement can use various techniques and tactics to resolve the situation. A containment strategy is ideal if the adversary does not attempt to breach the device or access the radioactive material.

2.2. Denial

If an adversary attempts to remove the source from the device or its shielding, Law Enforcement will need to take additional measures to stop the adversary's actions. This strategy is known as "denial" and can be categorized as denial of task or access. An example of denial of task would be Law Enforcement interrupting and stopping the adversary's actions of breaching the shielding to a radiological source. An example of denial of access is Law Enforcement stopping an adversary as they attempt to gain access to where the material is stored. In a denial strategy, the Law Enforcement actions are determined by the adversary's actions.

Operators/licensees should relate the following information to Law Enforcement to assist in their response:

- Size of the facility.
- The layout of the facility.
- Location of devices and materials.
- Number of Adversaries.
- Adversary capabilities (Tools, weapons, and equipment).
- Location of the adversary(s).
- Adversary(s) actions.

Law Enforcement can move immediately to a denial strategy if an adversary attempts to remove the source or breach the shielding. In all denial strategies, Law Enforcement will confront the adversary. If containment and denial strategies fail and the adversary attempts to leave the facility with radioactive material, Law Enforcement will pursue the adversary(s).

2.3. Pursuit

The window of opportunity for Law Enforcement to enact a pursuit strategy is extremely small. The adversary must be in the act of leaving the facility with radioactive material as Law Enforcement is arriving on the scene. As the adversary is leaving and develops the ability to go with the source material, law Enforcement will enact a pursuit strategy. The pursuit of an adversary by Law Enforcement is known as the immediate pursuit. This strategy can involve multiple law Enforcement resources and continue until the adversary(s) are stopped, and the material is secured.

Operators/licensees should relate the following information to Law Enforcement to assist in their response:

- Description of adversary(s).
- Location of adversary(s) with the radioactive material.
- Number of Adversary(s)
- Vehicle description to include:
  - Make and model of vehicle.
  - Colour of vehicle.
  - Distinguishing characteristics of the vehicle
  - License plate if possible.
- The direction the vehicle is headed (street names if possible).

The primary purpose of a pursuit strategy is to recapture radiological material the adversary has in their possession.

2.4. Recapture

A recapture strategy is initiated by Law Enforcement when an adversary has possession of the radioactive material and or device. The source may be in its protective shield or not. During a recapture strategy, the adversary may be on-site, or Law Enforcement may be involved in immediate pursuit. The goal of a recapture strategy is to regain control of the radiological material. Recapture strategies ensure the adversary(s) have been separated from the material. Often this can mean direct action from Law Enforcement to stop the adversary(s) actions, or in some instances, the adversary(s) can abandon the source during pursuit or attempted theft. Law Enforcement will ensure a safe perimeter around the device/source to ensure everyone’s safety. Once the material has been, it will take a collaborative effort between Law Enforcement, the Operator/Licensee, and the Regulator to determine the condition of the material and source and determine the safest way possible to relocate the source/material to a secure location.

3. CONCLUSION

To ensure radioactive materials remain safe even when an adversary attempts to steal the material, all stakeholders, Regulators, Operators/Licensee, and Law Enforcement will need to understand one another’s roles and responsibilities. All three entities should work together and understand the actions to be taken by Law Enforcement while responding to the attempted theft of material. The Operator/Licensee should also be aware of the information Law Enforcement needs to determine the strategy used in their response. When all stakeholders have a working knowledge of the protection strategies, it increases the ability to mitigate the risks associated with attempted theft of radiological material.