How To Deal With The Radiological Dispersal Device (RDD) Threat

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Abstract - In the United States of America (U.S.), the International Atomic Energy Agency's (IAEA's) "Code of Conduct on the Safety and Security of Radioactive Sources" and RS-G-1.9, "Categorization of Radioactive Sources," provide a basis for risk-informing both safety and security actions to protect against the threat of radiological dispersal devices (RDDs). The United States Government, States, and the private and public sectors are working to address a broad range of issues for reducing RDD risk, in a consistent manner, across multi-jurisdictional authorities. Key NRC safety and security actions for protection against RDDs and implementing the key elements of the Code of Conduct include developing and implementing increased controls for risk-significant radioactive material, enhancing import/export protocols, and establishing a national source registry, known as the National Source Tracking System. Challenges arise in coordinating a national threat policy and consequences of concern, and implementing protective strategies that balance safety, security, and response, as well a sharing burdens across diverse operational modes and overlapping regulatory responsibilities. The U.S. Nuclear Regulatory Commission (NRC) participates in several collaborative initiatives with the Department of Homeland Security (DHS) to achieve consistency for the protection and response to National threats. The U.S. National Infrastructure Protection Plan describes the integrated activities needed to protect the Nation's critical infrastructure/key resources, including protection from an RDD attack. In addition, the U.S. National Response Plan (NRP) provides the protocols for coordinating response to nuclear or radiological incidents. In January 2006, DHS issued its draft ''Application of Protective Action Guides for Radiological Dispersal Devices (RDD) and Improvised Nuclear Device (IND) Incidents,'' which was developed within the U.S. Government in coordination with State and local agencies. The U.S. Government continues to work with State and local governments and commercial entities to implement integrated plans to protect against and respond to potential RDD attacks commensurate with the threat and potential consequences. The United States regulatory framework is an open, inclusive, and democratic process. All levels of the Federal government are working with stakeholders in a manner that seeks to instill public trust and confidence in the regulatory oversight process and the subsequent safe and secure use of radioactive materials.

1. Introduction

In the United States of America (U.S.), International Atomic Energy Agency's (IAEA's) "Code of Conduct on the Safety and Security of Radioactive Sources" (Code of Conduct) and RS-G-1.9, "Categorization of Radioactive Sources," provide a basis for risk-informing both safety and security actions to protect against the threat of radiological dispersal devices (RDDs). The objective of these actions is to ensure that the most desirable radioactive sources are not stolen for use in RDDs. The United States Government, States, and the private and public sectors are working to address a broad range of issues for reducing RDD risk, in a consistent manner, across multi-jurisdictional authorities.

The U.S. framework requires multi-jurisdictional coordination. Several U.S. Governmental agencies have regulatory authority, sometimes overlapping authorities, over radioactive materials. Both the U.S. Department of Energy (DOE) and U.S. Nuclear Regulatory Commission (NRC) have developed reports that support the use of the Code of Conduct in their regulatory programs. NRC used the IAEA's "Categorization of Radioactive Sources" to establish priorities for issuing advisories and regulatory actions. Key NRC safety and security actions for protecting against RDDs and implementing the key

elements of the Code of Conduct include developing and implementing additional security measures and increased controls for risk-significant radioactive material, enhancing import/export protocols, and establishing a national source registry, known as the National Source Tracking System (NSTS).

2. Implementing the IAEA Code of Conduct

The NRC issued Orders requiring enhanced security and controls for licensed activities involving large panoramic irradiators, manufacturers and distributors (M&Ds), transportation of radioactive material for quantities of concern (RAM QC), and other licensed uses based on the authorized possession of individual sources or aggregated quantities of radioactive material exceeding the IAEA Category 1 and 2 threshold quantities.

Because about 80 percent of commercial byproduct material users in the U.S. are regulated by Agreement States under an agreement with the NRC to protect public heath and safety and the environment, a Materials Security Working Group (MSWG) of NRC and Agreement State representatives was established to develop, in partnership, enhanced security and control requirements for protecting against RDDs. The MSWG used security assessments and the IAEA RG-G-1.9 (formerly TECDOC 1344) to establish priorities and inform the new requirements for the various users of radioactive sources. Although the initial Orders were issued by the NRC under its authority to protect the common defense and security of the U.S. (which is an NRC authority not relinquished to the States), many of the States have established additional agreements to inspect their licensees for compliance with the security Orders. Subsequently, requirements for increased controls, were added by both NRC and Agreements States to protect public health and safety, are based on possession of IAEA Category 1 and 2 threshold quantities and their relative accessibility in use, commercial transportation and international trade. Another joint Agreement State and NRC working group is tasked with ensuring consistent national implementation for the inspection and enforcement of the increased controls. NRC expects to work closely with the States to incorporate the enhanced security and control Orders into regulations over the next couple of years.

Although recent interest has been intense concerning the security of radioactive materials, the U.S. regulatory framework for radiation sources has been based on the integration of safety and security. Existing U.S. safety regulations require licensees to secure radioactive material in storage from unauthorized removal and to report lost, stolen, and missing sources. To enhance prevention and mitigation of an RDD event, the MSWG identified the need for personnel background checks, new access control requirements, and an immediate intrusion detection, assessment, and response capability to rapidly detect unauthorized access and intrusions with malevolent intent. Licensees must coordinate with local law enforcement authorities in planning for prompt response to interdict intruders, recover stolen sources, and implement protective actions to mitigate potential consequences. Shippers of radioactive materials must use carriers that implement similar security and control requirements to the Orders, use methods to track shipments of radioactive materials, and verify the timely receipt of shipments. Two independent physical controls are now required for portable gauges and for mobile and portable devices containing sources exceeding the Code of Conduct Category 2 threshold quantities.

In fulfilling its obligation to implement the Code of Conduct, the NRC imposed new controls on the import and export of radiation sources in Title 10 Code of Federal Regulations Part 110, “Export and Import of Nuclear Equipment and Material.” The final rule was published on July 1, 2005, and became effective on December 28, 2005. The new requirements are risk-informed and promote confidence in the regulatory framework. The NRC is continuing to work with the U.S. Government to work with trading partners to harmonize controls to address issues related to the detection of smuggled nuclear materials as well as authorized and inadvertent imports of radioactive materials at border points of entry. The majority of incidents of anomalous radiation measurements observed by the Department of Homeland Security (DHS) Customs and Border Protection are related to the improper management of

radioactive materials in the fabrication of commercial products (e.g., reprocessing of sources in scrap metal) and are not the result of malevolent intent.

The NRC, in coordination with the DOE, is developing a web-based national source registry, known as the National Source Tracking System (NSTS), to track risk-significant sources. Working groups were formed to plan and develop the system and regulatory requirements. A Steering Committee and a U.S. Government Interagency Coordinating Committee were also established to oversee the project to assure that that the tracking system meets the needs of U.S. Government users. The NSTS will include transfers of IAEA Category 1 and 2 sources within the U.S. The proposed rule on the tracking system was published in July 2005. Public meetings were held in August and September 2005, to solicit stakeholder input. The comment period closed on October 11, 2005, and the staff is preparing responses to public comments and drafting the final rule for the Commission's approval.

3. U.S. national strategy for reducing the risk of RDDs

The NRC has been working in partnership with other agencies of the federal government to protect against RDD threats. One of these organizations is the Department of Homeland Security (DHS). Challenges arise in coordinating a national policy on threat assessment and consequences of concern, and implementing protective strategies that balance safety, security, and response, as well a sharing burdens across diverse operational modes and overlapping regulatory responsibilities. The NRC has participated fully in these DHS initiatives that include the new Domestic Nuclear Detection Office (DNDO) monitoring program, National Response Plan (NRP), interim "Application of Protective Action Guides for Radiological Dispersal Devices (RDD) and Improvised Nuclear Device (IND) Incidents," and National Infrastructure Protection Plan (NIPP).

The DNDO is developing a comprehensive, integrated, and risk-informed national radiation and radioactive material monitoring system to detect an adversary's transport of radioactive or nuclear material before an attack occurs. The proposed radiation monitoring system provides infrastructure for a broad range of both security and non-security events. The DNDO and U.S. Government agencies are partnering with State, Tribal, and local officials to detect import or transport of radioactive material with emphasis on points of entry into the U.S. When completed, the radiation monitoring system is expected to provide near real-time situational awareness of the movement of radioactive materials at points of entry into the U.S. and across transportation routes. The NRC has dedicated several full-time staff personnel to work with the DNDO in establishing the national monitoring system.

If a RDD attack occurred in the U.S., the government's response would be guided by the National Response Plan (NRP). The NRP provides an all-discipline, all-hazards plan that establishes a single, comprehensive framework for the management of domestic incidents. It provides the structure and mechanisms for U.S. Government agencies to coordinate and support State, Tribal, and local incident managers. The NRP defines the roles and responsibilities for coordinating and cooperating agencies of the U.S. Government. It also provides for the integration of lessons learned from exercises, such as for terrorist attacks, and from real life natural disasters recently experienced in the aftermath of Hurricanes Katrina and Rita. The Nuclear/Radiological Incident Annex of the NRP, previously known as the Federal Radiological Emergency Response Plan (FRERP), is the primary government-wide guidance document for handling incidents involving radioactive materials, including an RDD event.

On January 3, 2006, the DHS issued draft protective action guides (PAGs) for RDD and IND incidents for public comment. The primary purpose of the PAGs is to support the preparation for, responding to and recovering from terrorist incidents involving nuclear or radioactive material. The PAGs address the characteristics of RDD and IND incidents, differences between acts of terror and accidents, and the phases of response. The PAGs were coordinated among U.S. Government agencies, State, and local officials. They were developed using existing guidance, experience from existing programs, and lessons

learned from interagency incident response exercises. For the early and intermediate phases of response, the PAGs published in the Environmental Protection Agency (EPA) PAG Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, are also appropriate for use in RDD and IND incidents. For the early phase, the existing PAG of 10–50 mSv (1-5 rems) projected dose is used for evacuation, sheltering, relocation, and protection of emergency workers For the intermediate phase, the existing PAGs of 20 mSv (2 rems) in the first year and 5 mSv (500 mrems) in any year after the first are used for relocation. New to the proposed guidance is the establishment of an optimization process (decision-making framework) for local officials in determining an appropriate cleanup for their community for the long term after completing prompt response and recovery actions. The optimization process will establish cleanup and restoration levels consistent with social, economic and health protection factors considering the overall welfare of the public.

The DHS is responsible for implementing the Homeland Security Act and Presidential directives on critical infrastructure protection. The U.S. Government's plan for protecting critical infrastructure and key assets is described in the National Infrastructure Protection Plan (NIPP). The NIPP provides a unifying structure for the integration of critical infrastructure and key resources protection into a coordinated national program, including protection against RDDs and INDs. The NIPP establishes the architecture for conducting strategic operational risk analyses and risk management activities. The NIPP partitions the critical infrastructure and key assets into areas of national concern and requires demonstration of compliance through the development of sector-specific plans. The DHS, in coordination with the lead agencies in the critical infrastructure and key resources sectors, is holding meetings with State and local officials, private interests, and members of the public to prioritize and agree upon methods for balancing protection and mitigation strategies with their associated regulatory burden. Although not identified as a lead agency, the NRC, in coordination with the DHS, developed a sector-specific plan for the key resources of Nuclear Reactors, Materials and Waste as input to the NIPP. This sector-specific plan covers of broad range of NRC and Agreement State regulated activities.

4. NRC framework assessing security and control measures

Both the NRC and DOE are the leading U.S. Government agencies responsible for establishing and overseeing security measures for the civilian and defense nuclear facilities and materials, respectively. Both agencies regularly coordinate with the intelligence community and Federal law enforcement agencies to review and assess threat information. The U.S. Government incorporates a graded threat concept. For facilities using risk-significant radioactive materials, NRC uses a deterministic approach and specifies protection requirements either through regulations or Orders that are based on an implicit referenced threat. Because the NRC and DOE regulate and oversee different types of facilities, differences in the respective threat documents and protection requirements do exist. The NRC and DOE have a long standing working relationship pursuant to a Memorandum of Understanding, and cooperatively share and coordinate assessments of threat information and strive for comparable protection for comparable material.

Similar to the NIPP method for risk analysis and management of critical assets protection, the NRC is using a security assessment decision making framework that provides a process and criteria to evaluate results of security assessments for a broad range of activities subject to the NRC's regulatory authority. This framework serves as a tool to help determine where additional security and control measures or mitigating strategies were needed for Materials, Fuel Cycle, and Research and Test Reactor facilities. Security assessments are performed on a range of threat scenarios for the transportation and licensed uses of IAEA Category 1 and 2 sources. Remote or speculative scenarios and scenarios with insignificant consequences are initially screened out based on threat assessments and engineering evaluations. Asset attractiveness is evaluated using factors that consider the target iconic value, complexity of planning, resources needed, execution risk, and protective measures for the safety of the

public. Attractiveness factors are valued and averaged to give overall ranking expressed as an Attractiveness Category. Effects are expressed, by order of magnitude, as a Consequence Category. The Attractiveness Category and the Consequence Category are then applied to a decision matrix to assess the need to develop additional mitigating strategies.

In an expanding global economy, safety and security are highly dependent on the cooperation and support of our international partners. The IAEA Code of Conduct and Categorization of Sources provide a sound basis for risk-informing both safety and security actions to establish effective international and national infrastructures to protect against the threat of RDDs. National risk assessment methods, preventive strategies and mitigating strategies should balance the risks with costs of protection. Open communications and coordination at all levels of government are essential to identify vulnerabilities and regulatory gaps, to achieve consistent safety and protection of radioactive sources over diverse modes of use, and to assure adequate emergency preparedness guidance and training to prevent the likelihood of an RDD event and mitigate its consequences.

Although new restrictions on the availability and protection of sensitive security-related information have challenged our regulatory system, the United States regulatory framework is still an open, inclusive, and democratic process. At all levels of the Federal government, agencies are working with stakeholders in a manner that seeks to instill public trust and confidence in the regulatory oversight, and the safe management, and secure protection of radioactive materials.

REFERENCES

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