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Radiological Transport Security Training Program Analysis*

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ABSTRACT

In 2018 Oak Ridge National Laboratory (ORNL), in support of the National Nuclear Security Administration (NNSA), Office of Global Material Security (GMS), Office of Radiological Security (ORS), developed the *US Transport Security of High-Risk Radioactive Materials Domestic Strategy* report. Among other issues, the report indicated that there is no well-defined training program in United States (US) radioactive material transport security. This paper is a follow-on to the 2018 report and is designed to evaluate current practices and future training needs of employees in the transportation sector and of emergency response personnel. To do so, the authors consulted with industry subject matter experts (SMEs), including trucking companies, logistics providers, and law enforcement personnel, to address the following research objectives and questions, as outlined in this paper: (1) what security training is presently required for radiological transportation; (2) what are the gaps in security training for radiological transportation; (3) what training is needed to fill these gaps; and (4) who needs additional security training and what training do they need?

1. INTRODUCTION

In 2018 Oak Ridge National Laboratory (ORNL), in support of the National Nuclear Security Administration (NNSA), Office of Global Material Security (GMS), Office of Radiological Security (ORS), developed the *US Transport Security of High-Risk Radioactive Materials Domestic Strategy* report. Among other issues, the report indicated that there is no well-defined training program in United States (US) radioactive material transport security. This paper is a follow-on to the 2018 report and is designed to evaluate current practices and future training needs of employees in the transportation sector and of emergency response personnel. This evaluation is based on consultation with industry subject matter experts (SMEs), including trucking companies, logistics providers, and law enforcement personnel to assess existing requirements and future needs

for training in radiological transport security and to identify gaps needing to be filled to promote a successful training program.

The paper summarizes the information gathered about transport security training programs within the industry, including their deficiencies and the reasons for their shortcomings. Training needs are assessed by examining current training practices in the domestic radiological transportation industry and identifying what gaps exist compared with the training that international partners receive. Domestic training requirements were also compared with the transport security training curriculum developed by ORNL and used to support the ORS international transport security program.

The paper provides the results of a study of current training that is required for the industry and the associated gaps. It also includes training curriculum recommendations, based on the analysis described to enhance radiological transport security training for shippers and carriers (operators), emergency response dispatchers (911 centers), and law enforcement.

2. EVALUATING CURRENT TRAINING FOR RADIOLOGICAL TRANSPORTATION

To develop a set of domestic transport security training recommendations, the authors interviewed various training and transport security specialist in industry and government regarding the status of training for those responsible for transporting radiological material. They also analyzed federal regulations that require transport training from the Department of Transportation (DOT). These interviews and regulatory review revealed that the primary requirement and focus of training for transporting radiological material is safety, that is, keeping radiological material contained and away from the public. Only limited attention is given to security training, that is, keeping radiological material from being obtained and misused by an adversary.

The DOT regulates the surface transport of all dangerous goods (hazmat) within the United States and requires training for all hazmat employees. The DOT training requirements are found in Title 49 of the US Code of Regulations (49 CFR) Subpart H – Training in Sections 172.700–704.

49 CFR 172.704(a)(4) requires security awareness training for all hazmat employees: "Each hazmat employee must receive training that provides an awareness of security risks associated with hazardous materials transportation and methods designed to enhance transportation security. This training must also include a component covering how to recognize and respond to possible security threats. New hazmat employees must receive the security awareness training required by this paragraph within 90 days after employment."

In-depth security training is also required for employees if their company is required to have a security plan as described in 49 CFR Subpart I – Safety and Security Plans. These training requirements are described in 49 CFR 172.704 (a) (5): "Each hazmat employee of a person required to have a security plan in accordance with subpart I of this part who handles hazardous materials covered by the plan, performs a regulated function related to the hazardous materials covered by the plan, or is responsible for implementing the plan must be trained concerning the security plan and its implementation. Security training must include company security objectives,

organizational security structure, specific security procedures, specific security duties and responsibilities for each employee, and specific actions to be taken by each employee in the event of a security breach."

While the transport security regulations from DOT and NRC focus on the shippers (or licensees), carriers, and receivers of radioactive material, our study shows that there are three large communities that need some level of training to ensure the secure transport of radioactive material within the United States. These three communities are (1) operators (i.e., shippers, carriers, and receivers of radiological material); (2) 911 center staff or the emergency dispatch community; and (3) state and local law enforcement community. Our research shows that the training needs for each of these communities are quite different.

The operators are regulated by DOT and NRC with some training regulations provided by DOT. The 911 centers operate under standard operating practices that are focused on safety response and, based on this analysis, do not include the possibility of a security incident involving radiological material. Law enforcement is also primarily focused on the safety aspects of radiological materials during transport with little training on security or the recovery of radiological material because of a security incident.

2.1 Operators

A typical commercially available DOT training course for shippers can vary from 4 to 16 hours. One SME who oversees training for his company stated that approximately 10% of his company's training curriculum is security-focused material and that the rest is safety- and compliance-based material. Safety and compliance may be adequate to comply with the regulatory minimum, but the effectiveness of the training in preparing operators to meet a security threat is doubtful. Unfortunately, the wording of the regulations allows for wide variation in training content.

Our research shows that the greatest identified training gaps for operators include (1) inconsistent security training among operators; (2) insufficient training with technical expertise to develop a successful transport security plan including threat assessment, vulnerability analysis, and transport security technical measures; (3) lack of trained expertise in transport security skills relevant to defense-in-depth, detection, delay, and working with response; and (4) inadequate training for dispatchers and movement control centers to appropriately respond to an incident.

Of the training that does emphasize security, DOT requirements for shippers and carriers do not specify training content, only general subject areas. There are no requirements that this training contain information on detection, delay, and response measures; defense-in-depth techniques; or insider threat mitigation—capabilities that can inhibit adversaries and prevent the loss of at-risk materials. Some training courses may cover these subject areas, but the implementation of DOT training requirements is left up to individual organizations, which may feel that this level of security training does not apply to them.

The DOT in 49 CFR Subpart I – Safety and Security Plans 172.800 (b) (15) requires that anyone offering to ship or transport a Category 1 or 2 quantity of radioactive nuclides, a Highway Route

Controlled Quantity of Radioactive Nuclides, or radioactive nuclides in forms listed as Radioactive Materials in Quantities of Concern (RAM-QC) by the NRC must develop, adhere to, and maintain a transport security plan for these transports. There are no training requirements regarding the security and technical knowledge that the person responsible for developing and maintaining a transport security plan must possess. Based on SME input, the author of a transport security plan needs considerable knowledge across several technical areas including the following:

- risk assessment of the radioactive material that is to be shipped;
- vulnerability assessment process and how to conduct a vulnerability assessment for the shipment;
- vetting and management of trusted personnel;
- information security and how to manage and share sensitive information in a secure manner;
- transport security technology; and
- response contact and coordination.

Another identified gap is that current training requirements for industry are focused primarily on response. Response is only one important aspect of a security regime, but it is does not provide a basis for building a complete and holistic security program that includes administrative measures, insider threat mitigation, physical protection measures, as well as response procedures. The success of a training program should be developed under a strategy that drives a mission and a vision that would lead to a more comprehensive safety and security program. The current training topics add value and are beneficial; however, these topics only lead to a narrow "event and response"–based approach to training.

The NRC in Title 10 U. S. Code of Federal Regulations (10 CFR) Subpart D – Physical Protection in Transit 37.79 (a)(1)(i) requires the establishment and continuous operation of a movement control center for the duration of the transport of a Category 1 quantity of radioactive material. In evaluating the requirements for a movement control center, it was not very clear if training for this position is required, yet if an event were to happen, these employees would most likely be the first ones to start the response process. The SMEs offered conflicting opinions on this matter. It was noted that some companies do provide training in this area, although it is not required.

2.2 Emergency Response Dispatch – 911 Centers

A large training gap was identified for 911 center personnel. An important component of response is communication or the dispatch to an event. Interviews from law enforcement personnel indicated that 911 dispatchers need additional training on responding to radiological transportation emergencies. If a 911 dispatcher receives a call regarding the theft of a radiological shipment, the dispatcher could very easily handle it like any other stolen vehicle, as he or she may not fully understand the vulnerabilities associated with these types of shipment. This lack of knowledge could lead to critical response time being lost.

2.3 Law Enforcement

Law enforcement agencies would be the primary first responders to a security event involving a radiological transportation incident. The initial response would be conducted by local and state-level law enforcement agencies, with federal agencies likely becoming involved as an incident evolves. Radiological transport security training for law enforcement is not standardized nationally, allowing for a wide variation in local response protocols. Information gained during interviews indicated that the officers who do receive specialized training related to transport are either regulatory compliance divisions or specialized units. All these considerations leave the patrol officers, likely the first responders to a radiological transport incident, with little training to assist them when deciding an appropriate course of action to take.

Law enforcement must always improvise, depending on the demands of a specific situation. Rarely occurring events such as the theft of a radiological shipment demand that officers have the necessary knowledge and skills to respond in an effective manner. A lack of specific training for response to an incident involving radiological material can lead to deficiencies in the response.

Some law enforcement agencies receive training regarding radiological shipments and response, but there is a lack of focus on transport security. Data gained during interviews with two agencies at the state level indicated that law enforcement training tends to lean heavily on the safety side. Most of this training is related to hazmat training and Commercial Vehicle Safety Alliance (CVSA) Level 6 vehicle safety inspections. Furthermore, very few courses related directly to the transportation of radiological materials were found, and none of the courses seemed to be delivered on a continuing basis.

Two training courses were found that address the security/response to radiological transportation.

***Course #1*:** This course was conducted in 2010 and 2011 and was funded by both the Federal Law Enforcement Training Center (FLETC) and the Transportation Security Administration (TSA) as part of FLETC's Commercial Vehicle Counterterrorism Training Program. The program was primarily for law enforcement officers who perform safety inspections and have daily roadside communication with commercial vehicles. The goal of the course was to teach officers to focus on awareness, inspection, behavior identification, in-depth interviewing techniques, fraudulent documentation recognition, and how to respond to suspicious behavior (Federal Law Enforcement Training Center, 2009).

Course #2: This course was conducted in 2018 and hosted by the Kentucky Trucking Association and the TSA Surface Division. The course, "Transportation Security & Law Enforcement Training Exercise – Terrorist Attack Preparations," included scenario-based presentations focused on intelligence and information sharing; planning; interdiction and disruption; physical protective measures; on-scene security, protection, and law enforcement; and mass search and rescue operations. The course also included a tabletop exercise discussion (Kentucky Trucking Association, 2018).

The first course illustrates law enforcement training that is focused on the specialist inspecting vehicles and the shipment. While this is an important aspect of detecting illicit activities involving radiological material, it does not address the needs of the first responders. The second course appears to address how responders should plan for and conduct a response to a transport incident, but it does not appear to be part of a continuing training program focused on radiological material security.

2.4 Summary of Training Gaps

Table 1 summarizes the results of the transport security training evaluation for domestic transport of Category 1 and Category 2 quantities of radiological material. ORS has invested considerable effort into developing a comprehensive international training curriculum for radiological transport security. This curriculum is based on IAEA guidelines and recommendations as well as industry best practices. The ORS transport security curriculum was used as the basis for evaluating the quality score for the current domestic training requirements. Table 2 provides a summary of training needs for the three transport security communities.

Security Function	Current Training Requirements	Comment
Material Characteristics	49 CFR Safety Training	
Threat Characteristics	49 CFR Security Plan	Requires a threat assessment – No guidance on how
Need for Transport Security	49 CFR Security Awareness Training	
Security Functions	49 CFR In-Depth Security Training	
Prudent Management Practices	10 CFR 37	Prescribed, no training required
Risk & Risk Management	49 CFR Security Plan	Requires a threat assessment – No guidance on how
Evaluating System Effectiveness	49 CFR Security Plan	Requires a threat assessment – No guidance on how
Enhanced Security	Correlates with Cat 2 in 10 CFR 37	No training requirements
Additional Security Measures	Correlates with Cat 1 in 10 CFR 37	No training requirements
Safety & Security Interface	Not addressed in US regulations	
Shipment Security Planning	49 CFR 172.800	Components of a security plan
Route Considerations		Not addressed in US regulations other than for spent nuclear fuel (SNF) and highway route–controlled quantities of radioactive material

Security Function	Current Training Requirements	Comment
Transport Security Plan	49 CFR 172.704 & 800	
Pre-Shipment Verifications/Readiness Review	49 CFR 172.704	Function specific training, security training, in-depth security training

Table 2. Summary of training evaluation for the transport security communities.

Community	Training Requirements	Identified Training Needs/Gaps
Operators	DOT requirements addressing security topics	• No required technical knowledge for persons responsible for developing transport security plans. • No required technical knowledge or training in response coordination for persons performing operations (e.g., loaders, drivers, etc.). • No required training in response coordination for movement of control center personnel.
911 Centers	No transport security training found	911 center personnel do not understand the implications of the loss of control of security for significant quantities of radiological material.
Law Enforcement	Internal to state and local agencies	Lack of response training for patrol officers responding to a transport security incident involving security-significant quantities of radiological material.

3. RECOMMENDATION FOR TRANSPORT SECURITY TRAINING CURRICULUM

Based on this evaluation, there exists some significant training needs/gaps in transport security for those involved in the domestic transport of radiological materials.

Although all three communities have training needs/gaps, there is little overlap among the communities regarding the types of training they need, other than basic security awareness of radiological material and coordination of operators and response. This section discusses recommended actions ORS should take to provide targeted and effective training to operators, 911 centers, and law enforcement in a cost-effective and acceptable manner.

ORS has invested considerable effort into developing a comprehensive international training curriculum for radiological transport security. The DOT and NRC have worked with the international community to ensure that US security regulations for radiological material comply with international guidance. For this reason, much of the ORS international transport security training curriculum can be easily revised to support domestic transport security training.

3.1 Recommendation: Leverage Existing ORS Transport Security Curriculum for Application to Domestic Transport Security Training

Except for the radiological transport security awareness curriculum (designated SA-100e), all the ORS training curricula are designed for in-classroom delivery. Because the ORS-developed curriculum is very extensive, both industry and agencies will likely be reluctant to invest the time required for their personnel to participate in face-to-face instruction. One of the recommendations is that the modules selected for inclusion in the domestic transport security training curriculum be modified for a domestic audience. These courses could be delivered either in person or formatted into an e-learning environment. Such an environment will include online presentations, video presentations, periodic webinars for selected topics, and possibly online "games". Moving the curriculum to an e-learning platform will allow personnel to access the needed training at their own convenience. In addition, an e-learning environment that requires user registration and authorization will allow ORS to monitor the uptake and effectiveness of the training curriculum. Finally, an e-learning approach is considerably more cost-effective for ORS than fielding or hosting the many instructor-led training sessions that would be required for in-classroom delivery of the subject matter.

To implement this new program, it would be beneficial to present these findings at the transportation stakeholder's forum to gain agreement and acceptance that additional security training is needed. By involving industry on the front end of the process to gain buy-in and commitment, there is a much better chance at success.

Secondly, it would be beneficial to create a team of SMEs consisting of transportation security experts to address the training gaps, develop goals, and take the first steps in addressing the needed changes. This team would then create the training program for implementation and delivery within the industry. This group of SMEs can determine the best format for delivering the training.

Table 3 summarizes the functional topics that a comprehensive transport security course for radioactive material would address. This table is organized by security task, the functional areas required to perform the task, and an indicator showing the specific training needs of operator, 911 call center, and law enforcement communities.

Table 3. Summary of security functional areas and need for training (X indicates in-depth training, and Y indicates awareness training).

Security Task	Functional Area	Operators	911 Center	Law Enforcement
Awareness	Transport Security for Radiological Material in General	X	X	X
Develop Transport Security Plan	Structure and Content of a Transport Security Plan	X		
	Interface between Safety and Security	X		X
	Material Characteristics	X	Y	Y

Table 3. Summary of security functional areas and need for training (X indicates in-depth training, and Y indicates awareness training) (continued).

Security Task	Functional Area	Operators	911 Center	Law Enforcement
	Threat Assessment	X		X
	Vulnerability Assessment	X		
	Risk Management	X		
	Personnel Reliability and Insider Threat Mitigation	X		
	Information Security	X		X
	Initial Response Coordination	X		
	Security Measures	X		
Conduct of Shipment	Personnel Reliability and Insider Threat Mitigation	X		X
	Information Security	X	Y	Y
	Security Measures	X		
	Readiness Review and Corrective Actions	X		
	Inspection	Y		X
	Initial Response Coordination	X	X	X
Response and Recovery	Initial Response Coordination	X	X	X
	Recovery Response			X

4. CONCLUSION: BENEFITS OF DEVELOPING STANDARDIZED TRAINING

By developing and providing a library of standardized training for industry, ORS can address some deficiencies that currently exist in transport security training. Through its involvement, ORS would contribute to the secure transport of radiological materials and enable organizations involved in their transport to have a much more robust security program by providing subject matter expertise. ORS is well positioned to assist in this area due to its access to technical SMEs, a skilled training development group, and training experience gained through current engagements both domestically and internationally. Also, a comprehensive training curriculum housed on a platform allowing authorized access from across the country would provide consistency in delivery across the multiple organizations responsible for transport security and reduced training costs for these organizations. Finally, developing a transport security training curriculum contributes to one of ORS's strategic objectives in protection.

5. REFERENCES

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