



## **Transportation Security Rulemaking Activities at the U.S. Nuclear Regulatory Commission**

Richard Correia  
U.S. Nuclear Regulatory Commission

Mark Shaffer  
U.S. Nuclear Regulatory Commission

Michael Layton  
U.S. Nuclear Regulatory  
Commission

Adelaide Giantelli  
U.S. Nuclear Regulatory  
Commission

### **ABSTRACT**

Since the formation of the U.S. Nuclear Regulatory Commission (NRC), the agency's mission has been to regulate civilian, peaceful uses of radioactive material but, at the same time, to ensure adequate protection of the public health and safety, and to promote the common defense and security, and protection of the environment. The events of September 11, 2001 heightened our concerns about the use of special nuclear material (SNM), spent nuclear fuel (SNF), and other radioactive materials in a malicious act. The theft or diversion of such materials, in particular SNF and Category 1 and 2 materials as listed in the International Atomic Energy Agency (IAEA) Code of Conduct on the Safety and Security of Radioactive Source (Code of Conduct), during transport could lead to their use in a malicious act. Since 2001, the NRC has evaluated its regulations, identified areas where security could be enhanced and, as an interim solution, issued several orders imposing additional security beyond the existing requirements found in Title 10 of the U.S. Code of Federal Regulations (CFR). With an interim solution in place, the NRC is moving forward with rulemaking to both enhance and put in place additional in-transit security requirements in the CFR. This paper will focus on the NRC's efforts to improve in-transit security of SNF and Code of Conduct Category 1 and 2 radioactive materials. In general, these enhanced in-transit security requirements will address areas such as preplanning and coordinating shipments, advance notification of shipments to the NRC and U.S. states through which the shipment will pass, control and monitoring of shipments that are underway, trustworthiness and reliability of personnel, and information security considerations.

### **INTRODUCTION**

The existing NRC in-transit security regulations were put in place before September 11, 2001, and before the renewed interest in nuclear power and reprocessing. The existing NRC requirements focus on preventing inadvertent exposure to radioactive material, safe handling and transport of radioactive material, and protecting SNM, including SNF, during transport.

Prior to September 11, 2001, the NRC regulations for medical, academic and industrial radioactive materials focused on safety during transport, safe handling and prevention of inadvertent exposures to workers and the public during transport of radioactive material. These regulations also mandated a certain level of security during transport. However, after September 11, 2001, the NRC reconsidered the extent to which an adversary would go to harm the public,



perhaps using medical, academic, and industrial radioactive materials. The NRC staff actively participated in studies, both domestic and international, to look at commonly used medical, academic and industrial radioactive materials (often contained in sealed sources), with this threat as its main consideration. As part of this process, the staff considered the chemical, physical, and radiological characteristics of each radioactive material. The IAEA led the international effort, publishing the results in 2003 in a document titled “Code of Conduct on the Safety and Security of Radioactive Sources” (Code of Conduct).

The IAEA Code of Conduct identifies 26 radionuclides as risk-significant radioactive material and encourages increased control of these materials within the international community. These materials could pose a serious threat to people and the environment if they were used maliciously. Of the 26 radionuclides identified, 16 are commonly used in the United States by NRC licensees. The NRC categorizes these 16 radioactive materials as Category 1 and 2 (see Table 1 below).

Table 1. Category 1 and 2 Material

	Category 1 (TBq)	Category 2 (TBq)
Americium-241	60	0.6
Americium-241/Beryllium	60	0.6
Californium-252	20	0.2
Curium-244	50	0.5
Cobalt-60	30	0.3
Cesium-137	100	1.0
Gadolinium-153	1000	10.0
Iridium-192	80	0.8
Plutonium-238	60	0.6
Plutonium-239/Beryllium	60	0.6
Promethium-147	40,000	400
Radium-226	40	0.4
Selenium-75	200	2.0
Strontium-90 (Yttrium-90)	1,000	10.0
Thulium-170	20,000	200
Ytterbium-169	300	3.0



Under the direction of the Commission, the NRC staff evaluated its regulations, identified areas where additional security could be improved, and, as an interim solution, issued orders to licensees imposing additional physical security measures during transport of Category 1 and 2 materials. A graded approach for security was implemented depending upon quantities of material being shipped. Each of the two orders (one for Category 1 quantities, the other for Category 2 quantities) requires licensees to implement additional security measures for transport of the above 16 radioactive materials. The Category 1 order issued July, 2005 is not publicly available because it includes detailed, sensitive security requirements; the Category 2 order issued November, 2005 is publicly available and is on the NRC's public website at <http://www.nrc.gov/security/byproduct/orders.html#increased-controls>.

As efforts were underway to review academic, medical and industrial radioactive materials, the NRC staff also reviewed the in-transit security requirements for SNF. These existing regulations require licensees to establish a physical protection system for shipments that meets the objectives to (1) minimize the possibilities for radiological sabotage of SNF shipments especially within heavily populated areas and (2) facilitate the location and recovery of SNF shipments that may have come under the control of unauthorized persons. Furthermore, it requires (1) early detection and assessment of attempts to gain unauthorized access to, or control over, SNF shipments, (2) notification to the appropriate response forces of any radiological sabotage events, and (3) impede attempts at sabotage of SNF shipments. After the attacks of September 11, 2001, the Commission determined that additional security measures should be put in place during the transport of SNF and that current security regulations should be enhanced to further protect SNF during transport from malicious use. Since October 2002, the NRC subsequently issued orders to licensees when shipping SNF; these orders are not publicly available due to the sensitivity of the information contained therein.

The NRC considers these orders an interim method for improving security. Indeed, the NRC is engaged in two rulemaking efforts to consider adding in-transit security requirements to the U.S. CFR, one for the transportation of Category 1 and 2 material and the other for transportation of SNF. In doing so, the staff considered security measures that prevent theft and diversion of material, ensure prompt detection, assessment and reporting of an event, and ensure prompt law enforcement response to an event. These in-transit security requirements would address areas such as preplanning and coordinating shipments, advance notification of shipments to the NRC and U.S. states through which the shipment will pass, control and monitoring of shipments that are underway, trustworthiness and reliability of personnel, and information security considerations.

#### **PROPOSED RULE CHANGE FOR CATEGORY 1 AND 2 MATERIAL**

The NRC staff has developed a draft rule proposing additional security requirements during transport of Categories 1 and 2 material. The proposed rule change, published in the U.S. Federal Register for public comment on June 15, 2010, is thus far based on requirements issued in several sets of orders since the events of September 11, 2001; information gathered during the implementation of the orders and inspection of that implementation; and comments received



from stakeholders both at a series of public outreach meetings and during a public comment period.

The proposed rule, in general, contains the following 14 security enhancements for licensees that transport or prepare for transport Category 1 material:

- Use carriers that have established movement control centers that maintain periodic position information from a location remote from the transport activity of the transport vehicle or trailer. The control center will monitor shipments 24 hours a day, 7 days a week, and have the ability to immediately communicate an emergency to appropriate law enforcement agencies.
- Verify and document that recipients are authorized to receive the regulated material and that the address of the licensee (consignee) is valid with the license-issuing authority.
- Ensure trustworthiness and reliability by performing background investigations on individuals whose assigned duties provide access to Category 1 shipment information.
- Preplan and coordinate shipment information with affected U.S. states.
- Preplan and coordinate shipment arrival and departure times with the consignee to ensure minimum delay in reporting the receipt of shipments and the notification of missing, lost, or stolen shipments.
- Provide advance notification of shipments, including a “no-later-than” final destination arrival time, to the NRC and to each affected U.S. state.
- For highway shipments, establish redundant communications allowing the transport to contact the escort vehicle (when used) and movement control center at all times.
- For highway shipments of long duration, provide an accompanying individual for the entire shipment.
- Ensure that rail shipments are monitored by a telemetric position monitoring system or an alternative tracking system reporting to the licensee, third-party, or railroad communications center.
- Require an immediate initiation of an investigation if the shipment does not arrive by the designated “no-later-than” time recorded on the advance notification.
- As soon as possible upon discovery of any actual, attempted or suspicious activities related to the theft or diversion of a shipment, notify the designated local law enforcement agencies along the shipment route.
- During stops, ensure that at least one individual is awake at all times and maintains constant visual surveillance of the shipment.
- Develop normal and contingency licensee procedures to cover notifications; communications protocols; loss of communications; and response to actual, attempted, or suspicious activities related to the theft or diversion of a shipment.
- Protect shipment information from disclosure to unauthorized individuals.

The following security enhancements would apply to licensees that transport or prepare for transport Category 2:



- Use carriers that have established package tracking systems.
- Verify and document (a) the shipment “no-later-than” arrival time and (b) the actual shipment arrival with the consignee.
- Initiate an investigation, with the consignee, to determine the location of the licensed material if the shipment does not arrive by the “no-later-than” arrival time.
- Ensure the safe handling, use, and control of licensed material when in use by having each licensee that possesses mobile or portable devices containing radioactive material in quantities greater than or equal to Category 2 values do the following:
  - have two independent physical controls that form tangible barriers to secure the material from unauthorized removal when the device is not under the licensee’s direct control and constant surveillance; and
  - when devices are in or on a vehicle or trailer, use a method to disable the vehicle or trailer when not under the licensee’s direct control and constant surveillance.

#### **PROPOSE RULE CHANGE FOR SNF**

The NRC staff is in the process of developing a draft rule and is proposing additional security requirements for transport of SNF. This proposed rule change is thus far based on requirements issued in several sets of orders since the events of September 11, 2001 and information gathered during the implementation of the orders and inspection of that implementation. There will be opportunities for the public and stakeholders to comment during the upcoming rulemaking process. In general, the NRC staff is considering the following 10 security enhancements to the existing requirements for in-transit security of SNF. An item to note is that in some areas, the recommendations being put forward by the staff represent a modernization of existing requirements.

- Emplace armed escorts along the entire length of the shipment.
- Ensure trustworthiness and reliability by performing background investigations on individuals whose assigned duties provide access to SNF shipments and information.
- Preplan and coordinate shipment information with the U.S. states through which the shipment will pass.
- Immediately upon discovery of any actual, attempted or suspicious activities related to the theft or diversion of a shipment, notify the designated law enforcement agency along the route.
- Develop normal and contingency licensee procedures to cover notifications; communications protocols; loss of communications; and response to actual, attempted, or suspicious activities related to the theft or diversion of a shipment. Ensure that drivers and accompanying personnel, railroad personnel, port personnel and movement control center personnel are appropriately trained in and understand these procedures.
- Notify the NRC Operations Center just before the shipment departs and when the shipment is received at its intended destination for each shipment within a campaign.
- Ensure that shipments are continuously and actively monitored by a tracking system that communicates continuous position information to a movement control center. The



movement control center should provide positive confirmation of the location, status, and control over the shipment and be prepared without delay to implement preplanned procedures in response to deviations from the authorized route or to a notification of actual, attempted, or suspicious activities related to the theft, loss, or diversion of a shipment.

- Establish redundant communications allowing the transport to contact the escort vehicle, designated law enforcement agency, and movement control center at all times. Redundant communications should not be subject to the same interference factors as the primary communication.
- Ensure that during periods when a shipment is stopped or when a shipment vessel is docked at least one armed escort is awake at all times, maintains constant visual surveillance of the shipment, and reports shipment status to the movement control center.
- Establish a minimum of two weapons for armed escorts.

#### **CONCLUSION**

The NRC is engaged in two rulemaking efforts to consider adding in-transit security requirements to the U.S. CFR, one for the transportation of Category 1 and 2 material and the other for transportation of SNF. The proposed rule which includes transportation security for Category 1 and 2 material was published for public comment in the U.S. Federal Register, Volume 75, page 33901 (75 FR 33901) on June 15, 2010. Comments on the proposed rule are due to the NRC by October 13, 2010. For transportation of SNF, the proposed rule is expected to be published for public comment in the U.S. Federal Register in the fall of 2010.