

INTERNATIONAL ATOMIC ENERGY AGENCY'S INTERNATIONAL CONFERENCE ON
PHYSICAL PROTECTION OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES
11-17 NOVEMBER 2017
VIENNA, AUSTRIA



TRAINING ON SECURITY DURING TRANSPORT OF NUCLEAR AND OTHER RADIOACTIVE MATERIAL



R. POPE AND Y. LIU, ARGONNE NATIONAL LABORATORY, AND
J. SHULER, U.S. DEPARTMENT OF ENERGY

Work sponsored by U.S. Department of Energy
Office of Packaging and Transportation



U.S. DEPARTMENT OF
ENERGY



EM Environmental Management
safety · performance · cleanup · closure
DOE PACKAGING CERTIFICATION PROGRAM

Background

As is well known, since 9/11/2011:

- Worldwide, emphasis has been on enhancing security for the transport of all dangerous goods—especially nuclear and other radioactive material
- Enhanced security has addressed both transport and storage incidental to transport

Domestically and internationally, and following a graded approach, this enhanced emphasis has resulted in

- An increase in transport security requirements
- Detailed security recommendations and guidance
- A need for detailed training of involved personnel

Training Is Required

For example:

- IAEA Recommendations document No. NSS 13 (INFCIRC/225) addresses the need for **training** of personnel involved in the transport of nuclear material
 - INFCIRC/225 is generally viewed as requirements by States Parties to the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment
- International modal regulations (air and sea) and regional modal regulations (road, rail, and inland waterway) require **training** of involved personnel
- Many domestic regulations require training of involved personnel
 - For example, the U.S. Nuclear Regulatory Commission requires, for the physical protection system during the transport of nuclear material, a “security organization composed of **trained** and qualified personnel” (10 CFR 73.25)

Training Is Recommended

For example:

- For nuclear material (IAEA Implementing Guide No. NSS-26-G):
 - Competent authorities should ensure that guards and response forces are **trained** (Para. 3.29)
 - Inspectors need to be suitably **trained** (Para. 3.36)
 - **Training** is needed for an effective nuclear security culture (Para. 3.57)
 - **Training** of shippers and carriers is needed for a sound sustainability programme (Para. 3.69)
 - State to ensure that local authorities, shippers, carriers, and all others involved in a shipment are **trained** (Para. 3.70)
 - Transport personnel should be trained (Para. 3.76)
- For other radioactive material (IAEA Recommendations document NSS No. 14):
 - Operators should be required to implement **training** (Para. 4.16)
 - Operators should be required to ensure that all personnel with security responsibilities are appropriately **trained** (Para. 4.22)

Development of Transport Security Training Courses at Argonne National Laboratory

Recognizing the need for training, Argonne developed and implemented a series of training courses on transport security

- Five courses have been held between 2013 and 2017
 - Supported by the U.S. Department of Energy (DOE) Package Certification Program (PCP), Office of Environmental Management, Office of Packaging and Transportation
- Courses have been directed toward:
 - Consignors (i.e., shippers)
 - Carriers
 - Consignees (i.e., receivers)
 - Public relations personnel
 - Logistics planners and brokers
 - Regulators
 - Regulatory inspectors
 - Guard, escort, and emergency response personnel

Overview of the Argonne Transport Security Training Courses

Topic	Date
U.S.-Domestic and International Transport Security	December 2013
International Transport Security	December 2014
U.S.-Domestic Transport Security	June 2015
U.S.-Domestic Transport Security	August 2016
International Transport Security	September 2017

- Participants have come from North America, Europe, the Middle East, and Asia

Lessons-Learned and Improvements

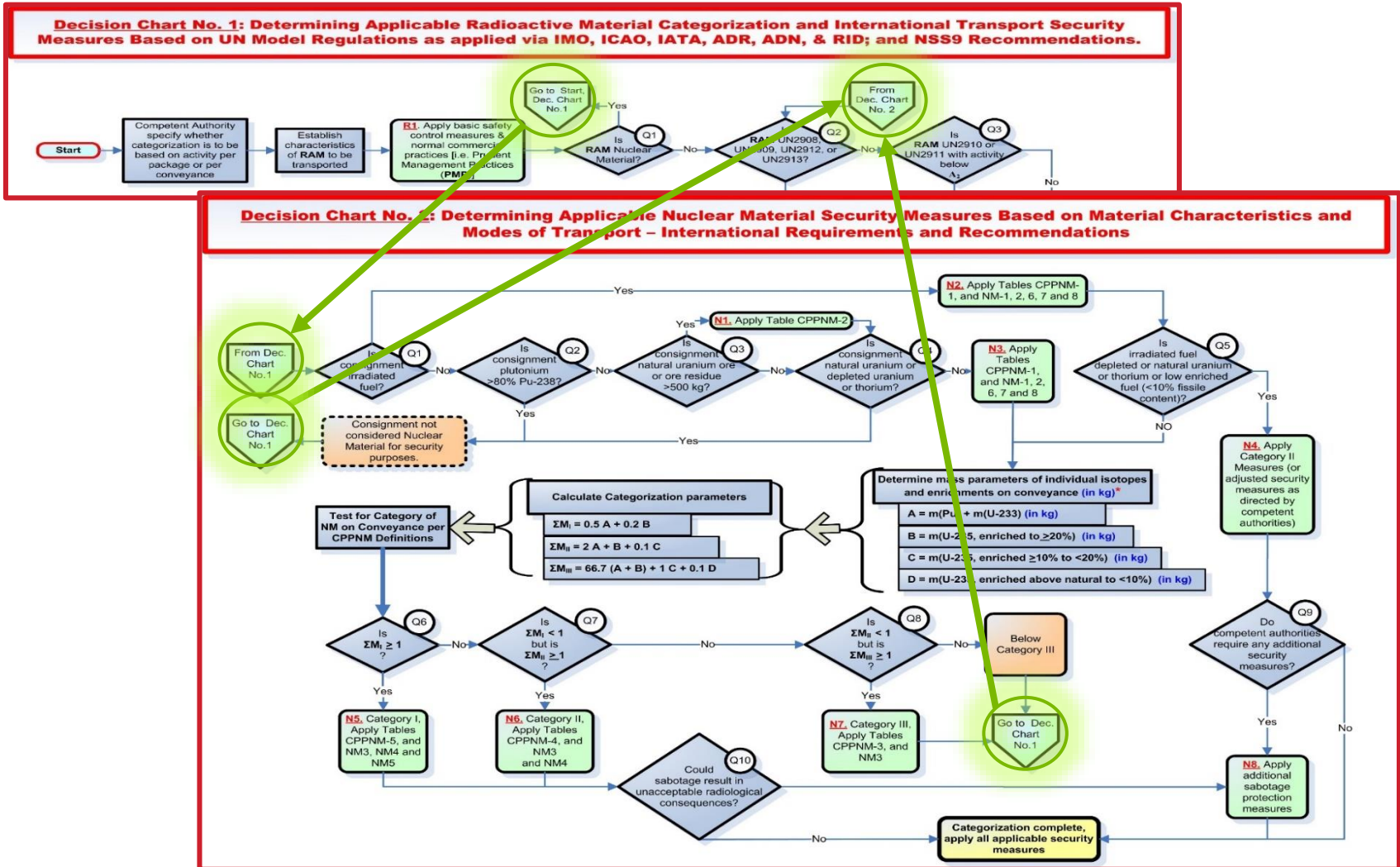
- Splitting original one-week international and domestic security course into two, one-week courses addressed the problem of too much information
- Increasing emphasis of in-class discussions/exercises/demonstrations improved student experience
 - Small team exercises
 - Discussion exercises
 - Tabletop exercises
 - Field exercises
 - Demonstrations
- Increasing use of an electronic audience participation (e-voting) system facilitated class interactions and enhanced learning
 - Survey questions were designed to elicit participant responses and measure progress throughout the training course

Key Features of the Argonne Transport Security Training Courses:

- Multiple in-class discussions, team exercises. For example:
 - Categorizing various shipments and determining security measures by using Decision Charts
 - Performing a Readiness Review of a staged shipment, defining deficiencies, and developing Corrective Actions
- Multiple tabletop exercises (TTXs):
 - Formalizing concepts, plans, procedures, arrangements, and transport security systems
 - Evaluating operational and tactical concepts with a Battle Board exercise
- Overview of transport security technologies and graded approach
- Field exercise of a mock shipment
 - Transport Security Plan, Readiness Review, and Corrective Action
 - Demo/Case Study using ARG-US remote tracking and monitoring systems
- Homework, facility tours, final exam, multiple documents, and tools

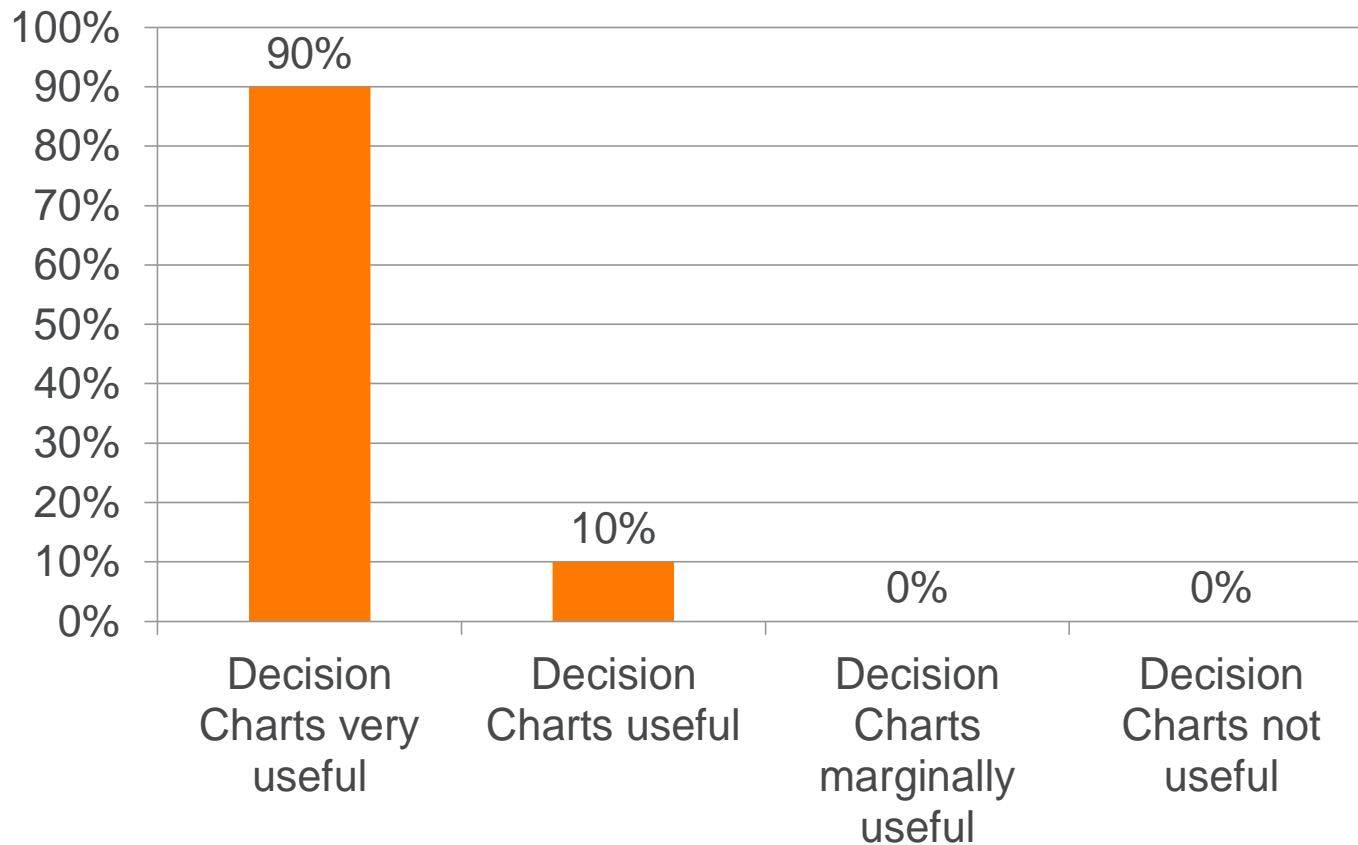
Categorizing Shipments, Determining Security Measures by Using Decision Charts

- For Nuclear Material



Participants' Responses to Usefulness of Decision Charts

How useful did you find the Decision Charts in determining material category and security requirements?



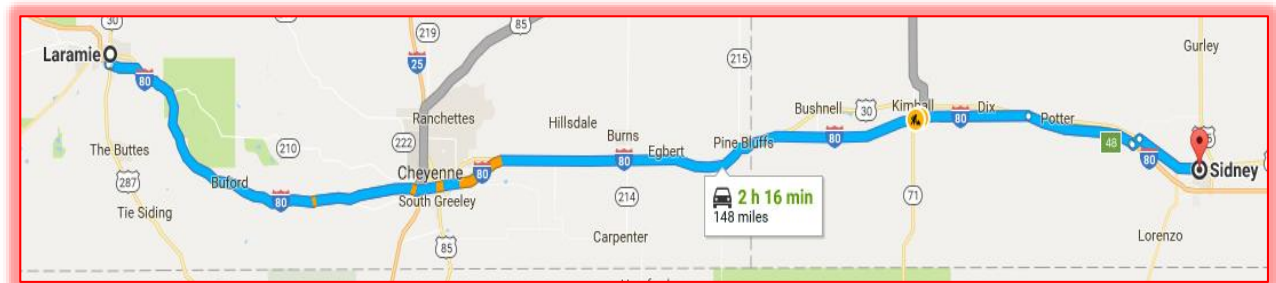
2017
Course
Response

Example of TTX: Planning and Testing Routes (1/2)

TTX involved a given, high-activity shipment:

- Develop shipment route following regulatory guidelines
- Propose safe havens along the route
- Evaluate adequacy of originally proposed safe havens
- Propose alternate safe havens, if necessary
- Perform a route survey, asking:
 1. Is the proposed route consistent with applicable requirements?
 2. Are proposed safe havens adequate?
 3. Does proposed route consider demographic parameters?
 4. Does proposed route consider potential of unplanned events?
 5. Does overall route planning establish sufficient contingency plans?

**Example considered
only the route from
Laramie, WY, to
Sidney, NE
[148 mi (239 km)]**



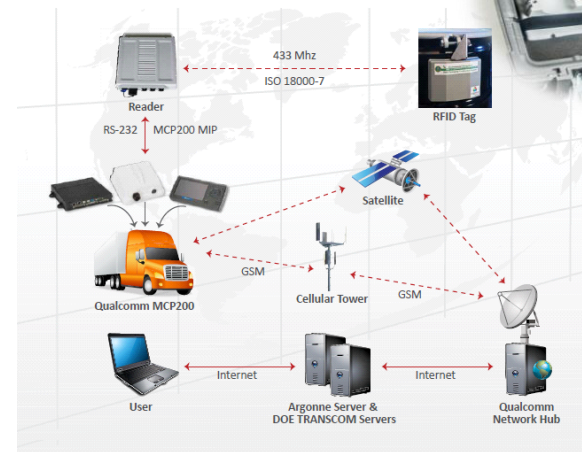
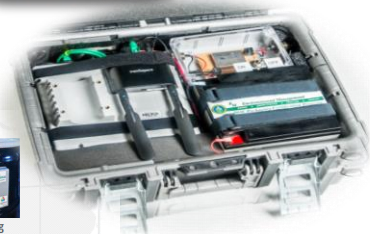
Example of TTX: Planning and Testing Routes (2/2)

- TTX then addressed a real-life event: a weather-caused accident
 - What would have occurred if nuclear material shipment was involved in this accident?
 - How can involvement in such accidents be avoided?

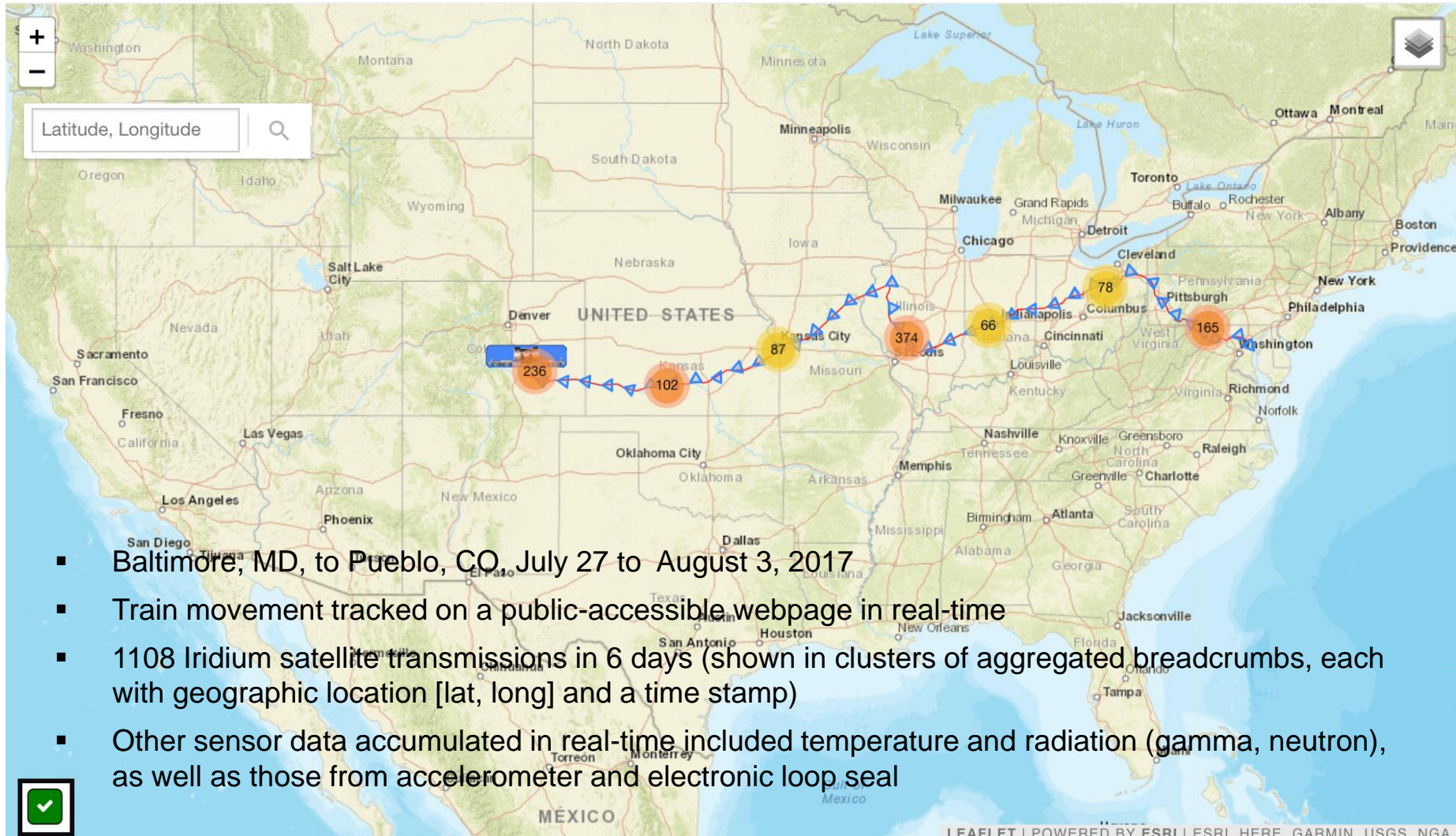


Field Exercise of a Mock Shipment

- Provide participants with portions of a Readiness Review checklist based on a fictitious Transport Security Plan
- Stage a simulated shipment:
 - Use “Box” Truck
 - Load with packages
 - Equip with ARG-US RFID/CommBox-mini monitoring/tracking/communication system for packages and truck entry doors
 - Create role-playing personnel (managers, drivers, escorts)
 - Create intentional deficiencies for participants to identify
- Participants
 - Identify deficiencies and needed Corrective Actions
 - Prepare Corrective Action checklist
- Key Takeaways
 - Must do more than ask “Yes or No” questions
 - Need to investigate adequacy of elements of transport security system



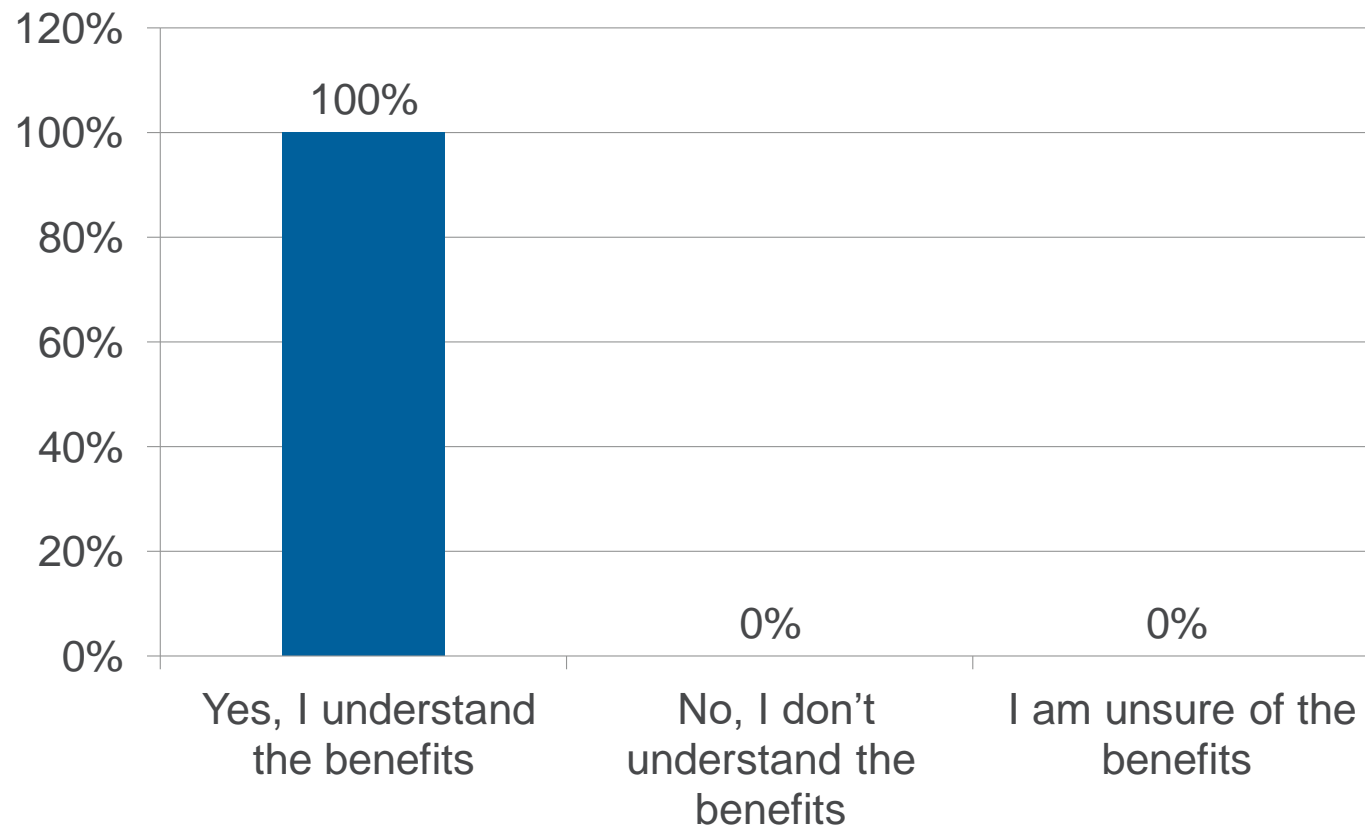
ARG-US Traveler Tracking of Rail Shipment



LEAFLET | POWERED BY ESRI | ESRI. HERE. GARMIN. USGS. NGA

Participants' Responses to Benefits of ARG-US Remote Tracking and Monitoring Systems

Do you understand the security benefits that can be derived from the use of the ARG-US Technologies for the monitoring and tracking of materials during transport?



**2017
Course
Response**

Alliance with UNR/WINS/WNTI/IAEA

- The University of Nevada, Reno (UNR) and Argonne, under the support of DOE PCP, have developed an accredited program, known as The Graduate Certificate in Nuclear Packaging (GCNP)
 - 40 students have enrolled in the GCNP program since 2015; the first GCNP was awarded in December 2016
- World Institute for Nuclear Security (WINS) and World Nuclear Transport Institute (WNTI)
 - Collaborated on two Best Practice Guides (4.8 and 4.10) and the WINS Academy Transport Security Module
- IAEA
 - Interface between Transport Security and Safety for Low-activity Radioactive Materials
- The knowledge and experience accumulated as a result of these training courses and alliances offers the opportunity to leverage future transport security educational efforts worldwide to support capacity building and next-generation security

International Transport Security 2018

- Will convene at Argonne, September 10–14, 2018
- Will focus on requirements imposed by international modal regulatory bodies and recommendations and guidance from relevant international bodies, including:
 - Convention on Physical Protection of Nuclear Material (CPPNM)
 - Amendment to the CPPNM
 - International Atomic Energy Agency (IAEA) Nuclear Security Series documents
 - International regulatory documents for individual modes of transport
- Will utilize additional TTXs to enhance learning

QUESTIONS?

Acknowledgement

This work is supported by the U.S. Department of Energy (DOE), Office of Environmental Management, Office of Packaging and Transportation under Contract No. DE-AC02-06CH11357.

Additional information on the September 2018 course is available at:
<https://rampac.energy.gov/home/education/packaging-university#FY2018>