

Training on Transport Security of Nuclear/Radioactive Materials for Key Audiences

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ABSTRACT

Beginning in 2013, the U.S. Department of Energy (DOE) Packaging Certification Program, Office of Packaging and Transportation, Office of Environmental Management has sponsored a series of three training courses on Security of Nuclear and Other Radioactive Materials during Transport. These courses were developed and hosted by Argonne National Laboratory staff with guest lecturers from both the U.S. and international organizations and agencies including the U.S. Nuclear Regulatory Commission, the Federal Bureau of Investigation, DOE, the National Nuclear Security Administration, DOE national laboratories, the International Atomic Energy Agency, the World Nuclear Transport Institute, and the World Institute for Nuclear Security. Each of the three courses held to date were one week in length. Significant lessons were learned, and have been used to improve the courses as time progressed, along with inclusion of new materials, new exercises, and the use of an advanced electronic voting system that greatly enhanced class interactions. Two options are being considered for adapting the training materials for key audiences in the future: A two-week university credit training course and customized courses for key audiences who may have specific training needs. This paper highlights the lessons learned in previous one-week courses, and discusses the options for university-credit and customized courses/workshops for key audiences.

INTRODUCTION

Since the events on 9/11, major emphasis has been placed, both internationally and in the U.S., on providing enhanced security for the transport of all dangerous goods, including nuclear and other radioactive materials. Increased requirements have been promulgated and detailed recommendations and guidance have been developed on how to provide adequate security during the transport of nuclear and other radioactive materials. These new provisions have been developed both at the international and at the U.S. domestic level.

With these advances, it also became apparent that those involved in the shipping of these materials need to be trained on proper security methods. To fulfill this need, Argonne National Laboratory (Argonne), with the support of the Packaging Certification Program (PCP) in the U.S. Department of Energy's (DOE's) Office of Packaging and Transportation, Office of Environmental Management, developed a pilot training course on transport security [1], which considered both international and U.S.-domestic requirements. This pilot course was held at Argonne in

December 2013 and the course contents and experience were described in a previous paper [2].

As a result of the feedback from the participants in the pilot course, a decision was made to divide the course into two elements: The first element focuses on international transport security, whereas the second element focuses on U.S. domestic transport security. The initial plans for the two elements of the course were outlined in detail [2], and the lessons learned were updated in a summary paper at CONTE 2015 [3] after the first element of the training course was held at Argonne in December 2014. The second element of the training course, which focused only on U.S domestic transport security, was held at Argonne in June 2015.

This paper summarizes the contents of, and enhancements that were made in, the two training course elements conducted in 2014 and 2015. Also discussed are the plans for future training course elements and their customization to serve the needs of stakeholders and key audiences.

The 2014 International Training Course Element

This course element, held in December 2014, included the following enhancements over the pilot course:

- expanding the use of in-class individual and team exercises;
- staging a tabletop exercise (TTX), simulating an adversarial event during transport and the potential response;
- introducing a generic discussion of interfaces between safeguards, safety and security; and
- providing an enhanced demonstration of a mock shipment with a “staged” incident in transit, using the ARG-US radio frequency identification (RFID) system for real-time tracking and monitoring [4].

The TTX was deemed by participants to be one of the highlights of the international element. Another highlight of the 2014 international element was the use of an electronic voting system (EVS) that greatly increased class interactions. The EVS is an anonymous voting system that can be utilized to elicit responses from the audience with carefully designed sets of questions on various topics.

The 2015 U.S. Domestic Training Course Element

This course element was held in June 2015 and delved, in depth, into the requirements imposed by the U.S. Department of Transportation (DOT) and U.S. Nuclear Regulatory Commission (NRC) on shippers of these materials within the U.S., as well as the DOE requirements for certain shipments. Additional modules were designed and added to enhance class interaction. For example, a class discussion was held that focused on real highway incidents (weather-related accidents and road blockages) and on how — in case nuclear or other radioactive material shipments were underway when such incidents occurred — operators needed to be prepared to monitor for such events and have contingency plans for taking appropriate actions.

Also added were two TTXs, one of which was originally designed by the guest lecturers from the Oak Ridge National Laboratory for the National Nuclear Security Administration training course. Other notable additions included modules that

addressed methods for developing response force capabilities along long-distance routes in the U.S., and an overview from one state of its regulatory requirements for escorting certain shipments across the state. The EVS was used throughout this training course element.

THE WORLD INSTITUTE FOR NUCLEAR SECURITY ELECTIVE MODULE ON TRANSPORT SECURITY MANAGEMENT

The World Institute for Nuclear Security (WINS) has developed a suite of general and elective modules that can be used by individuals to obtain training, certification and professional recognition, and to demonstrate leadership and expertise in nuclear security. According to WINS [5], *"After participants complete the Foundation Module and one Elective Module, they will have the option to sit for an exam in one of over 5,100 local accredited test centres in 175 countries. Participants who successfully pass the examinations will receive certification from WINS and be eligible to join the WINS Academy Alumni."* With the exception of the exam, the WINS Academy program is designed to be completed entirely online.

One elective module that became available in the summer of 2015 is "Transport Security Management" [6]. The textbook for this elective module has been developed with extensive input from Argonne, and contains six units: (1) The Evolution of Nuclear Transport Security; (2) The Framework for Transport Security; (3) Preparing for Transport; (4) Key Operational Considerations; (5) Transport Operations and Incident Response; and (6) Transport Scenario Development. This WINS elective module provides a general background on the international aspects of transport security; it does not address country-specific transport security issues. Since it is offered online, it does not involve live interactions in the small-group TTXs or the hands-on field exercises embedded in the two DOE/PCP training course elements conducted by Argonne. Discussion has been initiated with WINS on how to complement the WINS Academy elective module via TTXs conducted remotely on the Internet.

ADAPTING TRAINING MATERIALS FOR STAKEHOLDERS AND KEY AUDIENCES

Two options are being considered for adapting the training materials for stakeholders and key audiences who may have different or specific training needs. Each of these two options is briefly described below.

Two-week, University Credit Training Course

DOE/PCP has been collaborating with the University of Nevada, Reno (UNR) in the development of a graduate certificate program in nuclear packaging (GCNP) that addresses various topics in radioactive material packaging and transport safety and security. Approval for the UNR/GCNP program was received in June 2015 from the Northwest Commission on Colleges and Universities. Students will receive UNR graduate credit if they (1) gain special graduate admission to UNR, (2) enroll in the UNR course and pay tuition, and (3) pass the exams and standards set forth for the courses. These credits may be applied toward graduate degrees at UNR or any other university that accepts that credit. If students receive a C grade or better, they will be able to use the credits toward the certificate. Students must have at

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least a B average in the courses to receive the certificate. The following PCP courses offered by Argonne, Lawrence Livermore National Laboratory (LLNL), and Savannah River National Laboratory (SRNL) have been approved, along with other UNR courses, for the certificate program:

ME 691 - ASME Pressure Vessel Code for Nuclear Transport and Storage (Argonne)
ME 692 - QA for Radioactive Material Packaging (Argonne)
ME 694 - Nuclear and Other Radioactive Materials Transport Security (Argonne)
ME 695 - SARP Review and Confirmatory Analysis (LLNL)
ME 696 - Management of SARP Preparation (SRNL)
ME 697 - Radioactive Material Package Operations and Leak Testing (SRNL)

The transport security course (ME 694) is one of the accredited courses, and upon completion by a participant can provide two university credits; one credit for each of the two training course elements on international and U.S. domestic transport security. Additional information on the UNR's GCNP program can be found at <http://www.unr.edu/degrees/nuclear-packaging/certificate> or <https://rampac.energy.gov/home/education/packaging-university>.

The development of the ME 694 course curriculum for the GCNP is underway. The curriculum will be made available in the spring of 2016.

Customized Courses/Workshops for Key Audiences

The comprehensive training material that has been developed, tested and improved in the two training course elements can be readily adapted to meet the needs of key audiences. The customized training course could be one to three days in length, and delivered by one to three lecturers at facilities away from Argonne.

Upon request, Argonne is prepared to tailor the modules used in the two-element training course to the needs of specific audiences, potentially on a function-specific basis. These audiences include (a) consignors, (b) carriers, (c) state regulators, (d) local law enforcement agencies that may be called upon to respond to a transport security event, (e) local emergency responders, etc. For example, the training materials can be adapted to include only the transport security requirements for radioactive material, if the requesting consignor only ships radioactive sources.

If training is needed only on certain transport security aspects mandated by regulations, the training material can be adapted to that specific functional need. For example, if the consignor desires to have appropriate personnel trained on what is required in the development and application of Transport Security Plans (as specified by DOT and NRC), then the training could be limited to a focus on that topic. Similarly, if a consignor or carrier is not involved in all the modes of transport (i.e. road, rail, water and air), then the training can be adapted to only those modes that apply.

Other variants of customized training include embedded workshops presented at conferences of professional societies such as the Institute of Nuclear Materials Management (INMM) or the American Nuclear Society, or at annual meetings such as Waste Management Symposia, National Transportation Stakeholders Forums, or

Contractors Transportation Management Association meetings. Prospective audiences for customized training/workshops are encouraged to contact any of the authors of this paper.

SUMMARY/CONCLUSIONS

A series of three training courses on transport security for nuclear and other radioactive materials were conducted by Argonne National Laboratory for DOE/PCP between 2013 and 2015. That effort matured during 2014/2015 into a two-element training course, one on international transport security and the other on U.S. domestic transport security. The two elements of the training course included lectures, in-class discussions, small-group TTXs, hands-on field exercises, a demonstration of the ARG-US RFID tracking and monitoring system for transport security applications, homework, and an exam.

In addition to the two training course elements conducted during 2014 and 2015, Argonne contributed significantly to the development of the WINS Academy "Transport Security Management" textbook, and discussions are underway with WINS on how to complement the WINS Academy elective module with the Argonne course elements to enrich the learning objectives of the participants. Future plans include a two-week, university-credit training course as part of the GCNP program at UNR, and customized, function-specific training courses or workshops that are held away from Argonne at a requesting organization's designated facility.

ACKNOWLEDGMENTS

This work is supported by the U.S. Department of Energy (DOE), Office of Packaging and Transportation, Office of Environmental Management, under Contract No. DE-AC02-06CH11357. The submitted manuscript has been created by UChicago Argonne, LLC, as operator of Argonne National Laboratory under Contract No. DE-AC02-06CH11357 with DOE. The U.S. Government retains for itself, and others acting on its behalf, a paid-up, nonexclusive, irrevocable worldwide license in said article to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the government.

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