



TEPP Radiological Training Matrix

The U.S. Department of Energy Transportation Emergency Preparedness Program offers a variety of training courses to prepare emergency responders for response to transportation accidents involving radioactive material. The courses are divided into distinct topics and delivery options. By establishing training prerequisites, each option is designed to target specific types of emergency responder audiences and ensure emergency responders can identify and obtain the appropriate level and type of training to develop necessary skills for response and management of a transportation accident involving radioactive materials.

Target audiences include: fire services, law enforcement, EMS, environmental and public health, emergency management, healthcare, public works, dispatch, medical examiners, coroners, and crime scene investigators.

The matrix below identifies the targeted OSHA level of training offered by the various courses.

Awareness	Operations	Technician	Specialist	Name of Course	Offering Agency
X				Modular Emergency Response Radiological Transportation Training (MERRTT) Overview <ul style="list-style-type: none"> • Facilitated: 1-3 hours • Prerequisites: None • Conferences only 	DOE TEPP
X				Understanding Radiological Threats in Your Community <ul style="list-style-type: none"> • Facilitated: 1-3 hours • Prerequisites: None • Conferences only 	DOE TEPP
X	X			Online MERRTT Refresher <ul style="list-style-type: none"> • Self-paced online course: 1-2 hours • Prerequisites: Participants must have previously completed a radiological response training program • This is a refresher course 	DOE TEPP
X	X	X		Compressed Modular Emergency Response Radiological Transportation Training (CMERRTT) <ul style="list-style-type: none"> • Facilitated refresher course: 8 hours • Prerequisites: Participants must have previously completed a radiological response training program • Often taught at conferences 	DOE TEPP
X	X	X		Modular Emergency Response Radiological Transportation Training (MERRTT) & TTT <ul style="list-style-type: none"> • Facilitated: 16-hours • Prerequisites: None • The Train-the-Trainer module is conducted at the end of the second day of training 	DOE TEPP



		X		Technician Modular Emergency Response Radiological Transportation Training (TMERRTT) <ul style="list-style-type: none"> Facilitated: 8 hours Prerequisite: 16-hour MERRTT within the prior year 	DOE TEPP
			X	Radiation Specialist <ul style="list-style-type: none"> Facilitated: 40 hours Prerequisite: 16-hour MERRTT course or equivalent 	DOE TEPP
			X	Hospital Emergency Department Management of Radiation Accidents Course <ul style="list-style-type: none"> Facilitated: 8 hours Prerequisite: FEMA IS-346 	FEMA
		X	X	Advanced Radiation Instrumentation <ul style="list-style-type: none"> Facilitated 3-4 hours Prerequisites: Students must have previously completed a radiological response training program Conferences only 	DOE TEPP

A special note about the MERRTT modules/courses:

- The MERRTT modules/courses have been reviewed by the Department of Homeland Security and accepted into the listing of federal courses available for State Administrative Agencies to employ consistent with state strategies.*
- The course has been reviewed by OSHA, who evaluated against the requirements of 29 CFR 1910.120 (q) and determined that it relates to a safe response to a radiological transportation incident when presented in conjunction with other hazardous materials training provided by the employer.*



MERRTT Overview

The overview is designed to be delivered in a 1 to 3-hour block designed to discuss how emergency responders should prepare for response to transportation accidents involving radioactive material. The overview presents and explains the Transportation Emergency Preparedness Program (TEPP). The presentation explains the comprehensive approach to planning and training for transportation incidents involving radioactive materials. The presentation details the available readiness assessment tools, planning tools including, model procedures, exercise scenarios, and the various types of training programs.

Prerequisites – None. The overview will assist students in developing an understanding of how to prepare and train for response to a radiological accident involving radioactive material.

Target Audiences – This overview is available to all types of emergency responders interested in understanding and planning for response to a transportation accident involving radioactive material.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience and providing adequate classroom arrangements, including, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers.

Understanding Radiological Threats in Your Community

This program is designed to be delivered during a 1 to 3-hour workshop. The session will review case histories of actual incidents involving radioactive material. Instructors will create an informative and participative learning environment during the discussion about these incidents. Theft, malicious intent, and transportation accident case studies involving radioactive material will be discussed during this session. Through the use of actual incident pictures, props, and radioactive material sources, students will participate in an interactive discussion about how they can recognize, detect, and protect themselves and their community from radiation and contamination.

Prerequisites – None. Students will review case histories to develop an understanding of how to prepare and train for a response to radiological accidents.

Target Audiences – This program is available to all types of emergency responders interested in understanding and planning for response to a transportation accident involving radioactive material.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience and providing adequate classroom arrangements, including, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers.



Online Modular Emergency Response Radiological Transportation Training Refresher (OMERTT)

The Online MERTTT Refresher was developed with the responder in mind. It is an interactive scenario-based training developed to test participants knowledge and awareness when responding to an accident involving radioactive material. Once the training is complete, a certificate will be generated and emailed to the participant. To receive a certificate, students must complete the on-line training. (<https://teppinfo.com/onlinemertrt>)

Prerequisites – Students should have previously completed a radiological response training program.

Target Audiences – Emergency responders assigned the responsibility to respond to transportation accidents involving radioactive material.

Host Agency Responsibilities – Students must have access to the internet and a computer.

Compressed Modular Emergency Response Radiological Transportation Training (CMERTT)

This 8-hour training program is offered to audiences who have completed previous radiological response training. The course consists of seven 30-minute modules and three hands-on practical exercises. Students will receive a comprehensive review ensuring their understanding of radioactive material, radiological survey instruments and decontamination techniques for handling radiologically contaminated victims. Hands-on practical exercises verify the student understanding and knowledge of radiological principles, instrument operation, decontamination techniques and employing radiologically contaminated patient treatment practices is solid. The course includes use of “live” radiation sources in the practical exercises to reinforce learning. Upon successful completion of this course students will receive a certificate from the Department of Energy’s Transportation Emergency Preparedness Program, including up to 5 hours of continuing education hours (CEH) for medical response personnel.

Prerequisites – Students must have previously completed a radiological response training program.

Target Audiences – Emergency responders assigned the responsibility to respond and support first responder activities at radiological transportation accidents.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience (a minimum of 15 students are requested to ensure the training is cost effective), and for providing adequate classroom arrangements. The classroom arrangement should include tables for the students, several of which will be used for the practical exercises, and, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers. The host agency is also requested to provide a backboard/spine-board to be used during the patient packaging practical exercise.



Modular Emergency Response Radiological Transportation Training (MERRTT)

This 16-hour training program is designed to take the complex topic of a radiological accident response and break it down into 16 easily understood modules and hands-on practical exercises. Students will be presented with the training to simplify the topic while developing a comprehensive understanding of radioactive material, radiological survey instruments, decontamination techniques for handling radiologically contaminated victims, and resources available to responders during a response. An important element of the training is detailed information on the types of packages used to transport radioactive material. The course includes use of “live” radiation sources in the practical exercises to reinforce learning. Upon successful completion of the MERRTT course students will receive a certificate from the Department of Energy’s Transportation Emergency Preparedness Program, including up to 9 hours of continuing education hours (CEH) for medical response personnel. MERRTT meets the WIPP Land Withdrawal Act training requirements and is listed on the Department of Homeland Security Federal Approved Courses Listing.

By attending the Train-the-Trainer module, one additional hour of instruction delivered at the end of the 16 hours of training, students can be qualified as MERRTT trainers.

Prerequisites – None. This training will develop necessary responder skills for all levels and types of responders.

Target Audiences – All types and levels of emergency responders assigned the responsibility to enter the hot zone, perform emergency rescue, identify package types, and isolate the hot zone until advanced level support arrives.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience (a minimum of 15 students are requested to ensure the training is cost effective), and for providing adequate classroom arrangements. The classroom arrangement should include tables for the students, several of which will be used for the practical exercises, and, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers. The host agency is also requested to provide a backboard/spine-board to be used during the patient packaging practical exercise.

Technician Modular Emergency Response Radiological Transportation Training (TMERRTT)

This 8-hour technician training program is aligned with the specific radiological competencies listed in NFPA 472 for a Technician Level and Agent Specific responder. The training includes a pre-test to verify responder knowledge and understanding of the actions necessary for radiological accident response. The course content includes advanced level training on instrument operation, radiological detector selection and limitations. In addition to the classroom training, students using their incident command system will participate in three field drills. In preparation for the exercises the students will establish an incident command staff, assign positions, and develop objectives for each of the three field drills. Upon completion of the incident command structure, students will discuss the field drill radiation safety plan, addressing protective clothing considerations, process for mapping the scene, using radiological instruments demonstrate how to conduct both radiation and contamination surveys, identify various types of “live” radiation sources, establishing control zone boundaries, explain and demonstrate decontamination methods and contamination controls. Upon successful completion of this



course students will receive a certificate from the Department of Energy's Transportation Emergency Preparedness Program.

Prerequisites – Technician Level Hazardous Materials Certification and completion of the DHS/FEMA Radiological Response Team Initial Course, US Department of Energy's Modular Emergency Radiological Response Transportation Training (MERRTT – TEPP 201), or equivalent. The host organization should have a wide selection of radiation and contamination detection instruments and personnel should be proficient in their use. This course focuses on different detection technologies and their application and is not designed for agencies that do not have radiation detection equipment or agencies who have a limited selection of equipment.

Target Audiences – Emergency responders assigned the responsibility to enter the hot zone, measure and map radiation levels, conduct contamination swipes, perform decontamination, and execute mitigation activities.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience (a minimum of 15 students are requested to ensure the training is cost effective), and for providing adequate classroom arrangements for the lecture portion of the training. The classroom arrangement should include tables for the students, and, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers.

There is some room for negotiation on the following requirements for the drill portion of TMERRTT. The final decision on whether TMERRTT can be conducted at a particular location will be made by TEPP Central Operations. First, the host facility must be configured so that three drills can be conducted simultaneously. These three areas MUST be in close proximity to one another. Course participants will need to be able to walk from one drill station to the next in a short period of time. This will require the following areas:

1. A multi-story building or multi-room facility where high activity sources can be hidden. This building must NOT be occupied during the time of the exercises or during exercise setup. Examples of facilities that may work well include a fire department drill tower or a multi-room warehouse.
2. A high bay or enclosed area where a decon tarp can be set up and where patient rescue handling can be simulated. This will require an enclosed open area that is at least 16 feet by 35 feet.
3. A large open parking lot or roadway where a mock accident scene can be set up. This area will need to be free of pedestrian traffic as high activity sources will be used in this area.

Additionally, the host agency will need to provide high activity sources for use in the drills. If the host agency does not have access to some of the sources required below,



TEPP Central Operations may be able to help provide sources. TEPP assistance will depend on fees and individual state requirements and reciprocity agreements regarding the use of sources. The following sources are required at a minimum:

1. Four individual sources that give a reading of at least 50 mR/hour at 1 foot (e.g., 3.5+ millicurie Cobalt-60 source or a 15+ millicurie cesium-137 source). ~30 millicurie cesium-137 brachytherapy sources have been used in the past and have worked very well.
2. Four individual sources that give a reading of at least 10 mR/hour at 1 foot (e.g., 1+ millicurie Cobalt-60 source or a 3+ millicurie cesium-137 source).

Optional sources that would be nice to have in the training include a neutron source (e.g., AmBe source) and either a density gauge or radiography camera.

Radiation Specialist

NFPA 470, Hazardous Materials/Weapons of Mass Destruction (WMD) Standard for Responders 2022 Chapter 32, *Competency for Hazardous Materials/WMD Technicians with a Radiological Hazard Specialty*. Chapter 32, *Competency for Hazardous Materials/WMD Technicians with a Radiological Hazard Specialty*. Chapter 32, *Competency for Hazardous Materials/WMD Technicians with a Radiological Hazard Specialty*.

Prerequisites – Students interested in obtaining a radioactive material specialty must have completed MERRTT or equivalent training, hold an organizational position that requires the development of the radiation specialist skills and be trained to meet all competencies of CFR 1910.120 first responder awareness, operations, and hazardous materials technician levels. Additional training to meet Department of Transportation, Environmental Protection Agency, Occupational Safety and Health Administration, and other applicable state, local, or provincial occupational health and safety regulatory requirements will greatly improve the student's ability to successfully complete this training course.

Target Audiences – Emergency responders and radiation authorities assigned the responsibility to respond and provide guidance and recommendations on safety and methods to execute mitigation activities for radiological incidents.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience (a minimum of 15 students are requested to ensure the training is cost effective), and for providing adequate classroom arrangements for the lecture portion of the training. The classroom arrangement should include tables for the students, and, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers.

Additionally, the host agency will need to provide several high activity sources. If the host agency does not have access to some of the sources required below, TEPP Central



Operations may be able to help provide sources. TEPP assistance will depend on fees and individual state requirements and reciprocity agreements regarding the use of sources. The following sources are required at a minimum:

1. Four individual sources that give a reading of at least 50 mR/hour at 1 foot (e.g., 3.5+ millicurie Cobalt-60 source or a 15+ millicurie cesium-137 source). ~30 millicurie cesium-137 brachytherapy sources have been used in the past and have worked very well.
2. Four individual sources that give a reading of at least 10 mR/hour at 1 foot (e.g., 1+ millicurie Cobalt-60 source or a 3+ millicurie cesium-137 source).

Optional sources that would be nice to have in the training include a neutron source (e.g., AmBe source) and either a density gauge or radiography camera.

Hospital Emergency Department Management of Radiation Accidents Course

Federal Emergency Management Agency and the Department of Energy will only offer the Radiological Training for Hospital Personnel Course (FEMA G-346) in support of TEPP and WIPP sponsored exercises. This 8-hour course is designed to introduce hospital medical care providers to ionizing radiation, the biological effects of ionizing radiation, facility preparation, radiological instrumentation, patient decontamination, and patient care/treatment. Upon completion of the classroom training, care providers will participate in a hands-on exercise for handling patients who have been exposed to ionizing radiation and/or are contaminated with radioactive material. The hands-on exercise allows hospital care providers the opportunity to demonstrate prompt and appropriate care for accident victims while minimizing exposure and preventing the spread of contamination. The course is targeted at all hospital type medical care providers who may be responsible for managing or treating a patient that has been exposed to radiation or is contaminated with radioactive material. The modular design of the program has been structured so non-medical care providers (e.g., maintenance, security, etc.) can attend the first 3 or 4 modules and then return in the afternoon for the hands-on exercise. Upon successful completion of this training, hospital personnel will have developed the knowledge and skills necessary to safely perform assigned duties to handle and treat victims from a radiological incident.

Prerequisites – Successful completion of Orientation to Hazardous Materials for Medical Personnel (FEMA IS-346). This training will assist hospital medical care providers in developing an understanding of/and the skills needed to handle and treat patients that have been exposed to radiation or are contaminated with a radioactive material.

Target Audiences – All type of hospital medical care providers who are interested in expanding their understanding of managing and treating patients that have been exposed to radiation or are contaminated with radioactive material.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience (a minimum of 15 students are requested to ensure the training is cost effective), and for providing adequate classroom arrangements for the lecture portion of



the training. The classroom arrangement should include tables for the students, and, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers.

To conduct the practical exercises in conjunction with this class, various Emergency Room supplies are required. These requirements can vary depending on whether the practical exercises are conducted in an actual ER or if they are conducted in the classroom. TEPP representatives will coordinate with the host medical agency/hospital prior to the conduct of the training to ensure the necessary supplies are arranged.

Advanced Radiation Instrumentation

This session will include information on performing instrument and detector operations, large area scene surveys and methods of mapping radiation and contamination at an accident scene involving the release of a radioactive material. Participants are encouraged to bring their jurisdiction's radiological survey instruments to the class. It is recommended that responders planning to participate in this training session be familiar with basic instrument operations, the different types of radiation, and have an understanding of basic radiological terms. Participants will learn to identify the capabilities and limiting factors with gas-filled radiation detection and measurement instruments. Identify the capabilities and limiting factors with scintillation style radiation detectors. Also, they will gain an understanding on the importance of radiation energy on detectors response. There will be discussion of radiation detection solutions and review the fundamental issues important in the selections and operation of all radiation survey meters.

Prerequisites – Students must have previously completed a radiological response training program and come from an agency that has radiation detection equipment.

Target Audiences – Emergency responders assigned the responsibility to enter the hot zone, make decisions on selection of radiation detection instruments, measure and map radiation levels, conduct contamination swipes, perform decontamination, and execute mitigation activities.

Host Agency Responsibilities – The sponsoring agency is responsible for recruiting the audience and providing adequate classroom arrangements, including, if possible, a projection system with a speaker system. If no projection system is available, TEPP Central Operations can ship a projector with speakers.