Transportation Emergency Preparedness Program (TEPP) Update

The Council of State Governments (CSG)
Midwestern Radioactive Materials Transportation Committee
2025 NTSF Annual Meeting – Las Vegas, NV

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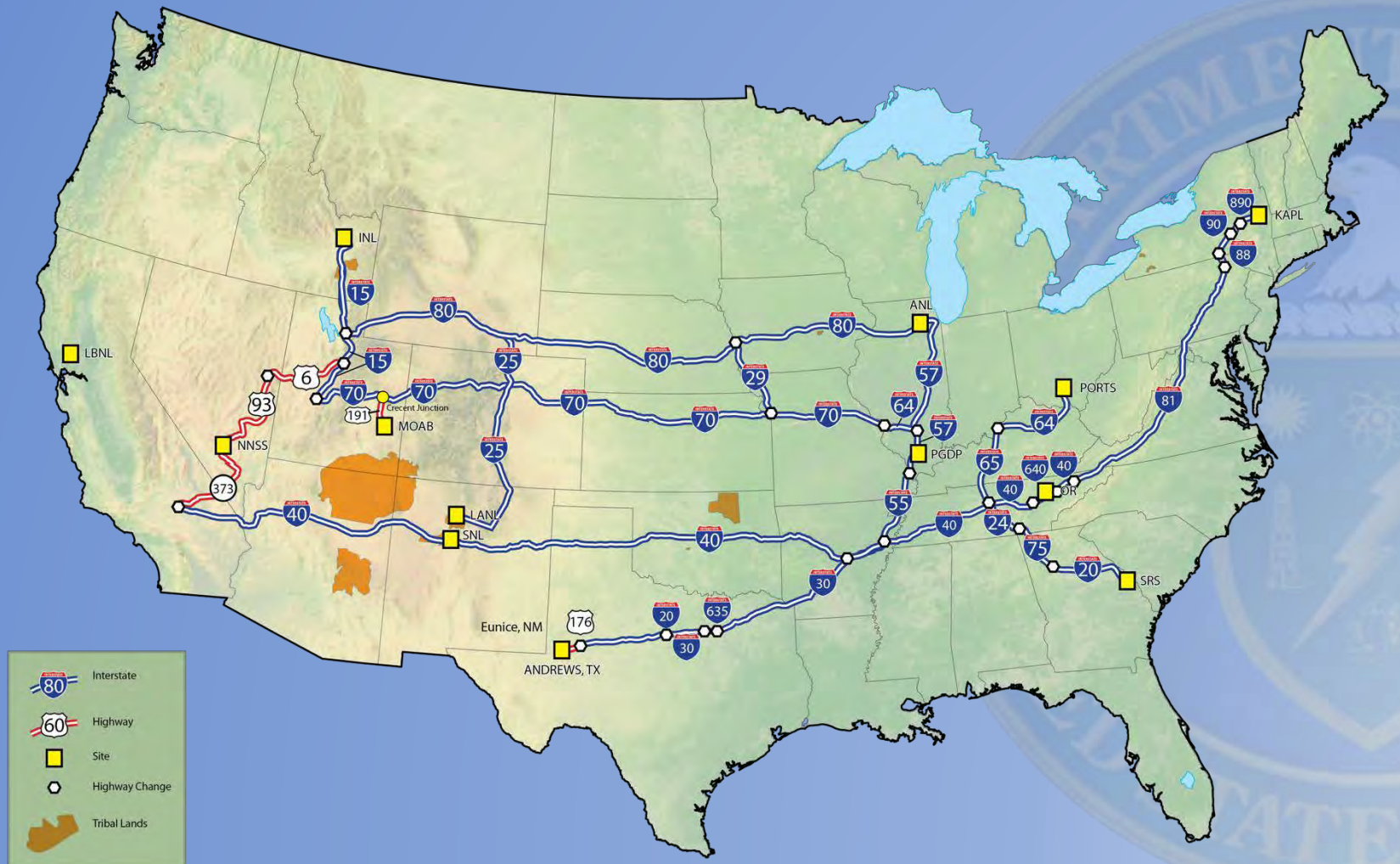
TEPP Mission

To ensure that federal, state, tribal, and local responders have access to the plans, training, and technical assistance necessary to safely, efficiently, and effectively respond to transportation accidents involving DOE-owned radioactive materials.

DOE Shipping Routes

Office of Environmental Management



DOE Shipping Routes

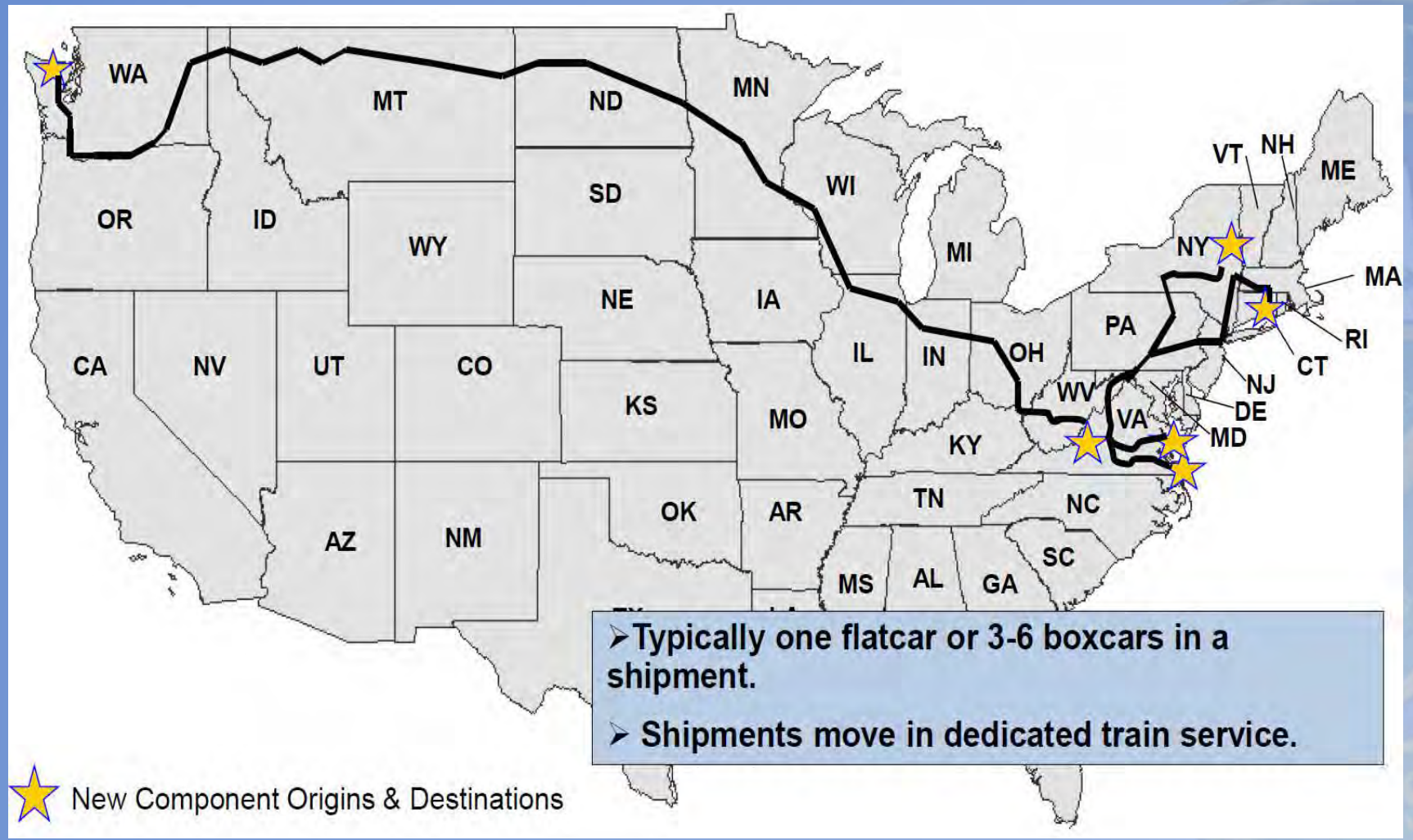
Waste Isolation Pilot Plant

DOE Shipping Routes

National Nuclear Security Sites

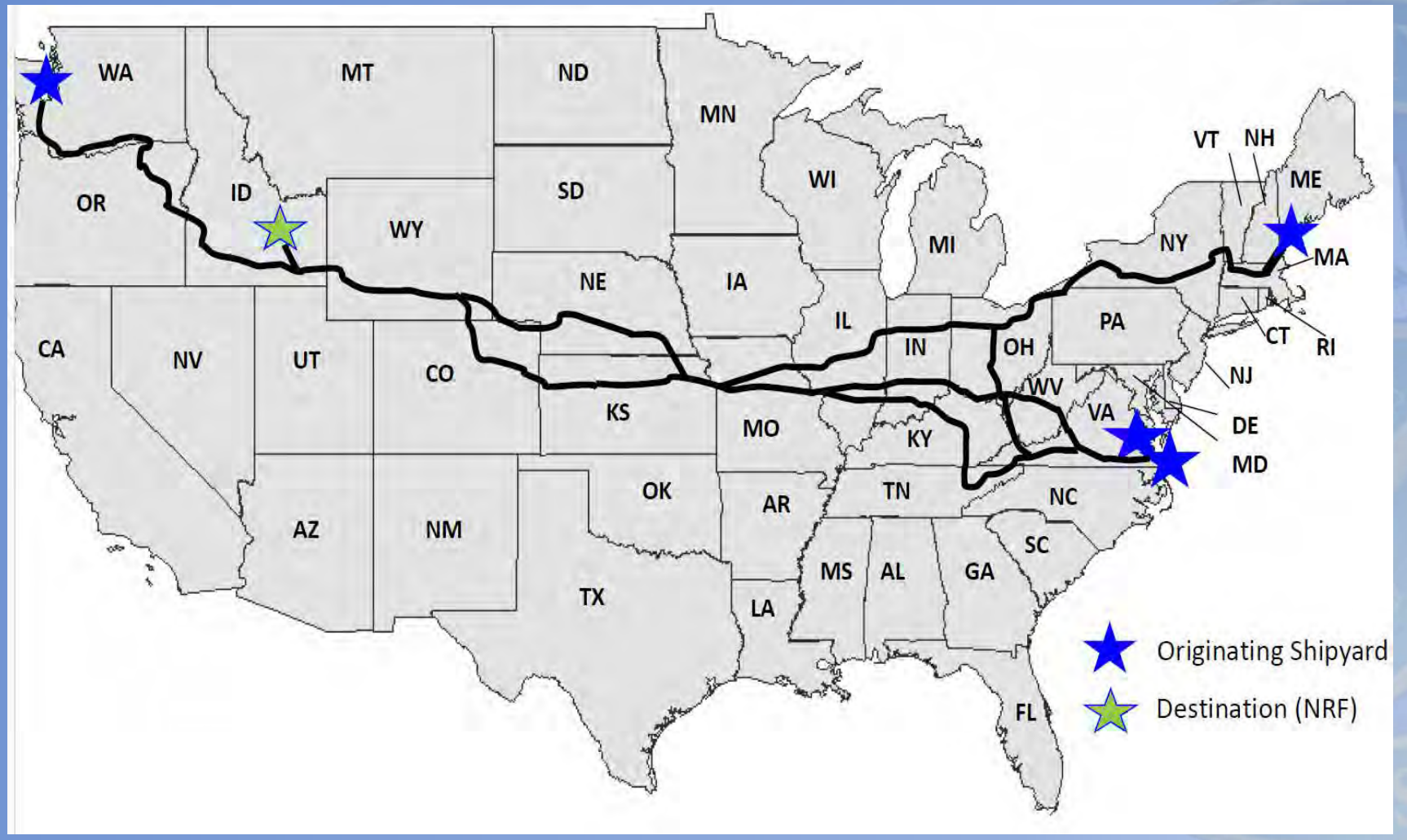
DOE Shipping Routes

Typical New Component Shipping Routes



DOE Shipping Routes

Typical Naval Spent Fuel Shipping Routes



TEPP Mission

Suite of tools developed to aid response jurisdictions in their readiness activities

- Training
- Needs Assessment
- Model Procedures
- Exercises

FY 2025 Training to Date

Courses	NE Classes-Students	Midwest Classes-Students	WIEB Classes-Students	SSEB Classes-Students
Full MERRTT	6 – 94	7 – 127	15 – 205	14 – 184
C-MERRTT	3 – 58	2 – 41	10 – 89	10 – 77
P-MERRTT		3	3 – 42	3
T-MERRTT				11 - 140
Hospital		1 – 26	1 – 15	
Specialist			1 – 32	1 – 23
Totals	**9 – 152**	**9 – 171**	**30 – 383**	**36 – 427**

Transportation Emergency Preparedness Program
Emergency Responder Radioactive Material Quick Reference Sheet

Initial Response/Scene Size Up

From a distance, try to identify the following:

- Spills, leaks, or fire
- Any victims needing rescue
- Type of vehicle and packages involved
- Placards, labels, or package markings
- Container/package damage
- Any person knowledgeable of the scene
- Location of shipping papers
- Proper protective clothing needed for entry

For radioactive materials, establish an **initial isolation zone of 75 feet** in all directions. Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels. Attempt to detain uninjured personnel who may be contaminated until they can be surveyed by local Radiation Authority.

Vehicle Placards

Standard Placard

Vehicle placarding is required when transporting:

- One or more packages with a Yellow-III label
- Exclusive use shipments of LSA/SCO materials
- HRCQ shipments (see placard below)

Highway Route Controlled Quantity (HRCQ) Placard

HRCQ is a high activity shipment transported in a Type B package. The package will always have a Yellow-III label regardless of radiation level. HRCQ shipments by highway will require the standard placard on a white square background with a black border as shown at left.

Package Labels

Radioactive White-I
Expect up to 0.5 mrem/hr at surface of package.

No Transport Index associated with this label.

Radioactive Yellow-II
Expect > 0.5 mrem/hr up to 50 mrem/hr at surface of package.

Maximum Transport Index is 1 or 1 mrem/hr at 1 meter.

Radioactive Yellow-III
Expect > 50 mrem/hr up to 200 mrem/hr* at surface of package.

Maximum Transport Index is 10 or 10 mrem/hr at 1 meter.*

Fissile Label
For packages containing fissile material, this label will appear with one of the three labels shown above. Criticality Safety Index on label is used by shipper to limit the number of packages on a conveyance.

EMPTY Label
For packages that previously contained radioactive material (e.g., Type B Packages) and have been emptied of their contents. Package may still contain internal contamination. Expect < 0.5 mrem/hr at surface of package.

* May read up to 1,000 mrem/hr at package surface and up to 10 mrem/hr at 2 meters (6.6 feet) if package is transported in a closed transport vehicle under exclusive use provisions. Shipping papers will denote "exclusive use."

Shipping Paper Information

Look for the following information on shipping papers for radioactive material:

- Emergency response telephone number
- Proper Shipping Name and UN ID
- Name of radionuclide(s) (e.g., Cs-137)
- Radioactivity level per package in MBq, GBq, etc. (will be listed as "activity")
- Category of label applied (i.e., White-I, Yellow-II, Yellow-III)
- Transport Index (for Yellow-II and Yellow-III labeled cargo only)
- The letters "RQ" if material is a Reportable Quantity of hazardous material
- Package Type (e.g., IP, Type A, Type B)
- Physical & chemical form of material (if not special form)
- "Fissile Excepted" or Criticality Safety Index (for fissile materials only)
- "Exclusive use" if shipment is being made under exclusive use provisions
- Highway Route Controlled Quantity or "HRCQ" (if shipment is HRCQ)

Common Prefixes

The activity level shown on shipping papers and on the radioactive label is required to be listed in **becquerel**. The becquerel (Bq) is a quantity of radioactivity. The Bq is a very small amount of activity; equal to 1 nuclear disintegration per second. Because a becquerel is such a small amount of activity, prefixes are often used to change the size of the unit. For example 2.2 MBq denotes 2.2 million Bq or 2.2 million disintegrations per second. Many of the commonly used prefixes are shown in the table below.

Symbol	Prefix Value
k	kilo = 1 thousand
M	Mega = 1 million
G	Giga = 1 billion
T	Tera = 1 trillion
P	Peta = 1 quadrillion

3/2019

Transportation Emergency Preparedness Program
Emergency Responder Radioactive Material Quick Reference Sheet

Radiological Protection Principles

Radiation is energy and cannot be detected by the human senses. A radiological survey conducted with specialized equipment is the only way to confirm the presence of radiation. Radiation survey instruments typically measure in units of µR/hour, mR/hour, or R/hour.

Contamination is radioactive material in an unwanted location (e.g., deposited on surfaces, skin, or clothing). Internal contamination can occur when radioactive material is inhaled, ingested, or lodged in an open wound. Contamination should not be suspected unless radioactive material packages are damaged and/or you suspect they have been breached. Contamination survey instruments typically measure in units of counts per minute (CPM) or kilo counts per minute (kCPM).

Decontamination involves removing radioactive material contamination from personnel or equipment. Remember that patient treatment takes priority over radiological controls.

For life-threatening injuries, decontamination is not a priority. Implement contamination controls as the situation allows but do not delay patient care or treatment. Attempt to contain contamination on patient using a blanket or sheet and notify the hospital of possible contamination as soon as possible.

For non life-threatening injuries where you suspect the patient may be contaminated:

- Carefully cut away and remove patient's outer clothing
- Treat injuries as necessary
- Package patient using double blanket method to help contain any possible contamination
- Notify hospital of possible contamination as soon as possible

Responder Safety involves wearing proper PPE and minimizing radiation exposure:

- Minimize time in radiological area
- Maximize distance from radiation sources
- Place shielding between you and source of radiation (e.g., vehicle)

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Guidelines for Control of Emergency Exposures

Adapted from: EPA-400/R-17/001

Dose Limit	Activity Performed	Condition
5 rem	All occupational exposures	All reasonably achievable actions have been taken to minimize dose
10 rem	Protecting critical infrastructure	Exceeding 5 rem unavoidable and all appropriate actions taken to reduce dose. Monitoring available to project or measure dose.
25 rem	Lifesaving or protection of large populations	Exceeding 5 rem unavoidable and all appropriate actions taken to reduce dose. Monitoring available to project or measure dose.
>25 rem	Lifesaving or protection of large populations	All conditions above and only for people fully aware of the risks involved

Fissile Material: Except for natural/depleted uranium, any material containing U-233, U-235, Pu-239 or Pu-241. Fissile material packages requiring criticality controls will have the fissile label.
Industrial package: Designed for shipments of low activity material and contaminated objects, which are usually categorized as radioactive waste. They contain non life-endangering amounts of radioactive material. There are three categories of industrial packages: IP-1, IP-2, and IP-3.
LSA/SCO: Low Specific Activity (LSA) material means the radioactive material is distributed throughout a substance to such an extent that it poses little hazard if released in an accident. Surface Contaminated Object (SCO) means a solid object which is not itself radioactive but has radioactive material distributed on its surface. Examples include contaminated tools/equipment.
Rem: A measurement unit of radiation dose. Rem measures the amount of damage to human tissue from ionizing radiation. 1 µrem is one-millionth of a rem; 1 mrem is one-thousandth of a rem. The average member of the general population receives about 620 mrem (0.62 rem) annually.
Special Form: Radioactive material in an accident-tested, non-dispersible form.
Transport Index (TI): Determined by taking the maximum radiation level (as measured in mrem/hr) at one meter (3.3 feet) from an undamaged package. The TI will be found on Yellow II and Yellow III labels, and shipping papers when required.
Type A package: Designed to survive normal transport conditions (minor mishaps and rough handling). Type A packages contain non life-endangering amounts of radioactive material.
Type B package: Designed to survive severe accidents conditions. Life threatening conditions may exist only if contents are released or if package shielding fails. The designations "(U)" or "(M)" (e.g., Type B (U) or Type B (M) Package) refer to unilateral (U) or multilateral (M) approval of the package design.

Stay Time Table

Gamma Dose Rate	Stay time to receive this dose				
	1 rem	5 rem	10 rem	25 rem	100 rem
1 mR/hour	6 weeks	30 weeks	1 year	–	–
5 mR/hour	200 hours	6 weeks	12 weeks	30 weeks	2 years
100 mR/hour	10 hours	50 hours	100 hours	250 hours	6 weeks
1 R/hour	1 hour	5 hours	10 hours	25 hours	100 hours
10 R/hour	6 minutes	30 minutes	1 hour	2.5 hours	10 hours
100 R/hour	36 seconds	3 minutes	6 minutes	15 minutes	1 hour

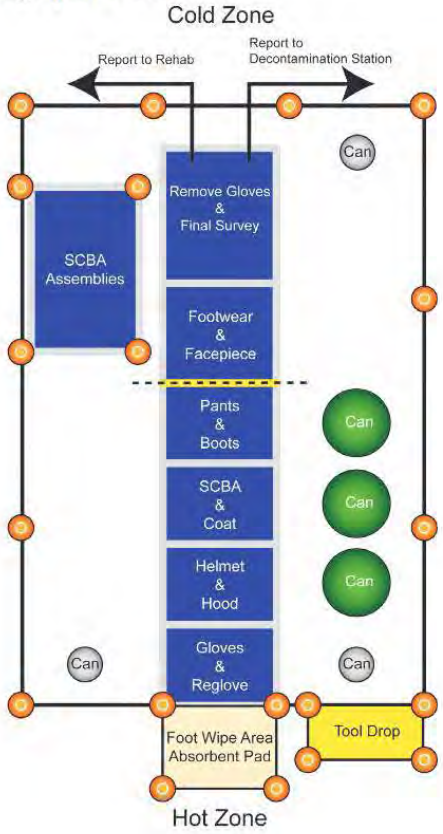
Transportation Emergency Preparedness Program
Bunker Gear Decontamination Corridor Set Up, Dress Up, and Dressdown Job Aid

Decontamination Corridor Set Up

Select a location that is uphill, upwind, and upstream from the incident scene

Prior to setting up the decontamination corridor, survey the selected location to verify that the area is free of radioactive contamination and that radiation levels are at or near natural background levels

Position elements: tarp, waste cans, pads, cones/anchors, and tool drop area as indicated in the graphic below:



Dressing Up in Bunker Gear

Wear typical firefighting bunker gear, which includes, helmet, hood, coat, pants, boots, and gloves

Wear respiratory protection e.g., self contained breathing apparatus (SCBA) or air purifying respirator (APR)

Put on communication equipment and wear dosimetry as available

Dressing Down from Bunker Gear

Wipe feet at the entrance and step into the decontamination corridor

Decontamination workers will dressdown the responder by doing the following:

Remove the responder's firefighting gloves and place in waste collection container

Decontamination worker changes gloves

Put medical exam gloves on responder's hands and have them step forward

Remove the helmet and hood and place in the waste container. Responder steps forward

Remove the responder's SCBA harness/ backplate. Responder steps forward

DO NOT REMOVE FACEPIECE OR TURN OFF AIR SUPPLY - MAINTAIN RESPIRATORY PROTECTION

Remove the firefighting coat and place in the waste container. Responder steps forward

Pull the pants down to the top of the boots. Have the responder step forward while stepping out of their firefighting boots.

Decontamination worker changes gloves

As available, put temporary footwear (shoe covers, sandals, etc.) on the responder, then place boots/pants in the waste container

Have responder remove their facepiece and hand it to the decontamination worker. Responder steps forward

Remove responder's final pair of medical exam gloves and conduct final contamination survey

Decontamination workers will conduct a self-decontamination using the steps above

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Rev. 05 2021

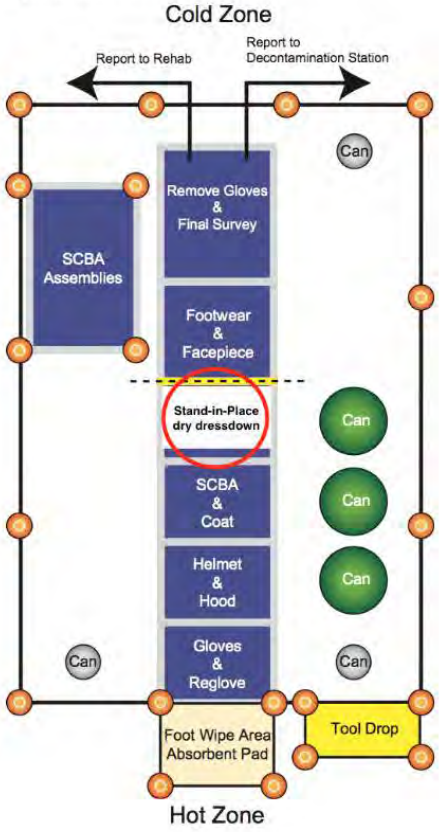
Transportation Emergency Preparedness Program
Disposable Coverall Decontamination Corridor Set Up, Dress Up, and Dressdown Job Aid

Decontamination Corridor Set Up

Select a location that is uphill, upwind, and upstream from the incident scene

Prior to setting up the decontamination corridor, survey the selected location to verify that the area is free of radioactive contamination and that radiation levels are at or near natural background levels

Position elements: tarp, waste cans, pads, cones/anchors, and tool drop area as indicated in the graphic below:



Dressing Up in Disposable Coveralls

Select the type of disposable protective clothing to be worn by entry team members

Put on at least two pair of medical exam gloves. Alternate colors if possible

Step into the selected disposable coveralls

Put on boots, tape top of boots to the coveralls

Continue to dress up by placing arms into coveralls and zip up. Put on an outer pair of gloves using glove rings, if available. If glove rings are not available, make sure to tape the gloves loose enough so as to allow for removal of coveralls with gloves still attached

Put on respiratory protection (SCBA backplate and mask or APR)

Pull hood over head and tape around mask and over zipper as needed

Put on communication equipment and dosimetry, as available

Put on head protection

Responder is ready to go on air (SCBA) and conduct entry operations

Dressing Down from Disposable Coveralls

Wipe feet at the entrance to the decontamination corridor and step into the bag designated for stand-in-place dressdown

Decontamination workers will dressdown the responder by doing the following:

Remove head protection, communication equipment, and dosimetry; place in the appropriate collection container

If wearing an SCBA, remove backplate and ensure responder remains on air

Remove tape from the hood and zipper. Place tape waste into appropriate waste container

Remove the hood off the responder's head

Unzip the responder's disposable coverall

Grasp the fingertips and have the responder free their hands from the outer gloves

Decontamination worker changes gloves

Gently pull the coveralls off the responder's shoulders, down their back all the way to the top of their boots

Have responder step out of their boots and bag and into available footwear

Decontamination worker will roll up or bag waste and place in container

Decontamination worker changes gloves

Responder will:

Remove one pair of gloves and place in appropriate waste container

Remove SCBA facepiece or APR and then remove remaining gloves

Report to final contamination survey area

Rev. 03 2020

Transportation Emergency Preparedness Program
Law Enforcement Decontamination Job Aid

Decontamination Stand-in-Place Dressdown

With the assistance of responders on the scene, the officer will step into the decontamination area where an oversized trash bag has been placed on the ground in a manner where the sides of the bag are rolled down.

All personal effects removed will be under the control of the evidence custodian.

Decontamination dressdown procedure

The evidence custodian will observe the decontamination workers removing/bagging the officer's personal effects using the following steps:

- The officer will step into the oversize trash bag
- Place wallet, jewelry, cell phone, etc. in a separate sealed bag
- Any gloves including medical exam gloves
- Glasses, head gear, and jacket
- Ballistic vest (if worn outside shirt)
- Shirt
- Ballistic vest (if worn inside shirt)
- Untie or unzip shoes/boots to make it easier for removal (leave on at this time)
- Slide pants to ankles
- With pants at ankles, have the officer step out of their pants/shoes/boots while stepping out of the trash bag
- All personal effects will then be double bagged and controlled by the evidence custodian

Modesty Clothing and Survey Station

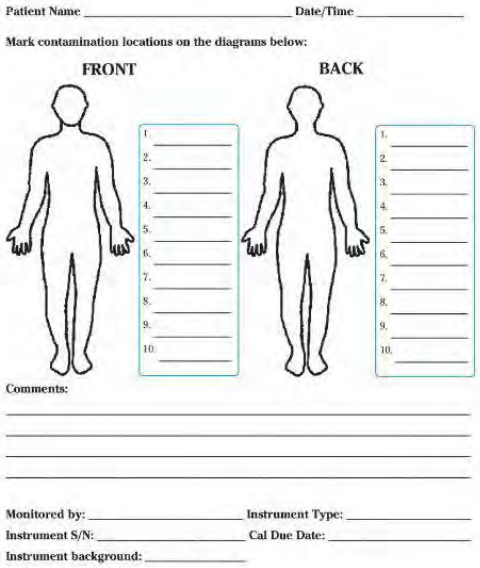
After decontamination, modesty clothing (disposable coveralls) will be provided.

Officer will proceed to the radiological survey station

At the survey station, the officer will remove their modesty clothing and the Radiation Authority will conduct a radiological survey to determine if they are contaminated.

If the officer is contaminated, the Radiation Authority will note contamination locations, levels and designate the necessary steps to ensure the officer is properly decontaminated and the spread of contamination is minimized.

Upon completion of the whole-body survey, the officer should be provided with clean modesty clothing.


Patient Name _____ Date/Time _____

Mark contamination locations on the diagrams below:

FRONT BACK

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Comments:

_____

_____

_____

_____

Monitored by: _____ Instrument Type: _____

Instrument S/N: _____ Cal Due Date: _____

Instrument background: _____

Return to Duty

The Radiation Authority and Incident Commander will decide if the officer can be released to continue normal work.

- The evidence custodian will maintain custody of the bagged items at a designated location near the decontamination area. The receiving officer will brief the Incident Commander on the number, type, and location of items (vehicle keys, weapons, and law enforcement vehicles) needing survey or possible decontamination.
- The Incident Commander will work with the evidence custodian and the Radiation Authority to determine the best location for the final contamination survey and decontamination of personal and law enforcement sensitive items.

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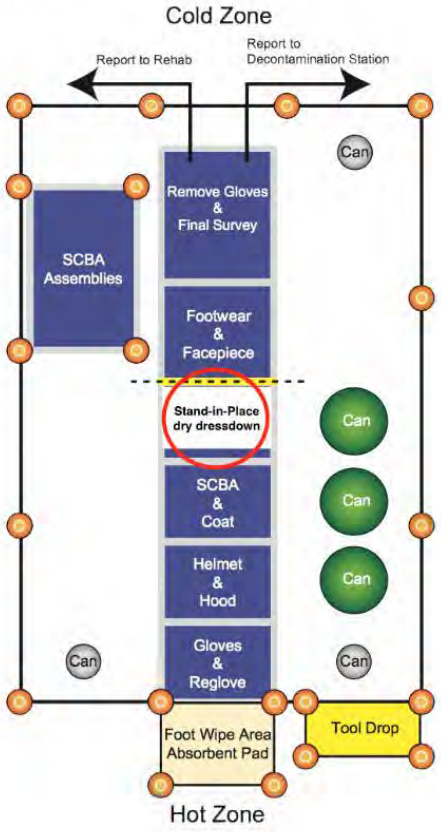
Transportation Emergency Preparedness Program
Law Enforcement Decontamination Job Aid

Decontamination Set Up
If the officer entered the incident scene (hot zone) to perform lifesaving actions or accidentally entered the hot zone and there is a potential that the officer is contaminated from the release of radioactive material, appropriate decontamination is necessary.

Responders will establish a decontamination corridor/process that uses a tarp, barricades, cones, or other identifying features to ensure that the decontamination area is obvious to responders.



Decontamination Considerations
Officer's who entered the hot zone and are potentially contaminated should implement self-protection measures until they can be processed through the decontamination area:

- Do not eat, drink, smoke, or chew
- As possible, limit activities/movement to control the spread of contamination

If radiological survey equipment is on scene, a qualified person should conduct a full-body radiological survey of the officer to monitor for radioactive material contamination.

If no radiological material contamination is detected, the officer can return to normal duties once the officer, the vehicle, and other equipment has been cleared by the Radiation Authority.

If radiological survey equipment is not available or contamination is detected, proceed with the remaining steps of this procedure.

Options for securing officer's sensitive items

Option 1: If officer's response vehicle is located inside the hot zone, the officer may elect to secure their law enforcement sensitive items (specifically, firearms, Taser, ammunition, radios, body camera, department issued phone, and hard badges) in their vehicle. The officer should lock the response vehicle and prepare to exit the scene through the decontamination area.

Option 2: Have the officer continue to the decontamination area wearing their sensitive items.

Law Enforcement Sensitive Items Custody
Maintaining a chain of custody of the weapons is required. Ensure that a law enforcement official who did not enter the hot zone and can act as the evidence custodian and is available to take possession of law enforcement sensitive items.

Options for proper handling of law enforcement sensitive items at the decontamination area

Option 1: If the items were locked in the vehicle, the vehicle keys will be placed in a large clear plastic bag and sealed. The bag will then be placed in a second large clear plastic bag and sealed to ensure good contamination control practices (double bagged).

Option 2: According to agency protocol, the officer will clear their firearm, render it safe, and double bag it with other law enforcement sensitive items.

Option 3: The weapons belt, backup weapon/ holster, and law enforcement sensitive items will be double bagged.

Transportation Emergency Preparedness Program
Hospital Care Provider Job Aid for Radiological Exposure and Contamination

The hospital staff's incident operations is key to the success of the setup, management, recovery, and public information for the incident. Assigning staff positions to perform the specific tasks needed to care for and treat the patient is the primary goal. Listed below are three assignment functions that can be used as guidance for the preparation, setup, and management of a radiologically contaminated patient. The hospital support staff from any or all of the following departments can be assigned the preparation, setup, and patient management tasks (Maintenance, Engineering, Nuclear Medicine, Security, Housekeeping, Administration, Physicians, Nurses, Radiation Safety Officer, and Public Information Officer).

Preparing the Radiation Emergency Area (REA)

The steps listed below are suggested to minimize the spread of contamination:

Outside REA

- Setup portable structure and establish a water supply
- As needed patient management systems
- Ensure the following equipment is available to receive the patient(s)
  1. Gurney(s) with multiple sheets
  2. Emesis basins/collection containers
  3. Survey meter(s) and, as available, dosimetry
  4. Waste container(s) lined with plastic bags

Inside REA

- Identify the treatment room(s) location
- Protect the floor surfaces with paper covering along the patient receiving area and pathway to treatment
- Remove unnecessary equipment/carts from the treatment room(s)
- Cover wall/ceiling mounted equipment with plastic sheeting or butcher type wrapping paper
- Cover light switch(es) with plastic sheeting/tape
- Cover floor and wall for splash protection
- Establish a water supply and a drainage system. A morgue/embalming type table for containment and easy draining is a good option
- If room is not designed for negative air pressure, consider HVAC operations as a possible spread of contamination; close or seal off conditioned air supplies
- Provide additional lighting in the treatment room as needed
- Provide public address systems
- Ensure the following equipment is available at the emergency entrance to receive the patient(s)
  1. Cart(s) of supplies
  2. Survey meter(s) and, as available, dosimetry
  3. Waste container(s) lined with plastic bags

Preparing the primary care provider to treat the patient

The steps listed below should be used to select, stage, and dressup/dressdown in the necessary personal protective clothing.

Establish a clean area for the personal protective equipment (PPE) staging area and care provider dressup area. The clean area should be marked and easily identifiable.

Select/inspect and dressup in the appropriate PPE:

- Disposable coveralls with headcover/hood
- Eye protection/face shield
- Respiratory protection
- Various colors and sizes of medical exam gloves
- Foot protection (boots or shoe covers)
- Masking type tape

Establish a decontamination dressdown area where care providers leaving the treat room can stand and conduct a stand-in-place self-decontamination.

Dressdown from head to toe carefully placing removed protective clothing in appropriate waste container(s).

Once all PPE has been removed, use a contamination meter conduct a whole-body survey.

Preparing the needed supplies to treat the patient

Select and stage necessary supplies for decontaminating/treating contaminated patient(s).

Supplies needed include:

- Cotton tipped applicators
- Sterile saline/water
- Bleach
- Iodine solution or other surgical soap
- Hydrogen peroxide
- Soft scrub brushes
- Medical equipment (suction, oxygen, IV solutions, airway intubation)
- Sharpie type pens
- Various sized plastic bags
- Sheets, blankets, towels, patient gowns
- Gauze of various sizes
- Masking/medical tape
- Five gallon bucket

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Transportation Emergency Preparedness Program
Hospital Care Provider Job Aid for Radiological Exposure and Contamination

Contamination Survey Techniques

Select and protect the appropriate instrument/probe/detector.

- Hold the probe ½ inch from the surface being surveyed and move the probe slowly, approximately 1 - 2 inches per second.
- If the count rate increases while surveying, pause for 5 - 10 seconds over the area to provide adequate time for instrument response.
- If contamination is found, note the location and continue surveying.
- Become familiar with the jurisdiction's or state's guidelines for when an individual or object is considered contaminated. Often, an individual or material is considered contaminated if it reads 100 CPM or more above background.

Radiation Survey Techniques – Exposure rate survey instruments usually measure radiation in terms of milliroentgen per hour (mR/hr) or roentgen per hour (R/hr).

Cutaneous Radiation Injury (CRI) - Injury to the skin from acute exposure to a large external dose of radiation. Presentation of CRI can include itching, tingling, or a transient erythema or edema without history of exposure to heat or caustic chemicals. Damage to the basal cell layer of the skin will result in inflammation, erythema, and dry or moist desquamation. In addition, radiation damage to hair follicles can cause epilation. Transient and inconsistent erythema (associated with itching) can occur within a few hours of exposure and be followed by a latent, symptom free phase lasting from a few days to several weeks.

Dose	Sign
300 Rem	Epilation (loss of hair)
600 Rem	Erythema (redness of skin)
1,200 Rem	Dry desquamation
1,500 Rem	Blistering or wet desquamation
2,500 Rem	Chronic Radionecrosis (long term)

Generalized Acute Dose-Response Effects - The doses and effects listed are generalizations and a great deal of variability exists among people.

Dose	Effect
50 Rem	Blood count changes
100 Rem	Vomiting Threshold
150 Rem	Mortality Threshold
320 - 360 Rem	LD 50/60 (with minimal supportive care)
480 - 540 Rem	LD 50/60 (with supportive care)
800 Rem	100% mortality (with treatment)

Patient Decontamination Considerations

Removing radioactive material (contamination) from locations on the patient. Survey the patient to determine the locations and levels of contamination, the isotope(s) involved, and provide documentation regarding the contaminant.

Patient contamination can be presented to the medical staff in different ways. Save all solutions, foreign bodies, and swabs for analysis.

- **External Contamination –** This is contamination that is deposited on the surface of the patient, such as on their skin, hair or clothing.
- **Internal Contamination –** when ingested, inhaled, injected (impaled), or absorbed.
- **Incorporation –** Taken into the cells, tissues and organs. Specific organs such as liver, bone and thyroid are involved depending on the material absorbed.

To prevent internalization/incorporation, the portals of entry (wounds, mouth, eyes, nose, and ears) should be addressed before intact skin.

Wound - survey the wound with an appropriate instrument, and to examine dressings, exudate, and/or debride tissue for radioactivity.

Lacerations - Gentle irrigation will remove most of the contamination. Sometimes hydrogen peroxide or betadine surgical scrubs will be necessary. Often residual contamination will be found on the jagged edges of a wound and debridement may remove it.

Foreign Bodies - Treat as usual, locate and remove appropriately.

Puncture Wounds - scrub the opening surrounding the wound. If that is not effective, a tourniquet or incision may be used to induce bleeding. Then scrub and cleanse.

Thermal and Chemical Burns - In most cases, normal burn care in the Emergency Department will remove most of the radioactive material.

Orifices - Remove foreign bodies, swab, and irrigate.

Intact Skin - Wipe or irrigate the skin and gently scrub the skin with warm soapy water using a soft brush such as a surgical scrub.

Medical Countermeasures for Internally Contaminated Patients

The most effective method of treatment is to prevent the internalization of the radioactive material. The method of treatment depends, in part, on the isotope and its chemical nature.

- **Decrease absorption from gut—**By decreasing the solubility of the radioisotope, the absorption of ingested radioactive material can be reduced and the material passed with the stool.
- **Isotopic dilution—**Administering large amounts of the stable isotope of the same element as the radioisotope will increase excretion of the radioactive isotope.
- **Block incorporation—**Saturate the target tissue/organ with the stable isotope to reduce uptake of the radioisotope.
- **Mobilizing agents—**Chemicals that enhance elimination of the radioisotope from the body.

More specific information about patient assessment and treatment can be found at the following websites:

- Radiation Emergency Medical Management (REMM) website at www.remm.hhs.gov
- CDC Radiation Emergency Information for Clinicians www.cdc.gov/nceh/radiation/emergencies/clinicians.htm
- Oak Ridge Institute for Science and Education Resources for Radiation Medical Professionals (865) 576-1005 ask for REAC/TS https://orise.orau.gov/reacts
- Radiation Injury Treatment Network Treatment Resources www.ritn.net

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ARRIVAL AND ASSESSMENT

Scene Arrival and Pre-Entry Considerations

If you are the first arriving unit, utilize your procedures and/or the ERG to conduct a scene size-up and establish control zones.

Notify hospital as soon as possible of a potentially radiologically contaminated patient.

If Incident Command has been established, EMS care providers should report to the Incident Commander for a scene size-up briefing.

If response actions are being initiated by EMS and the scene size-up has been completed, care providers should wear PPE and only carry essential medical equipment into the hot zone.

Protective Clothing

- Multiple pairs of disposable gloves
- Respiratory protection if available (such as self-contained breathing apparatus, air purifying respirator, or N95 particulate mask)

Prepare the Rescue Immobilization Device (RID)

- Spread a protective barrier (blanket, sheet, etc.)
- Spread a second protective barrier on top of the first barrier
- Place the RID in the center of the protective barriers
- Roll edges of the protective barriers until only the remaining unrolled portion can be placed on top of the RID
- Place essential medical response equipment on top of the RID. Unless needed, avoid taking ALS equipment into the hot zone

Entry and Treatment Considerations

Medical treatment always has priority over radiological concerns. Additional decontamination may be necessary if the patient was exposed to additional hazardous materials

- Enter the hot zone and place the RID adjacent to the victim
- Deploy/unroll the protective barriers adjacent to the victim
- Place the medical equipment on the barrier
- Contact with the patient may result in cross contamination, change gloves as necessary

Life-Threatening Conditions

Initiate ALS care as necessary. Radiation and/or contamination will not affect the operation of ALS equipment. All equipment used must be surveyed for contamination prior to return to service.

Airway Control and Oxygen Administration

- Administer oxygen via mask, non re-breather preferably
- Put oxygen mask on patient as soon as possible
- Never withhold oxygen regardless of the patient's location

Invasive Airway Treatment

- Realize intubation may result in internal contamination
- Maintain endotracheal tube sterility if possible
- Hospital should be informed if intubation occurred in the hot zone

Bleeding Control

- Control life-threatening hemorrhage immediately
- Cover wounds as quickly as possible to avoid internal contamination
- If irrigation is necessary, irrigate distally and laterally to the wound

Cardiac/Respiratory Arrest

- Initiate CPR if necessary
- To avoid introducing internal hazards, utilize adjunct equipment such as bag-valve mask, pocket mask, or microshield

Spinal Immobilization

- If the medical situation indicates the need, a full spinal immobilization should be incorporated
- Gross decontamination should be performed prior to spinal immobilization
- Immobilized patients may have contaminants trapped between the RID and their skin

Needles (Intravenous Cannulation, EpiPen®, etc.)

- Intravenous cannulation should be avoided in the hot zone
- Cleanse selected IV site
- Change gloves prior to venipuncture

Medications

- Administration should follow local protocol

Non-Life-Threatening Conditions

- Conduct a head-to-toe assessment
- As available, to limit inhalation of airborne contamination consider placing mask over the patient's mouth and nose (e.g., N95, non-rebreather, etc.).
- Perform gross decontamination
- Extricate patient to the cold zone

Rev. 1 2024

DECONTAMINATION AND TRANSPORT

Radioactive Material
Contaminated Patient Handling

Gross Decontamination

Reduce patient contamination by very carefully cutting, from head to toe, the patient's outer clothing away from the body.

- Use proper contamination control techniques
- Cut clothing on the center of all body extremities and the trunk
- Carefully lay cut clothing open, exposing the patient's body
- To avoid cross-contamination, carefully remove the outer pair of disposable gloves
- Load the patient onto the RID using standard medical protocols and wrap the inner protective barrier around the patient
- Leave all removed items in the hot zone
- Move patient to the hot zone boundary
- Pass the patient across the control line to EMS
- Place patient on gurney that has been covered with a third protective barrier

Note: The entry team should remain in the hot zone unless also providing transport. If so, consider removing entry PPE and replace with new PPE.

Transport Considerations

If time permits, prepare the ambulance prior to transport to minimize the spread of contamination:

- Avoid using internal/external compartments
- Close all inside ambulance compartments prior to loading the patient
- Cover radio communication microphones
- Cover the floor of ambulance
- Avoid using the compartment exhaust system
- Bag all clothing removed in the ambulance

EMS should cover the patient with a third protective barrier that was placed over the transport stretcher.

- Load patient into ambulance for transport.
- Notify the hospital that they are receiving a potentially radiologically contaminated patient
- Provide patient report
- Inquire whether the hospital has any special instructions or procedures for receiving contaminated patients
- Keep patient wrapped as much as possible to minimize the spread of contamination
- Avoid exposing covered wounds; only expose the patient's injuries for assessing and treating

When necessary/available, air transport of a patient may be an option. As stated in the ERG, radiation presents minimal risk to emergency response personnel and medical problems take priority over radiological concerns.

Hospital Arrival Considerations

Follow hospital's radiological control protocol and instructions for patient transfer to hospital care.

- Provide patient report
- Unless needed back at the incident scene, the ambulance should not be returned to regular service until the care providers, vehicle, and equipment have been surveyed for radiological contamination by qualified radiological personnel: local or state Radiation Authority, hazmat team, radiation safety officer, or nuclear medicine department personnel

This Quick Reference Sheet was produced by the
U.S. Department of Energy
Transportation Emergency Preparedness Program
For additional information, visit the TEPP website at:
www.em.doe.gov/otem
or phone (208) 528-8895

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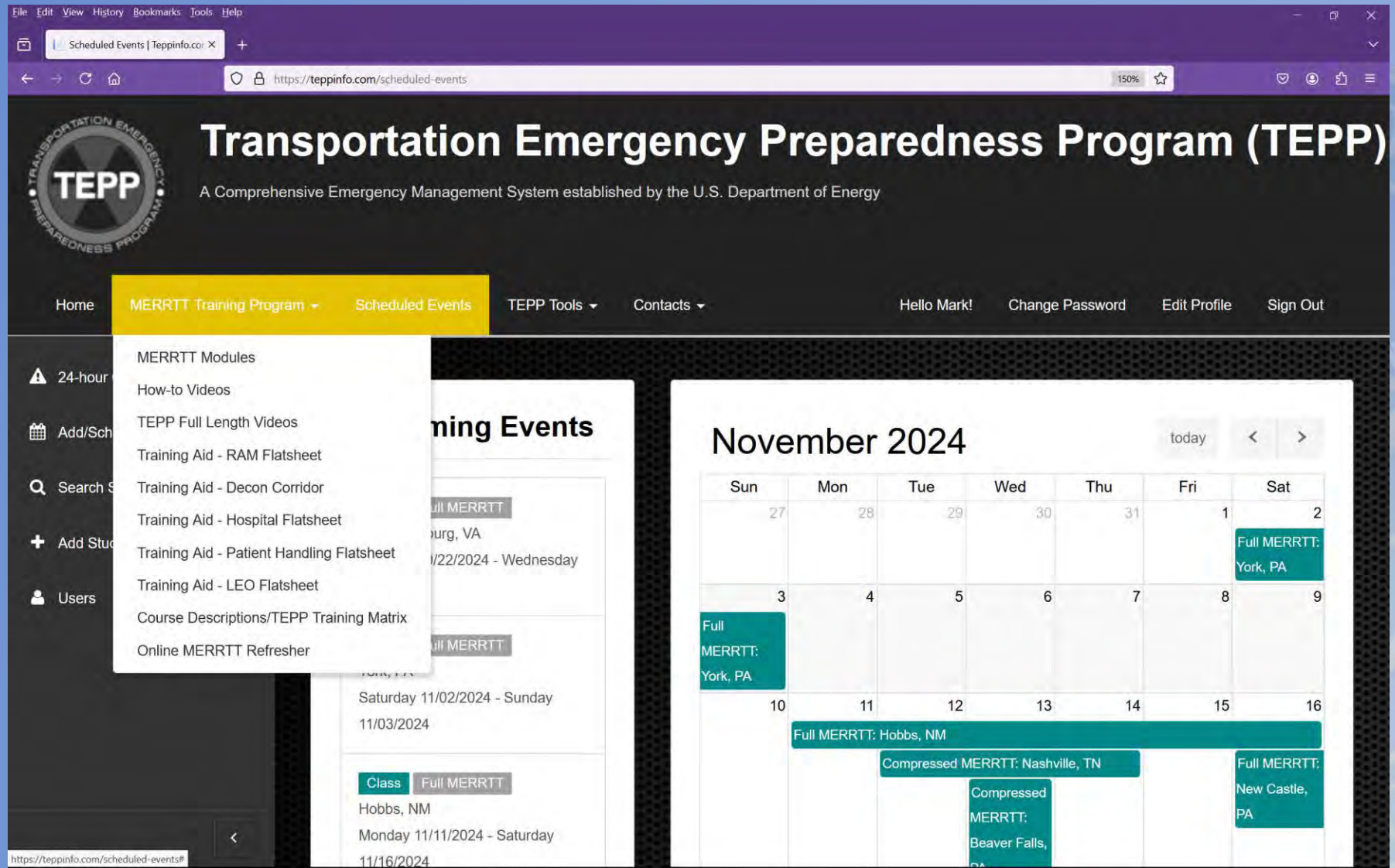
TEPP Resources



TEPP Improvement Project Updates

- 2024 MERRTT CAPCE Recertification
  - Commission on Accreditation for Pre-Hospital Continuing Education
  - MERRTT: 9-hours of CEC
    - Test – needed to eliminate True/False questions
    - Course evaluation MUST be completed
    - Increase to 4 of the hands-on practical exercises
  - CMERRTT: 5-hours of CEC
    - Course evaluation MUST be completed

TEPP Improvement Project Updates

- Law Enforcement Dressdown Video

TEPP Improvement Project Updates

- Coroner Program
  - Pilot class tentatively planned for August in Reading, PA
  - 7-modules with hands-on practical exercises
    - Radiological Basics
    - Biological Effects
    - Instrumentation
    - Uses and Regulations
    - Hazard Assessment
    - Scene Management
    - Disposition of Remains

Website Resources

- National Training and Exercise Schedule
- MERRTT Refresher Online Training
- State 24-Hour Points of Contact
- Needs Assessment
- Model Procedures
- Exercise Planning Resources
- TEPP Central Operations Contact

www.em.doe.gov/otem
www.teppinfo.com

Questions ?