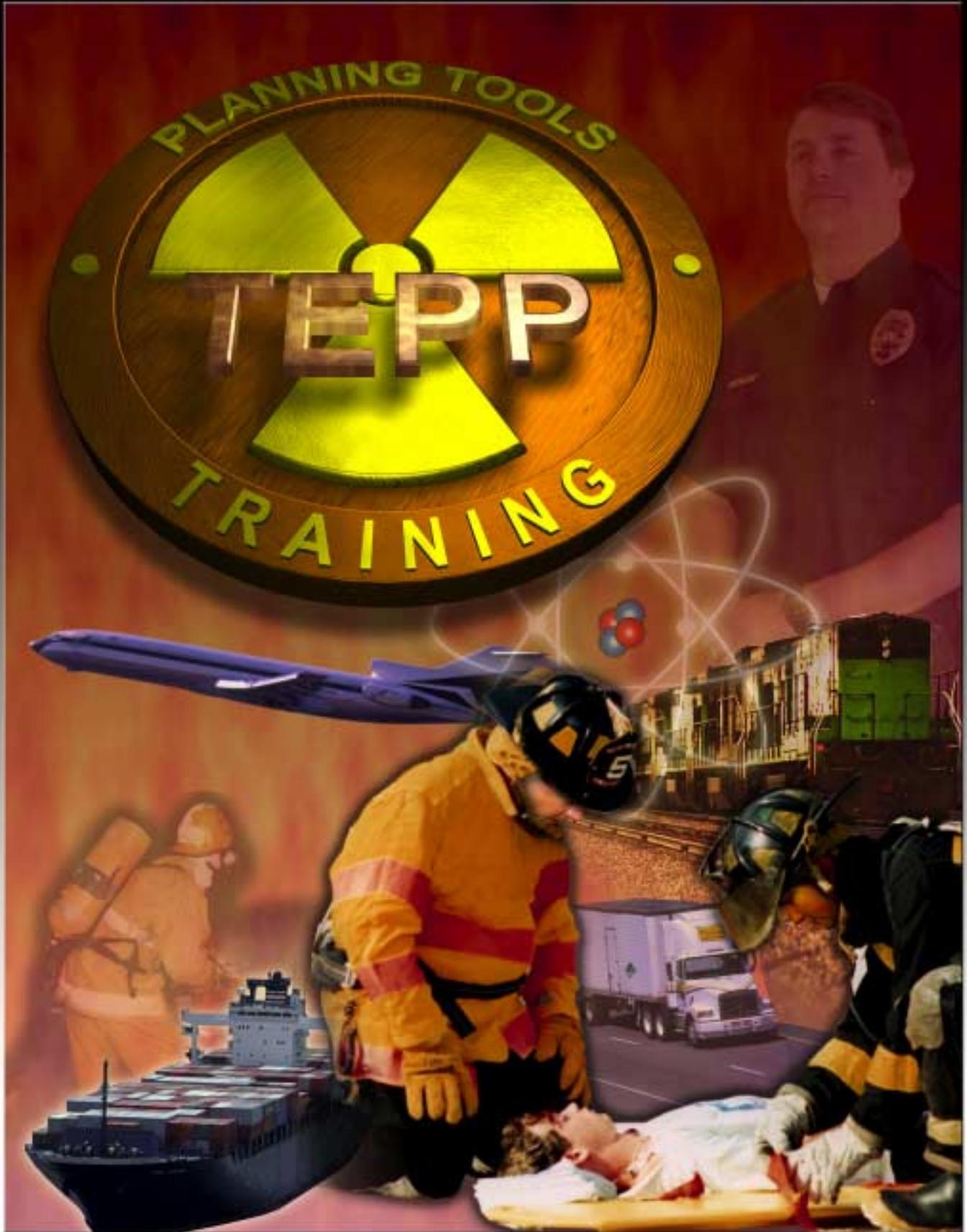




DEPARTMENT OF ENERGY



## **Model Procedure for Properly Handling and Packaging Potentially Radiologically Contaminated Patients**

Prepared For The Department of Energy Office of Transportation and Emergency Management

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# table of contents

**Transportation Emergency Preparedness Program (TEPP)  
Model Procedure for Properly Handling and  
Packaging Potentially Radiologically  
Contaminated Patients**



Assumptions .....	4
1.0 Purpose .....	4
2.0 Scope .....	4
3.0 Responsibilities .....	4
4.0 Records .....	5
5.0 Frequency .....	5
6.0 References .....	5
7.0 Equipment .....	5
8.0 Location .....	5
9.0 Safety .....	5
10.0 Terms/Definitions .....	6
11.0 Response Procedure .....	7



## ASSUMPTIONS

This Transportation Emergency Preparedness Program (TEPP) model procedure contains information that Emergency Medical Service Care Providers can use to develop local procedures for responding to transportation incidents involving radioactive materials.

The following assumptions are to be considered when reviewing this model procedure:

- This procedure is not all inclusive, when Federal, State, Tribal or Local regulatory requirements are more stringent than the model procedure, then the more stringent requirement should apply.
- This procedure was developed as a guide for trained and qualified emergency medical service care providers. It is expected that each EMS organization would review and develop its own procedure based on its own organizational requirements.
- All Emergency Medical Service Care Providers have been trained to the appropriate level for hazardous material response.
- All emergency response personnel have been trained in the use of an Incident Management System such as Incident Command System.
- Incident scene decisions regarding operations in the Hot Zone shall be approved by the official designated as the Incident Commander.

### 1.0 PURPOSE

The purpose of this procedure is to provide guidance for properly handling and packaging potentially radiologically contaminated patients.

### 2.0 SCOPE

This procedure applies to emergency response organizations that have the responsibility for response to a radioactive material transportation incident/accident that involves potentially contaminated injuries.

### 3.0 RESPONSIBILITIES

#### 3.1 Emergency Medical Service Organizations

- 3.1.1 Size up accident scene using appropriate reference information and sources.
- 3.1.2 Initiate response actions as outlined in the North American Emergency Response Guidebook.
- 3.1.3 Maintain accident scene contamination control until relieved by a higher authority.

**Transportation Emergency Preparedness Program (TEPP)  
Model Procedure for Properly Handling and Packaging  
Potentially Radiologically Contaminated Patients**



- 3.1.4 Provide accident scene turnover to the relieving authority.
- 3.1.5 Promptly treat and transport injured patients to a medical care facility.

## **4.0 RECORDS**

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As needed.

## **5.0 FREQUENCY**

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As needed.

## **6.0 REFERENCES**

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- 6.1 2000 Emergency Response Guidebook (ERG)
- 6.2 Transportation of Radioactive Materials Q&A - Oak Ridge Associated Universities
- 6.3 U. S. Department of Energy Transportation Information Wheel
- 6.4 U. S. Department of Energy Modular Emergency Response Radiological Transportation Training (MERRTT)

## **7.0 EQUIPMENT**

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As outlined in the ERG and/or as required by State, Tribal or Local procedures, plans, or policies.

## **8.0 LOCATION**

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Procedure use as appropriate for incident/accident location.

## **9.0 SAFETY**

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- 9.1 Respond and work within safety guidelines specified within the 2000 Emergency Response Guidebook.
- 9.2 Involve appropriate State, Tribal, Local, Shipper and Carrier officials to disposition accident.





## 10.0 TERMS/DEFINITIONS

**ALARA** - As low as reasonably achievable. Guide for radiation exposure protection.

**Control Zones** - The areas at a hazardous materials incident that are designated based upon safety and the degree of hazard.

**Decontamination** - The physical and/or chemical process of reducing and preventing the spread of contamination at a hazardous materials incident/accident.

**DOE** - United States Department of Energy

**Dose** - A general term for the quantity of radiation energy absorbed.

**Dose Rate** - The dose delivered per unit time. It is usually expressed as rads per hour or in multiples or submultiples of this unit, such as millirads per hour. The dose rate is commonly used to indicate the level of hazard from a radioactive source.

**ERG** - Emergency Response Guidebook - A booklet that provides guidance during the initial phases of transportation emergencies involving all hazardous materials.

**Exposure** - A quantity used to indicate the amount of ionization in air produced by x-ray or gamma radiation. This unit is the Roentgen (R). For practical purposes, one roentgen is comparable to 1 rad or 1 rem for x-ray and gamma radiation.

**Hazardous Materials** - A substance capable of harming people, environment or property.

**IC - Incident Commander** - The person responsible for all decisions relating to the management of the incident.

**ICS** - Incident Command System - An organized approach to control and manage operations at an emergency incident.

**Monitoring Equipment** - Instruments and devices used to identify and quantify contaminants.

**Qualified Person** - A person with specific training, knowledge, and experience in the area for which the person has the responsibility and/or authority to control.

**Radiation Authority** - A Federal, State, or Tribal agency designated official. Responsibilities include evaluating radiological hazard conditions during normal operations and emergencies.

**Radioactive White** - I - 0.5 mR/hr maximum on surface.

**Radioactive Yellow** - II - 50 mR/hr maximum on surface; 1 mR/hr maximum at 1 meter.

**Radioactive Yellow** - III - 200 mR/hr maximum on surface; 10 mR/hr maximum at 1 meter.

**Strong, Tight Packages** - Used to transport materials with extremely low levels of radioactivity.

**Type A Packages** - Used to transport small quantities of radioactive materials with higher concentrations of radioactivity than those shipped in industrial packages. Typically constructed of steel, wood, fiberboard. Type A Package designs undergo more extensive testing than industrial packages.

**Type B Packages** - Used to transport materials with the highest levels of radioactivity. Type B Packages range from small steel drums to heavy shielded, steel casks. Type B Package design must withstand all the Type A tests as well as a series of severe accident conditions simulated by performance testing and engineering analysis.





## 11.0 RESPONSE PROCEDURE

1. Utilize the ERG to conduct a scene size-up. Establish contamination control zones, and without entering the Hot Zone, determine essential treatment equipment needed.

*Note: If Incident Command has already been established, EMS care providers should report to the Incident Commander for a scene size-up. If response actions are being initiated by EMS Care Providers and the scene size-up has been completed, care providers should also consider reducing the possibility of contamination spread by only carrying essential medical equipment inside the Hot Zone.*

2. Prior to entry into the Hot Zone, prepare the backboard or other device that will be used to remove the patient from the Hot Zone as follows:

- A. Spread a protective barrier (blanket, sheet, etc.).



- B. Spread a second protective barrier (blanket, sheet, etc.).



- C. Place the backboard or other device in the center of the protective barrier.



- D. Roll edges of the protective barrier until only the remaining unrolled portion can be placed on top of the backboard or other extrication device.



**Transportation Emergency Preparedness Program (TEPP)  
Model Procedure for Properly Handling and Packaging  
Potentially Radiologically Contaminated Patients**



DEPARTMENT OF ENERGY



E. Place essential medical response equipment on top of the backboard or other device.



3. Don appropriate protective clothing. Firefighting gear or Body Substance Isolation Clothing (BSIC) are recommended, including 2 pair of latex gloves and respiratory protection if available (such as Self-Contained Breathing Apparatus, Air Purifying Respirator, N95 Particulate Mask).



4. Enter the Hot Zone and place the backboard or other device adjacent to the patient and unroll the protective barriers.



*Note: The two-blanket method will reduce the possibility of the spread of contamination. The outer-blanket will reduce/eliminate responder contact with contaminated surfaces. The inner blanket when wrapped around the patient will encapsulate any remaining radioactive contamination to the patient.*

*Life threatening injuries such as exsanguinating hemorrhage and airway control should be corrected immediately. Cardiopulmonary resuscitation should not be attempted in the Hot Zone. The patient should be promptly packaged and transferred to the clean area for further care.*

5. Evaluate the need for reducing contamination on the patient.

*Note: Contamination reduction should be considered if the incident/accident scene contains open or breached radioactive materials packages.*

6. Reduce contamination by very carefully cutting the patients clothing away from the body.



*Note: Cut clothing on the center of all body extremities and the trunk. Carefully lay cut clothing open, exposing the patient's body.*

**Transportation Emergency Preparedness Program (TEPP)  
Model Procedure for Properly Handling and Packaging  
Potentially Radiologically Contaminated Patients**

7. Responders should carefully remove their outer pair of latex gloves.



8. Treat non-life-threatening injuries as necessary. If contamination is suspected in or near the wound/injury the primary option is to treat the wound/injury and prevent additional spread of contamination.

*Note: If cleaning of injured area is to be conducted, wipe away from all open wounds or the airway. Only use the wipe(s) one time and handle all waste as potentially contaminated material. Place the wipe(s) in a controlled disposal container until the contents has been monitored to be contamination free or removed by the local radiation authority.*

9. Load the patient on to the backboard or other device using standard medical protocols and wrap the inner protective barrier around the patient.



*Note: Removed clothing, gloves and outer blanket should remain in the Hot Zone. The removed clothing and gloves should be considered as waste. The outer blanket is providing protection against the spread of contamination. The radiation authority will coordinate the packaging and removal of waste.*

10. Emergency medical care providers should hand carry the patient to the Hot Zone Contamination Control Line.



11. A second team of care providers should have an appropriate transportation device waiting at the Hot Zone Contamination Control Line. This device should also be covered with a protective barrier.



**Transportation Emergency Preparedness Program (TEPP)  
Model Procedure for Properly Handling and Packaging  
Potentially Radiologically Contaminated Patients**



DEPARTMENT OF ENERGY



12. At the Hot Zone Contamination Control Line, responders should pass the patient across the contamination control line to waiting responders.



*Note: Care providers within the Hot Zone should not cross the Contamination Control Line until monitoring conducted by the radiation authority determines care providers to be free of contamination. If additional responders are not available, the treating responders should remove protective clothing at the Hot Zone Contamination Control Line and provide transportation of the patient to the appropriate medical facility. Based on local procedures, the patient may require additional transfers at each of the contamination control zone lines.*

13. After transferring the patient to the clean area, Emergency Medical Service Care Providers should cover the patient with the protective barrier that was placed over the transport device.



14. Load patient into the ambulance and transport to hospital.



*Note: To reduce/prevent possible contamination of the ambulance, consider the following additional precautions: Open the protective barrier only to administer necessary patient treatment, place floor covering (paper or plastic, etc.) on ambulance floor, and treat all items used in the treatment of the patient as potentially contaminated.*

15. After the patient(s) has been loaded into the ambulance, the emergency medical care provider(s) should wear appropriate protective clothing.
16. Care providers transporting the patient should verify the receiving hospital has the capability to treat and care for potentially radiologically contaminated patient(s).

**Transportation Emergency Preparedness Program (TEPP)  
Model Procedure for Properly Handling and Packaging  
Potentially Radiologically Contaminated Patients**



17. Upon confirmation Emergency Medical Service Care Providers should notify the receiving hospital of patient status, radiological contamination concerns, estimated time of arrival, and the need for the monitoring of themselves and the ambulance.
  
18. Emergency Medical Service Care Providers upon arrival at the hospital should follow the hospital's radiological control protocol. At the maximum, emergency medical care providers should remove the patient from the ambulance and then establish a contamination control zone in and around the ambulance.

*Note: The ambulance should be declared out of service until the radiation authority has monitored and determined the Emergency Medical Service Care Providers and ambulance to be free of contamination.*

