Course Number: **Radiological Control Technicians**
Module Title: **Radiological Considerations for First Aid**
Module Number: **2.15**

Objectives:

2.15.01 List the proper steps for the treatment of minor injuries occurring in various radiological areas.

2.15.02 List the requirements for responding to major injuries or illnesses in radiological areas.

2.15.03 State the RCT's responsibility at the scene of a major injury in a radiological area after medical personnel have arrived at the scene.

☞ 2.15.04 List the requirements for treatment and transport of contaminated injured personnel at your facility.

References:

1. Basic Radiation Protection Technology (2nd edition) - Daniel A. Gollnick
2. Operational Health Physics Training - H. J. Moe
3. Injury or Serious Illness in Regulated or Radiation Zones; Special Hazards Bulletin 4
4. Handling Regulated Area and Radiation Zone Injuries; DPSOL 193 -201

Instructional Aids:

1. Overheads
2. Overhead projector/screen
3. Whiteboard/chalkboard
4. Lessons learned

I. MODULE INTRODUCTION

A. Self Introduction

1. Name

2. Phone Number

3. Background

4. Emergency procedure review

B. Motivation - Injuries occurring in radiological areas, particularly in contaminated, airborne, or areas with high radiation dose rates require special considerations above and beyond standard first aid. The RCT may often be the first person or one of the first, to arrive at the scene of an injury. Because of this, the RCT must know how first aid requirements and radiological control requirements may conflict and on what basis to establish priorities. This lesson will introduce the special considerations for injuries in radiological areas.

There is no way possible to prepare and train for all possible injuries and radiological condition combinations. It is incumbent on the RCT to use his or her knowledge and training to make judgement calls based on available facts and conditions. Often there is more than one "right way" to handle the situation, with many alternatives which may all work equally well.

C. Lesson Overview

1. Minor injuries occurring in radiological areas

2. Major injuries occurring in radiological areas

3. Interface of RCT with medical personnel

4. RCT responsibilities in the treatment and transport of contaminated personnel

D. Introduce Objectives

Show O.H.: Objectives

II. MODULE OUTLINE

A. First Aid

Standard first aid is applied prior to contamination control whenever it is considered to have life-saving value, or is important to the patient for relief of pain or prevention of disability. It is the obligation of all who assist a patient to render such aid within the limits of their training and qualifications.

B. Minor Injuries Occurring in Radiological Areas — Objective 2.15.01

1. Render first aid as needed

2. Survey for contamination (clothing, skin, wounds).

   a. Radiological Protection is responsible for determining whether wounds are contaminated, and then advise Medical.

3. Decontaminate as necessary, including area(s) around the wound(s). Do not attempt to decontaminate the wound(s).

   Decontamination of wounds or broken skin by RCT's is generally limited to flushing with tepid water. Complete decontamination of wounds or broken skin is generally done by Medical personnel.

4. Inform Medical - This information is of use in determining appropriate treatment.

   a. Injured's name

   b. Injured's condition

   c. Location

   d. Contamination levels

5. Get Medical Aid

   Depending on the minor injury and local procedures, activation

	of an emergency response may be appropriate and this would provide medical aid.
a. If the person is not contaminated, the person may be escorted to the nearest First Aid Station for treatment.	
b. If the person is contaminated, contain the contamination if possible by covering the area, and transport to the nearest personnel decon station as necessary, and medical assistance should be requested at that location	
C. Major Injuries Occurring in Radiological Areas	Objective 2.15.02
1. If first to arrive on the scene:	
a. administer first aid	
b. get help to the scene	
c. survey injured person(s)	
d. assist Medical personnel	
2. Administer first aid. The first consideration **IS NOT** moving the injured person from the radiological area. This should be considered prior to first aid measures **only** if leaving the person in the area for a short time would further endanger the injured's and rescuer's health and safety.	
a. Contamination levels would almost never be cause for immediately evacuating, or delaying first aid to, a seriously injured person from an area **prior** to first aid.	Ask students: "What contamination level, if any, would require evacuation prior to treatment?"
1) A contaminated live person is, in every case, preferable to a clean deceased person.	
2) If the person administering first aid becomes contaminated, remember that the rescuer can be	Ask students: "What if person needs CPR and

decontaminated much easier than the injured person can be brought back to life if first aid was delayed to enable the rescuer to avoid becoming contaminated.

has facial contamination?"

b. Airborne radioactivity would almost never be cause for immediately evacuating, or delaying first aid to, a seriously injured person from an area **prior** to first aid.

Ask students: "Would there ever by an airborne level high enough to warrant evacuation prior to first aid?"

1) Remember that a live patient with some internal contamination is always preferable to a deceased person with no internal contamination.

c. Radiation levels **could** require evacuation to be the first consideration.

Ask students what radiation levels they think would require movement prior to first aid.

1) Consideration must be given to both the injured and the rescuer(s) in this instance.

2) If treating the person in the location would expose them or the rescuer(s) to a hazardous radiation dose, movement out of the area would then be done first.

3) This is a judgement call, depending upon the nature of the injuries, the radiological conditions, the location of the injured, etc. There is no "magic number" for a dose rate that would require immediate movement regardless of injury.

3. Get help to the scene. The timing and method of doing this will depend on the extent of the injuries, the location, how many people are present, etc.

4. Survey the injured person(s). This should include the clothing, exposed skin, and any wounds.

a. If the injured is in an area with high radiation levels, the RCT must be able to provide an estimated dose

e.g., A person has an injury with severe

equivalent to Medical. Even if the levels are not high enough to warrant immediate evacuation, the total dose to the injured individual may dictate what medical treatment is given. This would require a knowledge of the radiation dose rates in the area, and determination (or estimate) of the length of time that the person was exposed to these levels.

bleeding in a very high radiation area, receives treatment and recovers, but received in excess of 400 rems whole body radiation. What is the primary long term medical concern?

5. Assist Medical personnel with treatment, transportation, and decontamination.

   a. For a seriously injured and contaminated person, transportation would be by ambulance.

   b. For transport of contaminated person(s), the RCT would accompany the injured in the ambulance.

Decontamination or even the purchase of a new ambulance is far easier and cheaper than bringing someone back to life.

      1) Necessary measures should be taken to reduce or eliminate the spread of contamination on the way.

      2) If the patient has gross transferable contamination, consideration should be given to wrapping the injured person in a blanket to contain the contamination. Since this could prevent or delay treatment, or in some cases aggravate the injuries, it would only be done with the concurrence of Medical personnel.

   c. Control movement of personnel between rooms at the medical facility to prevent the spread of contamination.

   d. Provide containers and instruct patients regarding the collection of bioassay samples. Collect specimens of any blood, excised tissue, etc.

   e. Survey all clothing, equipment and instruments used in the transport vehicle, recommend decontamination or disposal of items as necessary.

f. Some typical problems and concerns arising in hospital situations:

1) Portable X-ray machines, as soon as the X-ray has been taken, the hospital staff will usually want to remove the machine from the room ASAP.

2) Waste and contaminated materials removed from the patient may begin to pose a radiation hazard if allowed to concentrate or remain in the immediate vicinity. Also will increase background levels.

D. Interface of RCT and Medical Personnel

Objective 2.15.03

1. After the initial response and first aid, the primary duty of the RCT will be with radiological concerns. The primary concern of Medical personnel will be the patients' medical condition and treatment. These two concerns must be balanced against one another keeping the best interest of the patient in mind. RCTs are not doctors; doctors and nurses are usually not qualified RCT personnel.

2. The RCT must be careful **not** to make medical decisions or judgements that he/she is not qualified to make. The RCT **will** be primarily responsible for decisions involving radiological concerns.

Examples:

a. A person has a piece of metal sticking out of her arm. The bleeding has been slowed so that it is not life threatening. The piece of metal has contact radiation levels of 10 rad/hr β and 5 R/hr gamma. The medical personnel arriving at the scene ask you "Should we remove the piece of metal prior to transporting the patient?" What do you tell them?

Encourage a discussion of this scenario with the class and illustrate the range of opinions.

b. A person has fallen off of a ladder and is unconscious. There are no outward signs of serious injury. The person is breathing and has a pulse. The immediate area has a neutron whole body radiation level of 15 rems/hr. You had a medical person arrive at the scene at the same time. Upon learning of the radiation level, the medical person asks if he should immediately

Encourage classroom discussion of this scenario, emphasizing that there are an infinite number of possible injury/radiological scenario combinations.

move the person prior to the arrival at the scene of a stretcher or more personnel. How do you respond?

3. The RCT should advise medical personnel of radiological conditions and precautions and make decisions concerning the radiological protection of personnel on the scene.

E. Requirements for the Treatment and Transport of Contaminated Injured Personnel — Objective 2.15.04

(Insert site specific material here.)

III. SUMMARY

A. Review major topics

1. Minor injuries occurring in radiological areas
2. Major injuries occurring in radiological areas
3. Interface of RCT with medical personnel
4. RCT responsibilities in the treatment and transport of contaminated personnel

B. Review learning objectives

IV. EVALUATION

Evaluation should consist of a written examination comprised of multiple choice, fill-in the blank, matching and/or short answer questions. 80% should be the minimum passing criteria for examinations.