Course Title: **Radiological Control Technician**
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.

Introduction

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.

References

1. 10 CFR Part 835 Occupational Radiation Protection

2. DOE-STD-1098-99 U.S. Department of Energy Radiological Control Standard

3. Gollnick, Daniel A., "Basic Radiation Protection Technology," 4th Edition, Pacific

4. Radiation Corporation, Altadena, CA, 2000.

5. Moe, Harold, "Operational Health Physics Training," ANL-88-26 (Corrected); DOE; Argonne National Laboratory, Chicago, 1992.

6. MCP-124 - Response to Abnormal Radiological Situations

7. MCP-148 - Personnel Decontamination

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

Minor Injuries Occurring in Radiological Areas

First, remove the individual from the Contaminated Area per correct doffing procedures. This will facilitate prompt attention to the injured individual without the delays of correct contamination control within a radiological area.

Render first aid as needed (first aid should be administered only to the extent that an individual is trained and qualified to perform).

Survey for contamination. The survey should be conducted normally including clothing, exposed skin, and any wounds. RCTs are responsible for determining whether wounds are contaminated, and to then advise Medical.

Decontamination is then performed as necessary. Decontamination of wounds or broken skin by RCTs is generally limited to flushing with tepid water. Complete decontamination of wounds or broken skin is performed by Medical personnel.

Inform Medical of the situation so that appropriate treatment may be administered. They will need to know the injured person's name and condition, and the location and degree of contamination.

Get to Medical Aid. If the injury is minor and the person is not contaminated, someone should escort the person to the nearest First Aid Station for treatment. If the injury is minor and the person is contaminated, the affected area should be covered, and he or she should be taken to the nearest personnel decon room or emergency decon station, and medical assistance should be requested at that location. Depending on the minor injury and local procedures, activation of an emergency response may be appropriate which would provide medical aid.

ICP Specific Information

The ICP has an Occupational Medical facility located in the Central Facilities Area (CFA), building CFA-1612, where Physicians are available Monday through Thursday, 7:00 am - 5:00 pm and 24 hour nursing coverage. CFA-1612 can be reached via telephone 526-2356.

In addition, first aid is accessible at the following facilities;

- Test Area North (TAN), 526-6263
- Reactor Test Complex (RTCA), 526-4311

Immediate emergency personnel can be reached via the following;

- Site Emergency dial **777** or the Warning Communications Center (WCC) @ 526-1515
- Dial **9-911** for emergencies in Idaho Falls

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

Major Injuries Occurring in Radiological Areas

If first to arrive on the scene, administer first aid to the injured. (As always, first aid should be administered only to the extent that an individual is trained and qualified to perform.) The first consideration **IS NOT** moving the injured person from the radiological area. Moving the injured person from the radiological area prior to administering first aid should be considered **only** if leaving the person in the area for a short time would seriously further endanger the health and safety of the injured person and of the rescuer. Protect yourself so that you do not become a victim also.

Contamination levels would rarely be the cause for immediately evacuating or delaying first aid to a seriously injured person.

- A contaminated live person is, in every case, preferable to a clean deceased person.
- If the person administering first aid becomes contaminated, remember that the rescuer can be 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.

Airborne radioactivity would rarely be the cause for immediately evacuating or delaying first aid to a seriously injured person.

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

Radiation levels **could** require evacuation to be the first consideration. Consideration must be given to both the injured and the rescuer(s) in this instance. 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.

- This is a judgment 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.

Get help to the scene. Seek trained Medical help and notify them to respond 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.

Survey the injured person(s). This should include the clothing, exposed skin, and any wounds. If the injured person is in an area with high radiation levels, Radiological Control personnel must be able to provide an estimated dose 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 a determination (or estimate) of the time that the person was exposed to these levels.

Assist Medical personnel with treatment, transportation, and decontamination. For a seriously injured and contaminated person, transportation would be by ambulance. For transport of contaminated person(s), the RCT would either accompany the injured in the ambulance or meet the injured at the medical facility, depending on available space in the ambulance. This will be determined on a case-by-case basis. Necessary measures should be taken to reduce or eliminate the spread of contamination while the patient is transferred to the hospital. 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.

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

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

Survey all clothing, equipment and instruments used in the medical facility and transport vehicle. Recommend decontamination or disposal of items as necessary. Some typical problems and concerns arise in hospital situations. Mobile x-ray machines, used extensively in emergency room settings, become a contamination control concern when brought into a room with a contaminated patient. Once the x-ray has been taken, the hospital staff will usually want to remove the machine from the room right away. An RCT will need to ensure the x-ray machine has not become contaminated while in the room. Waste materials, contaminated materials, radioactive materials or particles, etc. removed from the patient may begin to pose a radiation hazard of their own if allowed to concentrate or remain in the immediate vicinity of the patient and treatment personnel. Accumulating radioactive material in the treatment area can also cause problems with monitoring for dose rates and contamination levels because of the increased background in the area.

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.

Interface of RCT and Medical Personnel

Upon their arrival, Medical personnel, not RCTs, have responsibility for the medical care of injured personnel. Medical personnel should consult with the RCT concerning the appropriate level of radiological controls for the situation.

After the initial response and the administration of first aid, the primary duty of the RCT will be with radiological concerns. The primary concern of Medical personnel will be the patient's medical condition and treatment. These two concerns must be balanced, keeping the best interest of the patient in mind.

The RCT must be careful **not** to make medical decisions or judgments that he or she is not qualified to make. However, the RCT **will** be primarily responsible for decisions involving radiological concerns.

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

Ensure when responding to a life threatening injury resulting from or involving high radiation exposure, the following need to be considered:

- Immediate evacuation of the injured
- Radiation exposure to rescuers and others in the immediate area from the source or possibly from the injured
- The need to administer first aid prior to evacuation of the injured.

Follow up supplementary actions by RCTs include the following;

- Send dosimetry of those involved in the event to RDR for processing.
- Estimate the dose of personnel involved in the event, and complete a Personnel Exposure Questionnaire (MCP-2381, Form 441.04), as applicable.
- Ensure response personnel and the affected area(s) are decontaminated. Maintain control of waste materials.
- Ensure applicable reports are completed and notifications are made.

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

Requirements for the Treatment and Transport of Contaminated, Injured Personnel

The RCTs primary responsibility when attending a contaminated /injured person to an off-site hospital is radiological control. The following considerations are typical of good radiological control practices:

If the RCT is the first on the scene and there are injured contaminated personnel, the injuries always take precedence over contamination control. The RCT should only administer first aid that her or she is trained to perform. The RCT should get help as quickly as possible.

When help arrives, the RCT should assist medical personnel. If the contaminated individual has to be transported to the plant medical facility, an RCT usually accompanies the injured person or follows immediately. Prior to transporting, preliminary cleanup of transferable contaminants are to be done to the extent that the patient's injuries permit. If it is not possible to do a preliminary cleanup, wrap the patient in a sheet or blanket to limit the spread of contamination.

Sometimes the injury may need a more extensive evaluation and the individual may have to be transported to an area hospital. The individual should have been stabilized and, if possible, contaminated clothing removed and skin decontaminated prior to transporting. If this is not possible, the RCT or other RadCon representative must accompany, or follow, the injured individual to the hospital.

After the needs of the contaminated injured person have been met, all areas and items that he or she came in contact with must be surveyed for contamination. Other RCTs are typically needed to assist in these situations.

The RCT is responsible for documenting all pertinent information about the incident and results of the surveys taken. The medical staff may be able to survey for contamination, but the RCT still needs to survey and complete the documentation. The RCT should make sure all documentation is thorough and accurate for legal reasons.

ICP Specific Information
See section 4.6 *Response to Radiological Casualty* of MCP-124 "Response to Abnormal Radiological Situations" for requirements for treatment and transport of contaminated, injured personnel at the ICP.

Section 5.4 of MCP-148 "Personnel Decontamination" also provides guidance in responding to contaminated, injured personnel.

Request medical assistance and if possible stay with the individual until proper medical attention can be provided, if the individual requires immediate medical attention. Medical attention takes precedence over radiological concerns.
With medical concurrence, proceed to a decontamination area and commence with the decontamination of uninjured areas of the body in accordance with MCP-148 or as directed by medical personnel.

Decontamination of an open injury will only be performed under the direction of or by occupational medicine personnel.

Protect personnel performing decontamination from exposure to biological and radiological hazards through the use of personal protective equipment as needed. Only properly trained personnel may obtain biological samples and dispose of biological waste. Radiologically contaminated waste containing biological waste should be collected in radiological waste bags, labeled as both biohazard and radiological.

Provide first aid only if properly trained.

Summary
It is imperative that the RCT be prepared to respond in the case of injuries or illnesses occurring in radiological areas. In cases of minor injuries, the primary concern will normally be the removal of contamination and preventing the spread of it. However, in the event of major injuries involving large doses of radiation or contaminated patients, first aid and life saving measures will normally take precedent, even at the expense of routine contamination control measures.