U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

HRTD
Human Resources
Training & Development

Chapter 7:

Personnel Decontamination

Objectives:

Describe the four goals of personnel decontamination.

Describe contamination determination methods.

Discuss personnel decontamination techniques.

Purpose

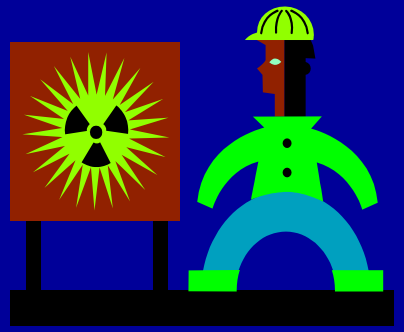
4 goals of personnel decontamination:

(1) Reduce exposure

(2) Minimize intake of radioactive material

(3) Prevent spread of contamination

(4) Remove contamination from skin and other body areas



Methods

Methods of personnel contamination monitoring :

(1) Using hand-held frisker probes,

(2) Automated personnel contamination monitors (PCM)

(3) Hand and foot monitors, and

(4) Portal monitors.

There are a variety of instruments used to determine the presence of contamination. They vary from hand-held GM detectors with a frisking probe to PCM's that use an array of detectors.

Contamination Monitoring Equipment

Frisking Criteria

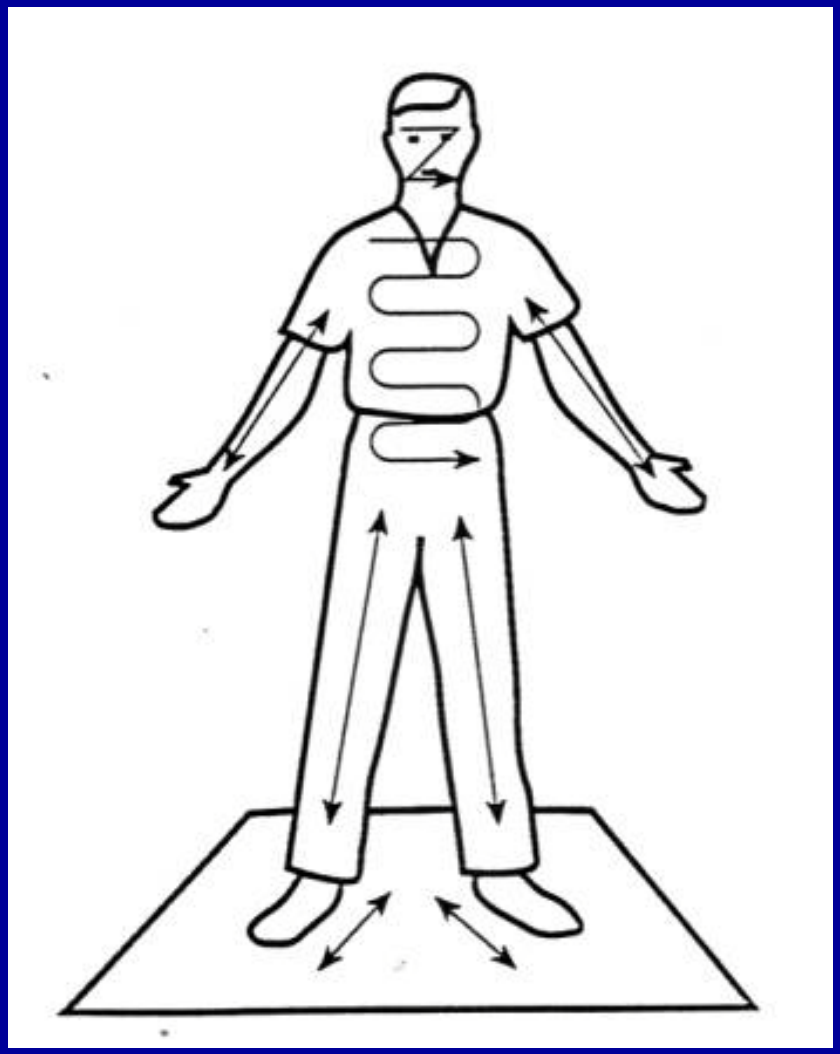
When using a GM hand-held probe, hold the probe about 1/2 inch above the surface of your skin. You want it close so it will detect contamination, but want to avoid contact with the probe to prevent contamination transfer.

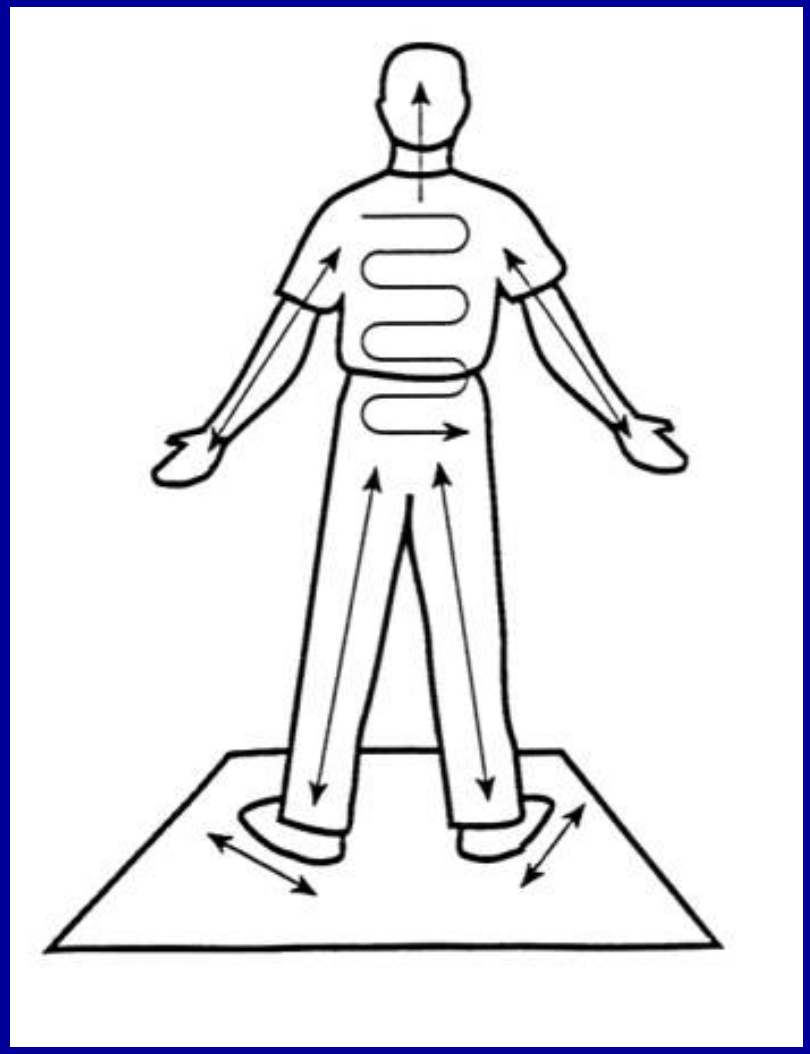
Move the probe slowly, about 2 to 3 inches per second. This will give the detector time to respond to the presence of any contamination.

The detector alarm is set for about 2X the background level, typically 50-100 counts per minute (cpm) above the ambient background level.

Notify Health Physics if the detector alarms. Call or have someone get them so you don't spread contamination.

Survey Technique

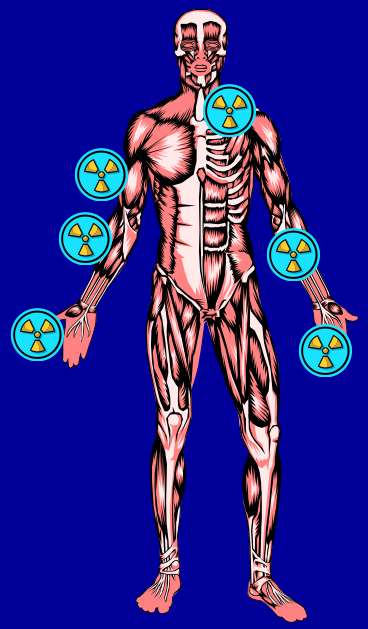




Assistance from a co-worker may be necessary to reach all body areas.

Decontamination - Widespread

If you have contamination on your body, the goal is to remove as much contamination as possible without injuring your skin. This involves showering with tepid water. You don't want the water to be very warm as this may open pores in the skin and allow contamination to enter the skin.



Frisk;
Shower;
Frisk;
Shower;
Frisk…

The process is repeated so long as there is an effective reduction in the contamination level.

Note: may mean that not all contamination will be removed.

Decontamination - Local

Contamination in the eyes, mouth, or an open wound may be flushed with water or a saline solution. A medical doctor should be contacted.

Contamination in the nose may be removed by having you gently blow your nose several times. Wet cotton swabs may also be used.

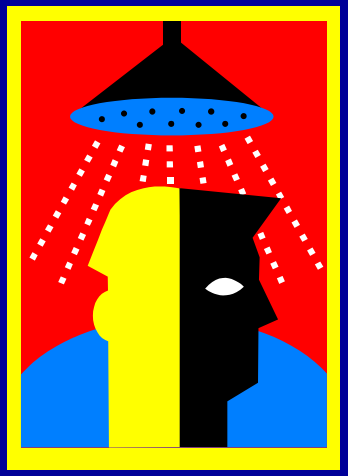
Contamination of hair may be removed by having you wash it several times with repeat surveys. If contamination levels are not reduced to acceptable levels, the hair may be trimmed.

Contamination around facial areas will require whole body checks to determine possible internal uptakes.

Decontamination - Local

Localized contamination on the skin may be removed:

- Wash with mild soap and tepid water,
- Detergent and corn meal (or more aggressive techniques);
- Sweating, e.g., putting a rubber glove on your hand to help the contamination to be "sweated out", and
- Decay – for nuclides with a short half-life you may be able to wait until the radioactive material decays away.



Decontamination - Clothing

Often clothing will "appear" to be contaminated due to airborne products which become entrapped in clothes. Usually these decay products have short half-lives so waiting for their decay is adequate. The radon decay products are attracted to clothes that are made of synthetic fibers such as polyester. For this reason you may want to wear clothes that are made of cotton.

Tape may remove contamination from the surface of fabrics.

If clothing cannot be decontaminated, it has to be disposed of as radioactive waste.

Avoid stepping on floor drains, wet areas, & of course, inside/near roped areas or areas posted as contaminated.

Review

- Contamination surveys are used to monitor personnel for contamination. This helps reduce dose and prevent the spread of radioactive material.
- Different contamination monitoring systems are available.
- For hand-held GM surveys, move the detector about 2 to 3 inches per second holding it about ½ inch away from your body.
- The low background count rate is about 50-100 cpm, the alarm set point is about twice background level.
- Most contamination may be removed by using soap and tepid water.
- Contamination monitors are usually present as you exit: contaminated areas, the RCA, and the plant.