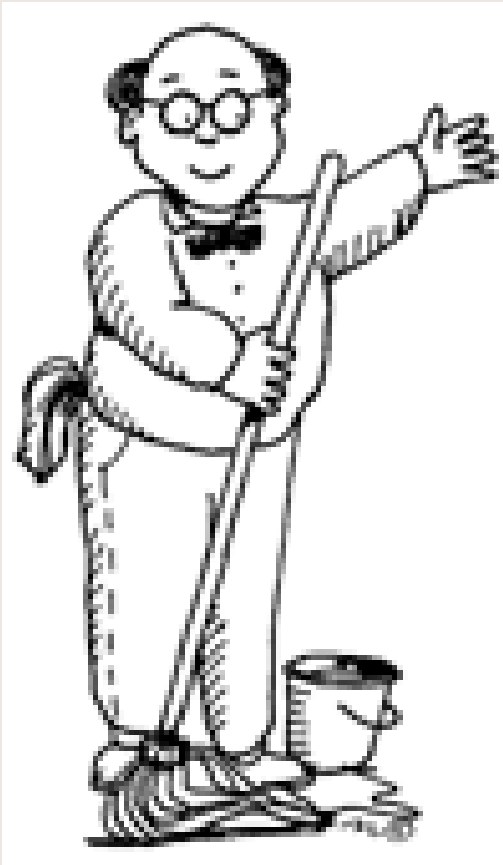


The image shows the cover of a spiral-bound notebook. The cover is a light beige or tan color with a fine, woven fabric texture. On the left side, there is a silver metal spiral binding. The text is centered on the cover in a black, serif font.

# Radiation Safety Training for Ancillary Personnel

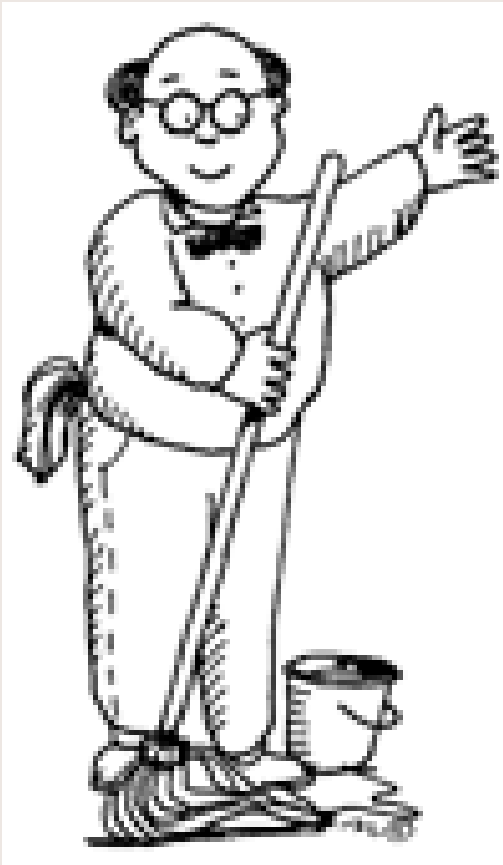
On-Line Training Notes For URI  
Employees and Contractors

# Who are ancillary personnel?



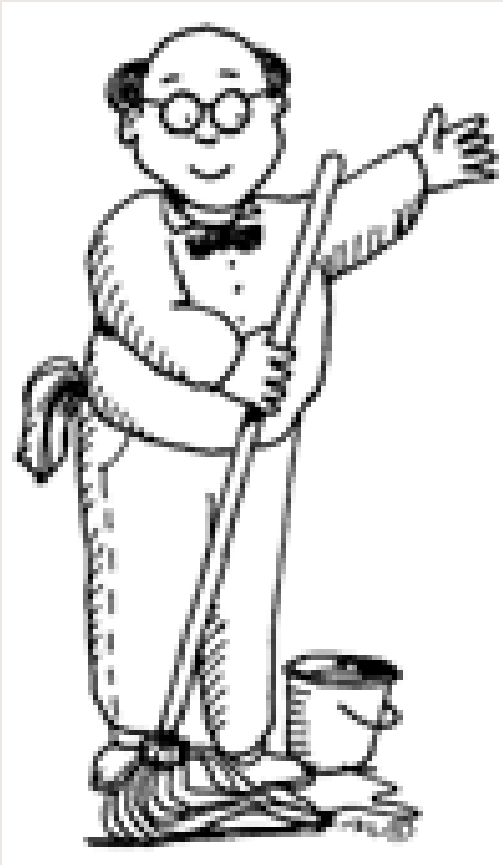
Ancillary personnel are University employees or contractors whose duties do not involve direct use of radioactive materials and/or radiation devices but who may require occasional entry into areas where those materials and/or devices are used.

# Radiation and Radioactivity



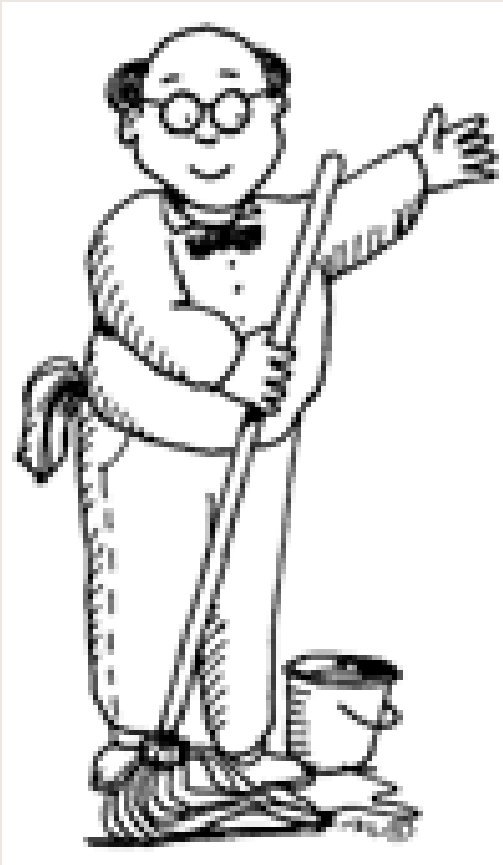
- Radiation is energy in transit, either as particles or electromagnetic waves.
- Radioactivity is the characteristic of various materials to emit ionizing radiation.

# Ionization



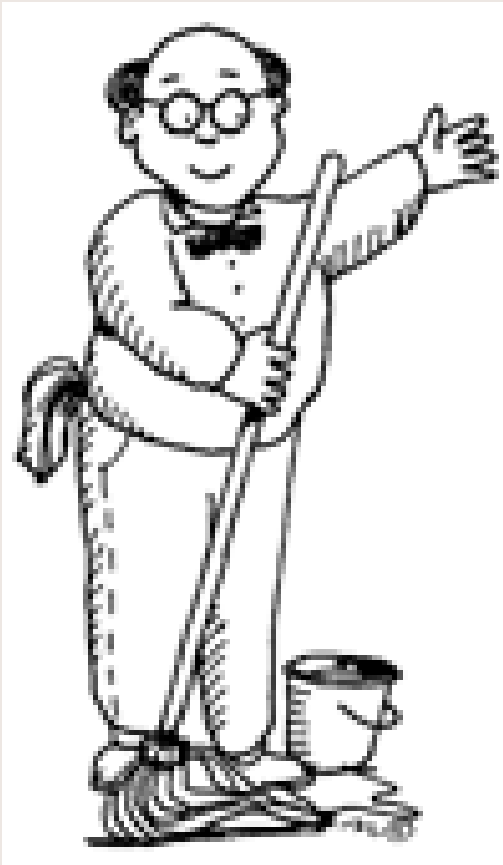
- Ionization is the removal of electrons from an atom.
- Ionization is the essential characteristic of high energy radiations when interacting with matter.

# Dose Units



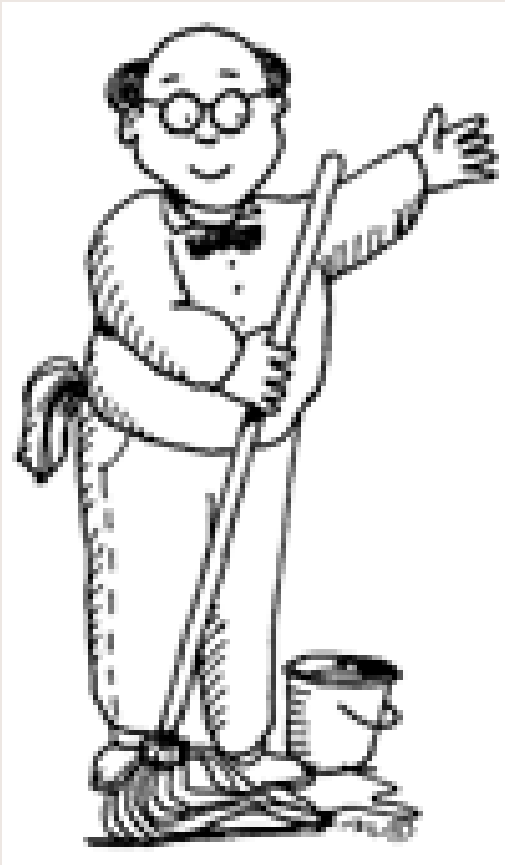
- The rad is a unit for measuring the absorbed energy from radiation
- The rem is a unit for measuring the biological damage caused by that radiation

# Millirem



Doses encountered in every day life are typically much less than a rem. As a result, doses are usually expressed in terms of thousandths of a rem, or millirem (mrem).

# How much radiation dose do we receive if we are not occupationally exposed?



- The average person in the United States receives about 360 millirem every year (whole body equivalent dose).
- This dose is mostly from natural sources of radiation.

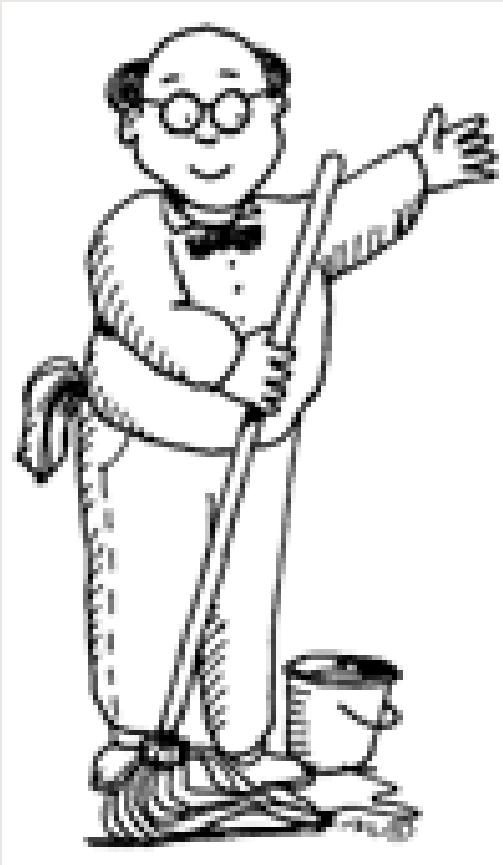
# Typical Annual Radiation Exposures To A Citizen of the U.S.

<b>Source</b>	<b><u>mrem</u></b>
Inhaled (Radon and its decay products)	200
Other Internal ( $^{40}\text{K}$ )	39
Terrestrial	28
Cosmic	27
Cosmogenic	1
Medical X-ray	60
Total	~360

# What are the regulatory dose limits expressed in millirems?

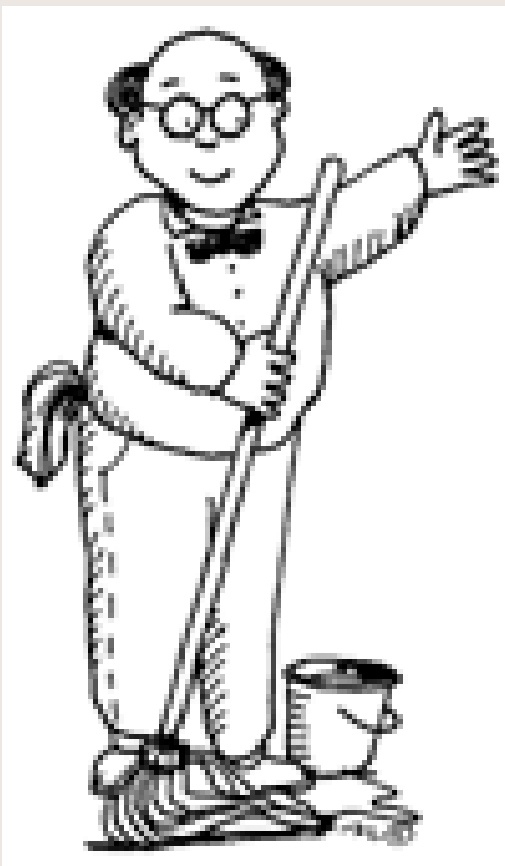
<b>Occupational Whole Body Dose Equivalent</b>	<b>5,000 mrem/year</b>
<b>Occupational Whole Body Dose Equivalent (Minors)</b>	<b>500 mrem/year</b>
<b>Fetus</b>	<b>500 mrem/9 months</b>
<b>Member of Public</b>	<b>100 mrem/year</b>
<b>Occupational Eye Dose Equivalent</b>	<b>15,000 mrem/year</b>
<b>Occupational Skin or Extremity</b>	<b>50,000 mrem/year</b>

# Ancillary personnel



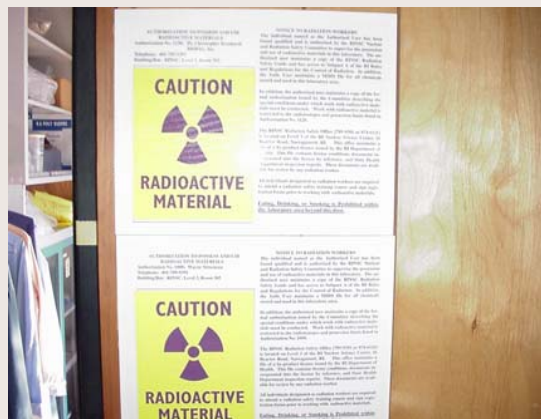
- Are considered members of the public.
- Do not receive personnel monitoring devices.
- Are limited to less than 100 mrem per year.

# What is the ALARA Principle?



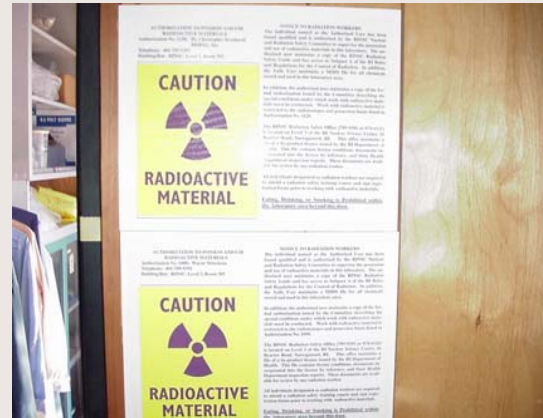
URI radiation safety activities strive to keep all radiation doses associated with University activities well below the regulatory limits and As Low As Reasonably Achievable (ALARA).

# How do I recognize a room that contains radioactive materials?



Look for a yellow and magenta radiation sign as shown here.

# What must I do if I need to work in a room that contains radioactive materials?



You should contact the Authorized User listed before doing any work in the laboratory.

Are there any general restrictions for work in a room that contains radioactive materials?



You should go to another area to smoke, eat, or drink. Those activities are not permitted in rooms where radioactive materials are used.

How do I recognize an item that contains radioactive materials?



Look for a yellow and magenta label as shown here.

# What should I do if I encounter an item that contains radioactive materials?



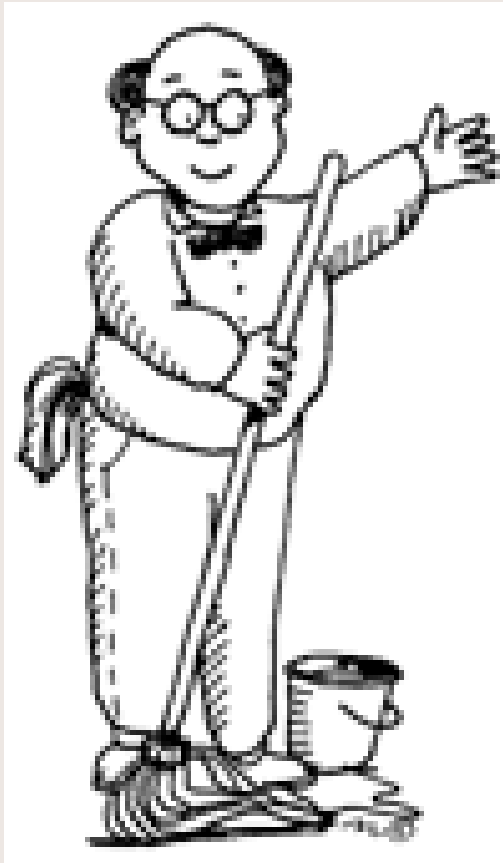
- Do not attempt to move, remove or service any piece of equipment with this sign.
- Do not discard any item displaying this sign.

# How do I recognize a package that contains radioactive materials?



Look for Department of Transportation (DOT) shipping labels on boxes and packages containing radioactive materials

# What should I do if I encounter a package that has one of these labels?



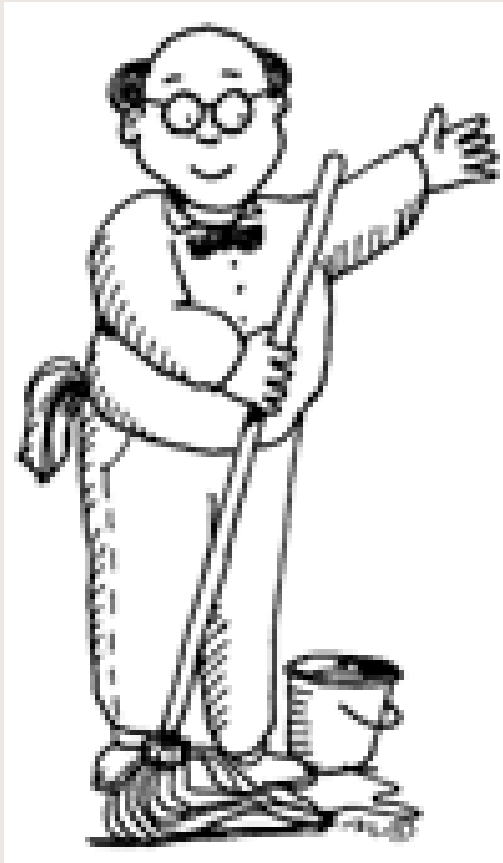
- Do not remove the labels.
- Do not dispose of, recycle, move or remove boxes or other containers containing these labels.

# How do I recognize x-ray equipment?



Look for a label or metal plate attached to the equipment similar to the one shown above.

# What should I do if I am asked to work in a room containing x-ray equipment?



- Contact the Authorized User for safety instructions.
- Ensure that the equipment is off before working around it.