Radiation Training for Ancillary Personnel

Introduction

A number of Oklahoma State University Center for Health Sciences (CHS) laboratories use radioactive materials. The Radiation Safety Officer has developed this radiation safety training module to help ancillary personnel recognize radioactive materials, and identify the hazards and the safeguards one should use when working around these materials. Ancillary personnel may include employees from shipping and receiving, security and physical plant. While these safeguards should protect you from unsafe conditions in most situations, there is no substitute for your personal knowledge and vigilance when working in areas where radioactive materials are used. The guiding principle of radiation protection is to avoid all unnecessary exposures. CHS promotes the principles of ALARA and is obligated to keep radiation exposure to all employees As Low As Reasonably Achievable. This module shall be reviewed upon your initial employment or at the time you are assigned a job where you may work in the vicinity of radiation materials. After reviewing this module the final page shall be signed to acknowledge completion and a copy sent to the Radiation Safety Officer.

Education

Radiation is probably the most feared and least understood of all the hazards we encounter in our lives. We cannot see, hear, smell, or feel it. However, radiation is actually one of the simpler hazards to measure and control. Unsafe amounts of radiation are also the least frequently encountered; the dangers from common chemicals, fire hazards, and physical accidents are much more common.

Radiation is simply a form of energy. The energy may be in the form of particles or electromagnetic waves, similar to light, microwaves, lasers, radio and television waves. It is all around us every day. No matter what we do or where we live, we have exposure to “background radiation.” Background radiation comes from the sun, stars, rocks, soil, and food we eat. These doses are quite small.

In addition to background radiation, you may have exposure to radioactive materials in certain laboratories at CHS. The following information will help you:

- Recognize where these materials are stored and used.
- Know what to do when you work in a room that contains radioactive materials.
- Understand general restrictions for working in these rooms.
- Control your exposure to radioactive materials should problems occur.

Recognizing Radioactive Materials

CHS strives to ensure the safety of all employees. Both state and federal guidelines provide a framework for this program. CHS depends on you to recognize the posted signs, identify hazards and safeguards, and to report any problems to your supervisor, and subsequently to the Radiation Safety Officer at 918-561-1403.

Warning signs indicate the presence of radioactive materials. These signs have a magenta, red or black symbol, called a trefoil, on a yellow background.

Packages used to transport radioactive materials also have labels. These will have the number 7 at the bottom of the diamond. The radioactive material is packaged to contain radiation and should not be a source of exposure; however, the package must be delivered to the person who ordered the material as soon as possible due to regulatory requirements for the package to be surveyed by radiation workers within 3 hours. If no one is available in the laboratory, the package should be locked inside and the laboratory personnel contacted as soon as possible. If the package is damaged, contact the Radiation Safety Officer.

Hazards and Control

You can think of radiation like a sun lamp or tanning bed. Skin will burn if exposed to a sun lamp too long, or is too close, or is not protected by sun block. Similarly, we can use three basic radiation safety techniques to control exposures. They are Time, Distance, and Shielding.

- Time: Limit your time around the area.
- Distance: Maximize your distance from the area to at least 6 feet, if possible.
- Shielding: Keep a wall or door between you and the radiation area, however the type of radiation that is used at CHS can be shielded by intact skin and more so by plastic bags, packaging or storage conditions.

Radiation is measured using several units. The most common of these, the rem, measures the biological damage caused by radiation. As mentioned previously, doses encountered in every-day life are typically very small. In fact, we use millirem (mrem) or thousandths of a rem to measure it. The average person in the United States receives about 200 to 400 millirem every year. This dose is mostly from natural sources of radiation.

Some Typical Annual Exposures

Source			mrem per year
Natural sources (=82%)	Radon gas		198
	Cosmic radiation		28
	Food, water, air that we ingest or inhale		29
Human-made sources (=18%)	Medical x-rays	Chest	5 mrem/x-ray
		GI series	210 mrem/x-ray
		Dental	1 mrem/x-ray
	Road surfaces		1 mrem/ 2500 miles of driving
	Home construction	Stone or concrete	45
		Wood	35
	Consumer products*		11
	Nuclear power		0.01
	Sleeping with partner or other		10

*Regularly smoking cigarettes adds about 1300 mrem/year to one's exposure.

Authorized users of radioactive materials wear personal monitoring devices (dosimeters) to track their exposure while working, as an ALARA practice, however due to the small amounts of materials used and the very small chance of exposure to ionizing radiation, monitoring devices would not be required by regulations. Ancillary personnel will have a much less possibility of exposure so no personal monitoring is required. Safety during pregnancy should be a concern; any employee may request to consult with the Radiation Safety Officer for additional information.

Work areas containing radioactive materials have added safety measures. The primary users and radiation safety staff routinely sample these areas by monitoring the area with a radiation detector (frisk) or swiping the area with filter paper and analyzing it for radioactivity. For example, active laboratories take wipes and or frisk areas:

- Daily or weekly in areas where radioactive material is used frequently, according to how often it's used and the type of radioactive materials
- At least monthly in all areas where use has occurred infrequently
- Every six months for inactive use areas where radioactive material is stored

Restricted Areas

Caution Radiation Area

- Routine cleaning may occur in rooms where there are radioactive materials and safeguards have been put in place to ensure that the materials are stored safely. The storage location of stock material is secured in labeled areas or laboratory personnel are present. Trash disposal if set outside the laboratory in the hall area is authorized to be removed.
- Never eat, drink, or smoke in rooms where radioactive materials are used.

Caution Radioactive Materials

- Do not handle, move, or remove bags or containers labeled “Radioactive Material.”
- Do not clean floors or counter tops unless requested by the Authorized User of the laboratory. All restricted areas have been identified and laboratory staff is present or stock radioactive material is in secured storage.

Emergency Actions

If you encounter a liquid or solid spill in an area posted as “Radioactive Materials,” close the door and notify your supervisor and/or the Radiation Safety Officer, Laurie St. Clair.

Emergency telephone numbers:

Security	918-625-8592
Safety Officer Radiation (RSO)	918-561-1403
Research Compliance Officer	918-561-1413
Chemical Hygiene and Radiation Use Committee Chair	918-561-1413 or 918-561-1403

E-mail: laurie.stclair@okstate.edu

More information can be found in the Radiation Safety Annual training for radiation users at http://www.healthsciences.okstate.edu/research/safety/radiation/training.php

Proof of Radiation Training for Ancillary Personnel

Signature below indicates the “Radiation Training for Ancillary Personnel” module has been read and understood.

Trainee (print)_____ Date_____

Trainee Signature_____

Department_____ Position/Title_____

Return original to Radiation Safety Officer, Research Office, OSU-CHS: Laurie St. Clair