Name: _____ Date: _____

Western University OF HEALTH SCIENCES

The discipline of learning. The art of caring.

Office of Research Regulatory Affairs
909-469-5592

RADIATION SAFETY TRAINING FOR NON-RESEARCH PERSONNEL WORKING AROUND, BUT NOT WITH, RADIOACTIVE MATERIAL

INTRODUCTION

Many WesternU employees work near areas in which radioactive material is used or stored without actually working with it themselves. Animal care personnel, facilities and housekeeping personnel would be examples. The information provided herein is intended to provide such persons some basic information about radioactive material to allow them to perform their duties in a safe and environmentally sensitive manner.

RADIOACTIVITY AND RADIATION

Some atoms are unstable and break down and, when they do, they emit energy. These unstable atoms are referred to as ***radioactive*** and the energy that they emit is called ***radiation***. The radiation emitted can be tiny subatomic particles or it can be in the form of energy waves like visible light only with much greater energy.

If the energy emitted by the radioactive material is sufficient to knock electrons out of atoms, it is called ***ionizing radiation*** which sometimes poses a risk to health. ***Non-ionizing radiation*** has less energy and cannot knock electrons out of atoms. This type of radiation includes visible light, radio waves, microwaves, ultraviolet light, etc.

A radioactive material is called a ***radioisotope*** and the time it takes for one-half of the atoms of a radioisotope to decay away is called its ***half-life***. The half-life of some radioisotopes can be a billion years whereas that of others can be less than one second. After two half-lives, one-fourth of the original number of atoms is left and after three half-lives, one-eighth is left and so on.

RADIATION SAFETY PROCEDURES

Working in laboratories or other rooms in which radioactive material is used or stored is very safe as long as simple precautions are taken and common sense is used. When in doubt, always speak with a person in the laboratory familiar with the radioactive material used or stored there or contact the Radiation Safety Officer (☎ x-5592) or the Alternate Radiation Safety Officer (☎ x-5373).

Access to all rooms in which radioactive material is used or stored is restricted by card-key access. In some cases, additional security is provided by requiring entry of a secret code into a key pad. In either case, doors to all rooms in which radioactive materials are used or stored are labeled with the sign to the left containing the universal symbol for radioactive material which resembles an airplane propeller in appearance and has the words "Caution, Radioactive Material". This is to inform you of the possible presence of radioactive material inside the room before you enter. In addition, fume hoods, refrigerators, freezers, waste containers, bench-tops, etc. are also labeled with caution signs or yellow caution tape containing the radiation symbol. ***Do not touch anything labeled like this without first speaking with knowledgeable laboratory personnel!***

Rooms in which radioactive material is present must not be left open or unlocked unless at least one person knowledgeable about the material is in that room. Therefore, someone should always be available to inform you of any hazards that may be present be they radioactive, chemical, biological or physical (heat sources, etc.) in nature.

Protection against accidental exposure to above normal levels of radioactivity is provided by requiring all radioactive material on campus to be used and stored in such a manner that it is well shielded. **It is, therefore, *very unlikely* that you will work in any area in which the radiation level is above normal.** If you are concerned about this, ask that your work area be properly checked to determine that radiation levels are safe.

Beta radiation is easily shielded by a one-half inch of plastic and, in some cases, by air alone. Gamma radiation and X-rays are shielded using lead. However, very few laboratories on campus use radioactive materials for which more than plastic or a very thin layer of lead is needed for safety.

Radioactive Contamination Monitoring: Persons who use radioisotopes are required to do so in such a way as to minimize the risk of contamination. Moreover, they are required to perform monthly checks for contamination in all campus laboratories in which radioisotopes are used and more often if contamination is suspected. **Therefore, it is *very unlikely* that contamination will be present in the areas in which you perform your work.** If you are concerned about this, ask that your work area be properly checked to determine that radiation levels are safe.

Radiation Dosimeters that measure the radiation dose that the wearer receives may take many forms as can be seen from the examples below. However, the Radiation Safety Officer will only

issue dosimeters to researchers who work with large amounts of radioactive material that emit high-energy radiation.

It is very uncommon for doses to show up on radiation dosimeters due to the very safe handling of radioactive material through the use of proper shielding, reducing the time needed to handle the material and avoiding frequently occupied areas. It is, therefore, not necessary for anyone else working in the laboratory to be issued a dosimeter because the chances of being exposed to radiation is very much less.

ANIMAL CARE PERSONNEL

There may be occasions when radioactive material must be administered directly to live animals. For example, a newly discovered drug may be tagged with a radioisotope and injected into living animals to determine the drug's tissue distribution and rate of elimination. Studies in which radioactive compounds are administered to live animals are called *in vivo* studies. If the *in vivo* study requires the use of a radioisotope, to minimize possible contamination and exposure of others to radioactive material, it may be best to administer the compound to animals while they are still housed within the animal housing area, also called a vivarium.

If a radioisotope is administered to a living animal, the animal itself is now radioactive, as is the cage in which it is housed and the bedding material lining the floor of the cage due to the presence of contaminated urine and feces.

Animal care personnel are already largely protected from exposure to such radioactive material by their **required use of personal protection equipment within the vivarium**. This equipment consists of a disposable lab coat, shoe booties, face mask, hair net and gloves. Nevertheless, the door to any room within a vivarium that is used either for the administration of radioisotopes to live animals or to store radioactive material of any kind will be posted with the sign on the left.

Any study conducted within a vivarium that requires the *in vivo* use of radioactive material will be conducted using **disposable cages** to house the animals. At the end of each study, the cages and all bedding material will be double bagged and properly disposed of in waste containers designated and approved for disposal of radioactive waste. Contaminated animal carcasses must be double bagged with the outer bag being yellow with the universal symbol for radioactive material and the words "Caution, Radioactive Material". Bags containing radioactive animal carcasses must be placed in a separate freezer dedicated solely to the storage of radioactive

carcasses. This freezer must be marked with the universal symbol for radioactive material and the words "Caution, Radioactive Material". This freezer will also have attached to its lid the following warning: STOP: Never mix the contents of this freezer with the contents of any other freezer or material of any other kind!! **Under no circumstances are non-radioactive carcasses and radioactive carcasses to be placed in the same freezer.**

When freezers containing radioactive carcasses are full, the Director of Environmental Health and Safety (EH&S) will have the carcasses picked up for disposal by an approved licensed vendor. The Director of EH&S will remain in attendance during the entire process. An Animal Facilities staff member who has been trained in how to differentiate bags and freezers containing radioactive carcasses from those containing non-radioactive carcasses must also be in attendance during this process to allow access to the facility and to assist the Director of EH&S in ensuring that only radioactive carcasses are removed for disposal.

Under no circumstances is a vendor permitted to take radioactive and non-radioactive carcasses.

EATING OR DRINKING IN ANY LABORATORY, VIVARIUM OR OTHER AREA DESIGNATED FOR THE USE OF RADIOACTIVE MATERIAL IS STRICTLY PROHIBITED! No food or beverages may be kept or consumed in areas posted for radioactive material use or storage. In addition, all other activities involving hand-to-mouth motion such as application of cosmetics, lip balm, gum chewing, etc. must be avoided. Do not place notebooks, pens, tools, etc. in posted radioactive material areas as they can easily become contaminated.

Additional radiation safety training may be obtained by contacting the Radiation Safety Officer at ☎ x-5592.

BE EDUCATED!!!

Considering the relatively small quantities of radioactive materials used at WesternU and the safe methods by which they are used and stored, there is no reason to fear the radioactive material used here.

The public media have at times instilled anxiety and fear into the public regarding all things radioactive such as nuclear power plants, radioactive waste disposal, etc. The reality for WesternU is that nobody has ever received a dose of radiation that has been harmful. This is in part due to WesternU's commitment to the policy of ALARA, keeping radiation doses **A**s **L**ow **A**s **R**easonably **A**chievable. With everyone's cooperation, we will be able to continue to ensure the safety of everyone working with or around radioactive material.

I have read and understand the information contained in this training, titled document titled

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and have been provided an opportunity by the Radiation Safety Officer or Alternate Radiation Safety Officer to ask any questions I have regarding this document or any other radiation safety issue.

Printed name _____Signature_____

Date_____

DO NOT WRITE BELOW THIS LINE

I have met with the above named person and reviewed the information contained in this Radiation Safety training document with him/her and answered any questions that person may have had about this document or any other radiation safety issues.

Printed name

_____Signature_____/RSO

Date_____