



## Radiation Safety Guidelines for Non-Users

This is a “Read and Sign Awareness Training” document. You should read and sign this document if you:

1. **DO NOT** work directly with radioactive materials or other radiation sources, but
2. **DO** work in close proximity to (such as in the same room as) others who do.

Note that throughout this document, the term “radiation sources” will be used to mean any material or device that produces radiation that is energetic enough produce ionization in the atoms that make up human tissue. Radiation sources include both radioactive materials and radiation-producing machines. Radioactive materials emit radiation as their atoms decay. Radiation-producing machines generate radiation electronically; unlike radioactive materials, radiation-producing machines stop producing radiation if they are disconnected from an external source of power.

These guidelines are useful to students in a class or laboratory where radiation sources are used, to persons who manage shared facilities where radiation sources are permitted to be used, and to individuals who have general questions about the university’s use of radiation sources. This document provides important information regarding the Radiation Use Authorization (RUA) program at UC Berkeley, radiation safety, potential hazards, and emergency procedures.

**After reading these guidelines, sign the last page and return it to the person who requested that you read this information.**

Your signature indicates that you (1) have read this document in full, (2) understand the hazards associated with the radiation sources you may encounter, and (3) know the basic steps to follow in the event of a radioactive material spill or other radiation-related emergency.

## The UC Berkeley Radiation Safety Program

The campus Radiation Safety Program is implemented by those using radiation sources and by the radiation safety staff in the Office of Environment, Health & Safety (EH&S). Oversight is provided by a campus faculty committee (the Radiation Safety Committee). The program is intended to protect both individuals authorized to use radiation sources and non-users who work nearby. The program's basic components are:

- ❑ The Radiation Use Authorization (RUA)
- ❑ Training
- ❑ Warning signs, labels, and postings
- ❑ Exposure monitoring
- ❑ Detection and cleanup of contamination (spill cleanup)

In order to work directly with radiation sources, individuals must have specific training and must be listed on a laboratory-specific RUA. EH&S trains users and issues RUAs to qualified UC Berkeley faculty and staff members. In cases where radioactive materials are used, the work must be authorized under a campus-wide Radioactive Materials License issued by the California Department of Public Health (CDPH). Radiation-producing machines are not covered by this license, however, the EH&S staff is required to register the details of each machine (model, location, etc.) with CDPH and to comply with applicable CDPH regulations.

The Principal Investigator (PI) obtains an RUA by applying to EH&S. After all proposed uses and procedures are determined to be in compliance with campus, state, and federal regulations, the RUA is approved by the campus Radiation Safety Officer (RSO) and/or the Radiation Safety Committee.

For the duration of the RUA, radiation use must remain in compliance with campus requirements, the campus license (in the case of radioactive materials), state and federal regulations, and specific requirements of the RUA itself. Rooms where radiation sources are used or stored are posted with a radiation hazard information door sign. The RUA and other radiation safety-related documents are posted wherever radiation sources are used or stored. Take a moment to find the RUA(s) covering your workplace and familiarize yourself with the information provided.

## Radiation Safety

As a person who works near, but not with, radiation sources, your exposure limits are the same as for members of the general public who do not normally work near radiation sources. Attention to four basic elements can reduce or eliminate radiation exposure: **time, distance, shielding, and administrative controls.**

1. **Time** refers to the time an individual spends actually handling a radiation source or being exposed to radiation. The shorter your exposure to a radiation source, the lower your radiation dose will be.
2. **Distance** refers to the physical distance between you and the radiation source. In general, the greater the distance between you and the radiation source, the lower your radiation dose will be. Most radiation sources used on the campus present no hazard or radiation dose, even at relatively short distances (a few feet).
3. **Shielding** is any barrier placed between an individual and a source of radiation. Shielding absorbs radiation, allowing a person to remain relatively close to a radiation source while minimizing radiation exposure.
4. **Administrative Controls** are rules used to reduce radiation exposure. Typically, the following precautions are mandated when working around radioactive materials:
  - ❑ Use gloves, safety glasses, lab coats, and closed-toed shoes
  - ❑ Label all use areas
  - ❑ Properly store and dispose of materials
  - ❑ Use fume hoods
  - ❑ Do not eat, drink, smoke, or apply cosmetics near radioactive materials
  - ❑ Do not store food with radioactive materials

It is important to understand that different sources of radiation call for different applications of time, distance, shielding, and administrative controls. Trained users of radiation sources adjust these applications to minimize the hazards related to particular sources in use.

## Warning Signs and Labels

**Radioactive materials:** All radioactive items and equipment are labeled with the radiation symbol and wording that describes the risk:



**CAUTION: RADIOACTIVE MATERIAL(S)**

Areas where radioactive materials are used are marked with “RAD (short for ‘radiation’) tape”. RAD tape is yellow and features the radiation symbol:



Both radiation users and EH&S staff periodically inspect laboratories and surrounding areas to ensure that radioactive materials are properly labeled and contained, and that radiation areas are properly marked off.

In the laboratory you will see radiation-warning signs and labels on refrigerators, freezers, and other pieces of laboratory equipment such as centrifuges and test tubes. **Never store food or drink in refrigerators or freezers that contain radioactive materials.**

If you are not listed on the RUA, **do not handle or move materials** displaying a radiation label or located inside an area marked with RAD tape. **Do not place personal items (books, cups, etc.) inside such an area;** you risk contaminating the item and yourself.

**Radiation-producing machines:** Radiation-producing machines are also labeled with the radiation symbol.



**CAUTION: X RAYS**

## Emergency Procedures

**Radioactive-material spill:** In the event of a radioactive-material spill in your workplace, follow the emergency procedures below. **Do not** directly assist with the cleanup of a spill unless you are listed on the RUA.

1. Leave the immediate area and report the spill immediately:
  - During regular business hours (M–F, 8 AM–5 PM) call EH&S at **642-3073**.
  - Before or after business hours, including weekends and holidays, call the University of California Police Department (UCPD) at **911**. If you are using a cell phone, the UCPD direct emergency number is **642-3333**.
2. Assemble nearby and keep others from entering the contaminated area. Keep out until the spill has been cleaned and you are instructed that you may re-enter.
3. If you have come in direct contact with a radioactive material, you may need to remove any affected clothing and thoroughly wash yourself with mild soap and warm water. Contact EH&S for directions. EH&S staff will perform any necessary checks to assure that you are free of radioactive contamination.

**Suspected radiation exposure:** Notify EH&S as soon as possible in case of suspected accidental radiation exposure.

## Transport of Radioactive Materials

Occasionally, shipments of radioactive materials may be delivered to your workplace by EH&S. Most often these are in white shipping boxes that display the radioactive materials symbol and the word “RADIOACTIVE”. Prior to delivery to your workplace, EH&S has opened these packages and checked the contents for contamination. If contamination is detected, EH&S notifies the PI. Delivery may proceed or be canceled, depending upon the severity of the contamination and the directions of the PI.

If a shipment is delivered to your laboratory directly by a shipping company (e.g. FedEx), please call EH&S Radiation Safety. Do not open the package.

The hazards associated with these materials are well controlled by their packaging. Most radioactive materials delivered to the campus are small vials packed in multiple layers of packaging and shielding. The packaging is designed to eliminate contamination to the outer layers of the package in case of a rupture and spill inside the package.

Ideally, EH&S delivers only to the storeroom or to individuals on the RUA. As a non-user, it is safe to receive a package being delivered by EH&S, but it is preferred that you find the PI or a person listed on the RUA to accept the shipment. If you do accept a shipment

from EH&S, be sure to place it in a safe location and tell the PI or an individual listed on the RUA.

For many RUAs authorizing radioactive materials, RUA personnel must transfer small amounts of radioactive material between their regular use area and other areas, such as Centralized Waste Pick-up Units (CPUs) or shared laboratories where analytical work is done. EH&S staff members review how these transfers are handled in the course of periodic laboratory audits of RUAs. EH&S staff members also check to be sure that materials are not transferred to improper locations. With the exception of the EH&S-established CPUs, RUA personnel may not move radiation sources to any location that is not listed on the RUA.

### **Additional Training**

Should your job change such that you are required to work directly with radiation sources, you must take additional training and be added to the RUA **before** beginning the work.

### **Question or Concerns**

Each RUA lists individuals in the laboratory who are authorized to use radiation sources. It also lists the Laboratory Contact who has special responsibilities in the laboratory. The Laboratory Contact can answer any questions about the use of radiation sources in that laboratory.

Additionally, if you have any concerns or questions, feel free to call the EH&S Radiation Safety staff at **642-3073**. This can be done anonymously, if you wish. If you believe that a radiation concern is not being addressed and resolved by your department or EH&S, you may contact the California Department of Public Health (DPH) Radiological Health Branch at **(800) 852-7550** for emergency assistance, or, for non-emergencies, at **(916) 327-5106** or <http://www.dhs.ca.gov/rhb>. Each building has a DPH "Notice to Employees" poster that describes your rights and how to contact the DPH. Again, you may remain anonymous.

### **Additional Information**

Many resources are available to you for good and accurate information about radiation and the use of radiation sources. One is the EH&S Radiation Safety website, at <http://radsafe.berkeley.edu/>. There you will find training handouts, the campus *Radiation Safety Manual*, and links to other resources.

# Radiation Safety Guidelines for Non-Users Training Record

Please complete and sign this page. Return it to the person who requested that you read this information; it will serve as a record of your training. Your signature indicates that you have read and understand the information presented in the Radiation Safety Guidelines for Non-Users, and have had the opportunity to ask questions.

Name: \_\_\_\_\_  
(Print)

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Instructions to RUA Holders:

The documentation should be kept with your other RUA paperwork and available for inspection by EH&S staff members.