

RADIATION SAFETY OFFICE PROCEDURES

RADIONUCLIDE USE IN ANIMALS

The Animal Care Committee in the Department of Comparative Medicine controls the use of animals in research studies at the University of Washington. Animals may be housed in a research laboratory for up to 24 hours. If procedures will take a longer period of time, animals must be held in facilities approved by the Animal Care Committee.

A. Certification of Radioactive Materials Space

If research involves the use of radioactive materials in animals, either approved animal care space or the researchers own space must be certified for radioactive materials use by the [Radiation Safety Office](#) (RSO). RSO [Form 50](#) must be filled out for the space and submitted to the RSO. Space may be assigned either short- or long-term use. The researcher must indicate on the [Form 50](#) the estimated length of time that the room will be used.

B. Prospective on Hazards to Workers

Typically, very small quantities of radioactive materials are used in animal research and the risk to employee's health is low. This is not to say that radiation protection in these situations is trivial, however it is typically a very minor concern compared to the other risks of research. Protection from radioactive materials is almost never different from proper precautions taken during normal animal care and research.

C. Protective Clothing

The use of gloves, laboratory coats, and other protective clothing minimizes the chances for the ingestion or absorption of radioactive materials when working with animals. The protective clothing normally associated with animal use does not differ when radionuclides are also used. A more complete description of the use of protective clothing when using radionuclides is given in [Chapter 9](#) of the [UW Radiation Safety Manual](#).

1. Gloves

Gloves should always be worn when handling radioactive materials. Latex or nitrile gloves are the most common types used in research laboratories, but several other types of gloves are available from safety supply vendors. The choice of type of glove to be used when working with radioactive materials should be dictated by the associated chemical and/or biological hazard.

2. Lab Coats/Coveralls

Laboratory coats, aprons, or coveralls are recommended to protect one's personal clothing from contamination. Coats, aprons, or coveralls worn as protective clothing should remain behind in the laboratory at the end of the day or whenever the individual leaves the laboratory. It is particularly important not to wear clothing that may be contaminated with radioactive materials, chemicals, or biologically hazardous materials into eating areas, such as break rooms.

3. Respirators

Typically, respirators aren't required when working with radioactive material in animals. In nearly all situations where significant airborne radioactive materials are involved, a fume hood or hot-cell is preferred to respirator use. Project review by Radiation Safety Office staff identify the need for a respirator and precautions will be addressed on a case by case basis.

4. Protective Eyewear

Protective eyewear (safety glasses) is recommended whenever using unsealed radioactive or hazardous materials. This eyewear must be kept clean and replaced if scratched, or the visual field can be affected.

5. Open Sores/Wounds

Open sores or wounds on exposed body surfaces provide an opportunity for absorption of radioactive materials. It is best to avoid work with radioactive materials, or properly dress and protect open sores or wounds before working with radioactive materials.

D. Training

[UW Radioactive Materials License](#) conditions require that all individuals working directly and independently with unsealed radioactive materials in the course of their employment must attend the [radiation worker training](#) and pass a final examination. For individuals simply handling animals that have radioactive materials administered to them, the requirements are less stringent. Training must be provided to all personnel regarding the specific radiation safety requirements for the tasks to be performed. This training must be directly related to the duties of the individual, and commensurate with the risks. Necessary training will be provided by the Authorized Investigator, his/her designee, or Radiation Safety Office Staff.

E. Personal Dosimetry

Personal dosimetry is usually not required or necessary when handling animals containing radioactive materials because penetrating radiation external to the animal is negligible. In the rare situation where the Radiation Safety Office determines that there is a potential for exposure, personal dosimetry will be provided.

F. Posting

All cages or pens containing animals with radioactive materials must be labeled with [appropriate warning signs](#). Animal room signage is similar to other rooms where radioactive materials are used and must include appropriate radiation warnings, emergency procedures, survey requirements, and certification documents. These signs and postings will be provided during certification of the space by RS staff. Typical signage is indicated in the following paragraphs, but actual signage (appropriate for the specific application) is determined by the Radiation Safety Office.

1. Notice to Employees, DOH Form RHF-3

Department of Health (DOH) Form RHF-3, "Notice to Employees" must be posted wherever individuals work or frequent and there is a likelihood of a radiation hazard. This includes radiation hazards from either radiation producing machines or radioactive materials.



STATE OF WASHINGTON

NOTICE TO EMPLOYEES





Radioactive Materials
License Number(s) WN- C001-1

X-Ray
Registration Numbers: 03641 to 03647

Employer University of Washington

In the Radiation Control Regulations, the Department of Health has established Standards for your Protection against Radiation Hazards

YOUR EMPLOYER'S RESPONSIBILITY:
Your employer is required to:

1. Apply these regulations to work involving sources of radiation.
2. Post or otherwise make available to you a copy of the Department of Health regulations, licenses and operating procedures which apply to work you are engaged in, and explain their provisions to you. These documents may be found and examined at: 201 Hall Health Center, University of Washington, Seattle, WA.
3. Post each Notice of Noncompliance involving radiological working conditions, proposed imposition of civil penalties and orders. These types of documents may be examined at: Same location as listed above.
4. Provide adequate radiation safety training to you, including training in the use and handling of radiation producing devices, as appropriate.

YOUR RESPONSIBILITY AS A WORKER:
You should familiarize yourself with those provisions of the Department of Health regulations, and the operating procedures which apply to the work you are engaged in. You should observe their provisions for your own protection and protection of your co-workers, patients (if any) and the public.

WHAT IS COVERED BY THESE REGULATIONS?

1. Limits on exposure to radiation and radioactive material in restricted and unrestricted areas;
2. Measures to be taken after accidental exposure;
3. Personnel monitoring, surveys and equipment;
4. Caution signs, labels, and safety interlock equipment;
5. Exposure records and reports;
6. Options for workers regarding Department inspections;
7. Performance standards for x-ray equipment; and
8. Other related matters.

YOUR RADIATION EXPOSURE HISTORY:

1. Your employer must advise you annually of your exposure to radiation.

POSTING REQUIREMENT

Copies of this notice must be conspicuously posted in a sufficient number of places where employees are engaged in activities licensed or registered pursuant to Chapter 246-224 WAC and Chapter 246-235 WAC, by the Department of Health, Radiation Protection, to permit employees working in or frequenting any portion of a restricted area to observe a copy on the way to or from such an area.

INSPECTIONS:
All licensed or registered activities are subject to inspection by the Department of Health or its duly authorized representatives. In addition, any worker or representative of workers who believes that there is noncompliance with Chapter 70.98 RCW, the regulations issued thereunder, or the terms of the employer's license or registration with regard to radiological working conditions in which the worker is engaged, may request an inspection by sending a notice of the alleged noncompliance to the Department of Health. The request must set forth the specific grounds for the notice, and must be signed by the worker or the representative of the workers. During inspections, Department inspectors may confer in private with workers, and any worker may bring to the attention of the inspectors any past or present condition which he or she believes contributed to or caused any noncompliance as described above.

INQUIRES:
Inquiries dealing with radioactive materials may be directed to the Department of Health, Radiation Protection, P.O. Box 47827, Olympia, Washington 98504-7827, Telephone (360) 753-4481. Inquiries dealing with radiation producing machines and facilities may be directed to the Department of Health, Radiation Protection, 1511 3rd Avenue, Melbourne Tower Bldg - 7th Floor, Seattle, WA 98101; Telephone (206) 464-6840.

DOH 321-011 (Rev. 11/93)

"RHF-3"

EMERGENCY PROCEDURES

RSO Form 38 (12/96)

MUST BE POSTED IN EACH CERTIFIED LABORATORY IN A CONSPICUOUS LOCATION

Emergency Phone Numbers: (Fill in)

Radiation Safety Officer **543-0463**

After hours, call University Police **543-9331**

Ask them to call EH&S Duty Officer. Give them your name and number.

Someone will call you back.

Authorized Investigator (Name & Home Phone) _____

Lab's Radiation Safety Agent (Name & Home Phone) _____

Radionuclides in Use: (Circle radionuclides being used in lab)				(ALI = Annual Limit on Intake)			
GROUP I ALI > 10 mCi	GROUP II 1 mCi < ALI ≤ 10 mCi			GROUP III 0.1 mCi < ALI ≤ 1 mCi		GROUP IV 0.01 < ALI ≤ 0.1 mCi	
H-3	C-14	Mn-54	Mo-99	Na-22	Sr-89	Sr-90	
F-18	Na-24	Fe-55	In-111	P-32	Cd-109	I-125	
Cr-51	P-33	Co-57	I-123	Cl-36	Ag-110m	I-131	
Cu-64	S-35	Co-58	Hg-197	Ca-47	Cd-115m		
Tc-99m	K-42	Ga-67	Au-198	Fe-59	Ir-192		

MAJOR SPILLS: Group I > 10 mCi / Group II > 1 mCi / Group III > .1 mCi / Group IV > .01 mCi

1. **CLEAR THE AREA.** Notify all persons not involved in the spill to vacate the room.
2. **PREVENT THE SPREAD.** Cover the spill with absorbent pads or diatomaceous earth, but do not attempt to clean it up. Confine the movement of all personnel potentially contaminated to prevent the spread.
3. **SECURE THE SOURCE.** If necessary, the source should be shielded only if it can be done without

4. "Caution, Radioactive Materials" (sign or label)

a. Room or Area

Any space in which radioactive materials or radiation sources are used or stored must be posted with a radioactive materials caution sign. These areas include, but are not limited to, laboratories, cold rooms, counting rooms, animal rooms, refrigerators/freezers, cabinets, and hoods.

b. Container

Any vessel (open or closed) in which radioactive materials are used or stored must also be labeled with a radioactive materials caution sign.



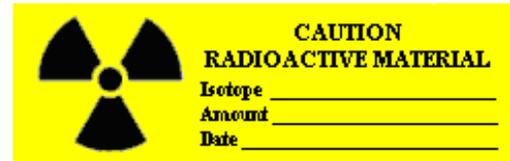
c. When Used

This sign should be used at all times, except for:

- **Rooms or Areas** in which containers will be attended and in which the containers will remain for short duration.
- **Containers** that are in transport, and are packaged and labeled in accordance with the regulations of the Department of Transportation.

5. “Caution, Radioactive Material” (tape)

All **contaminated and/or hot areas and items** must always be labeled as radioactive, unless decontaminated to the background level.



G. Surveys

1. Laboratories with Animals

Laboratories with animals are surveyed in a manner similar to typical research laboratories that do not have animals. Surveys are performed in accordance with [Section 13](#) of the [Radiation Safety Manual](#). Oversight of survey records and spot checks are performed on a regular basis by Radiation Safety Office staff.

a. Authorized Investigator Surveys

1) After Use Surveys

Authorized Investigators and his/her laboratory personnel must survey their laboratories to assure that radioactive material is contained after each use. They do not need to include the entire laboratory, but may be limited to the particular portion of the laboratory where the work took place.

2) Monthly Surveys

Laboratory personnel must perform and record a monthly survey of the entire laboratory. The surveys must be made with instruments or wipes as appropriate for the radioactive materials authorized for the laboratory. If no radioactive material was used in the laboratory during the month, a survey of the space is not required. However, the following statement, or a similar statement, accompanied by the date of the entry must be made on the laboratory survey log, “No radioactive material use – no survey required.”

3) Surveys of Common Use Areas

Frequent surveys while using radioactive materials are encouraged. In addition, good practice necessitates self-monitoring in certain situations. Examples of situations where self-monitoring is necessary would be when use or process is interrupted by a distraction, and whenever contamination is suspected. Self-monitoring must be done before leaving the area, for example when taking a break or leaving for lunch. Self-monitoring does not need to be documented.

b. Radiation Safety Staff Surveys

Radiation Safety staff also survey labs to satisfy Department of Health requirements for administrative oversight. These surveys are conducted on a schedule related to the hazards resulting from the activities and types of radioactive materials in use. The survey schedule varies from monthly to yearly.

2. Animal Freezer (D605)

The freezer in Health Sciences Building (Room D605) is used for storage of animal carcasses and putrescible animal waste. Radioactive animal carcasses and wastes are labeled by the authorized investigator, separated from other animals, and placed into the yellow Radioactive Animal Bin. Radiation Safety staff removes these animals regularly for processing and disposal. This area is also regularly surveyed by the Radiation Safety staff.

H. Disposal of Animal Carcasses and Putrescible Animal Waste

1. Monitoring/Calculation

Monitor or calculate the activity levels and the activity per gram of animal carcasses, bedding, and waste materials as they are produced. These activity levels will be necessary to determine proper methods or disposal.

2. Below Regulatory Limits – Exempt Carcass Waste

Animals contaminated with H-3 or C-14 at a concentration less than 0.05 $\mu\text{Ci}/\text{gram}$ may be disposed as (exempt) non-radioactive waste.

3. Organs with Higher Levels

If certain organs with H-3 or C-14 have concentrated radioactivity at or above 0.05 $\mu\text{Ci}/\text{gram}$, these parts can be removed and treated separately for radioactive waste disposal. The remainder of the animal can be disposed as non-radioactive if it is below these limits.

4. Animal Waste Above Limits

Putrescible animal waste containing radionuclides greater than the levels listed in Item H.2. must also be treated as radioactive waste. This includes blood, excreta, tissue samples, animal bedding, and similar materials.

5. Long-lived Radionuclide Disposal

Animal carcasses, animal organs, or putrescible animal waste containing long-lived radionuclides above the exempt limits must be transferred to RS staff for disposal.

Waste presented in an incorrect form or which becomes putrid will jeopardize the authorization to use radioactive materials. Putrid packages will be returned to the originating laboratory for proper packaging. To package radioactive animal carcasses, animal organs, and putrescible animal waste:

- a. Notify Radiation Safety by e-mail at radsaf@uw.edu indicating the volume, nuclide(s) and approximate activity of the waste.
- b. Place carcass in a plastic bag and add enough lime to cover the animal. Place in a second plastic bag.
- c. Take to Comparative Medicine, Health Sciences D605 (freezer section).
- d. Label with a RAM tag provided in HSB D605. The tag should be filled out with:
 - 1) Nuclide(s)
 - 2) Approximate activity
 - 3) PI
 - 4) Contact information
 - 5) Budget number
- e. Large Animals

When the disposal of large animals is anticipated, arrange with RS staff to have a 30-gallon drum delivered to your work area. The carcass can then be placed in the drum before it becomes rigid. When notified, the RS staff will pick up the drum and take it directly to the freezer in the Radiation Safety Waste Facility.

6. Animal Carcasses Containing Short-lived Radioactive Materials

- a. Holding for Decay

Animals containing only radionuclides with short half-lives (< 120 days, e.g., I-125, I-131, P-32) can be held for radioactive decay. **Do not mix short-lived waste with long-lived waste.**

b. Storage

These animals are stored without charge. Make arrangements with the Radiation Safety Office by e-mailing Radiation Safety at radsaf@uw.edu.

c. Labeling

This waste **must be labeled** by the researcher with a disposal date, nuclide(s), approximate activity, and contact information.

For more information about radioactive waste, please review [Section 14](#) of the [Radiation Safety Manual](#). For addition questions, please contact Radiation Safety by e-mail at radsaf@uw.edu, or by phone at 3-0463.