

RADIOACTIVE MATERIALS MANAGEMENT

1. INTRODUCTION

Management of radioactive materials and radiation is the responsibility of the Principal Investigator (PI) under whose license the material/machine is being used. Ultimately, however, it is the responsibility of each member of the laboratory to maintain safe storage and use of the radioactive materials and machines in their area. By using correct procedures to order, store, and dispose of radionuclides, sealed sources, and radiation producing machines, each researcher is helping to implement the ALARA Program and ensure safety at the University of Colorado.

2. PURCHASING

To Receive Radioactive Materials and/or Radiation-producing Machines:

1. Ensure that the **Laboratory License** is obtained and includes the appropriate authorization for the radionuclide(s) or radiation-producing machine(s)
2. All **deliveries** must be **through Health Physics** (see address below)
3. All items must be purchased using a **Purchase Request (PR)** or **Standing Purchase Order (SPO)**
4. The University's **Procurement Card** or any other credit/debit cards are **not permitted** for these purchases
5. Exceptions to the above may be granted **with prior approval** of the RSO or ARSO on a case-by-case basis

Laboratories wishing to order radioactive materials and/or a radiation-producing machine must first obtain a license for the specific product from the Radiation Safety Officer (RSO) and the Radiation Safety Committee (RSC). Radioactive materials will not be delivered to laboratories if the material will cause the license limit to be exceeded. If a limit is exceeded, a license amendment or disposal/removal of current inventory will be required and may prevent timely delivery. Please refer to the Laboratory Licensing chapter. The PI and laboratory staff members who will be using radioactive materials and/or radiation should complete Radiation Safety Training prior to ordering the product, however, the required training must be completed prior to receipt of the product. Please refer to the Training chapter.

Ordering radioactive materials and radiation-producing machines requires using a Purchase Request (PR)/Standing Purchase Order (SPO). In most cases, these are established by individual departments through the Procurement Service Center. All PRs and SPOs must be approved in advance by Health Physics. The "Ship To" address must be verified on all PRs. See Delivery Address below. **The University's Procurement**

Card, other credit/debit cards, and other purchasing methods may NOT be used to order radioactive materials or radiation-producing machines unless PRIOR approval is granted by the RSO or Alternate RSO. Exceptions may be granted on a case-by-case basis.

All radioactive materials and sources must be delivered to Health Physics and checked for contamination prior to delivery to the receiving laboratory unless special arrangements have been approved in advance. Radionuclide stock vials contaminated at a level of 1,000 dpm/100 cm² or less will be delivered to the laboratory. Laboratory personnel will be notified of the contamination. Radionuclide stock vials contaminated at a level of 10,000 dpm/100 cm² or above will not be delivered to the laboratory. Exceptions may be granted by the RSO or Alternate RSO on a case-by-case basis. In the case of vials contaminated at a level above 1,000 dpm/100 cm² but below 10,000 dpm/100 cm², laboratories will be notified of the potential for contamination from the vial and reminded to use safe handling procedures. Laboratories have the right to refuse receipt of a vial contaminated at any level. It is the laboratory's responsibility to arrange for a replacement from the manufacturer if necessary.

Radioactive materials that are purchased, donated, received as gifts, or transferred from other institutions must be delivered through Health Physics.

Radiation-producing machines that are purchased, donated, received as gifts, or transferred from other institutions may be delivered to the area of use only after prior notification has been made to Health Physics and approval has been granted. In most cases, delivery should be made through the Health Physics office.

Radioactive Materials Delivery "Ship To" Address:

**University of Colorado at Boulder
Environmental Health and Safety Center
Health Physics
1000 Regent Drive, 413 UCB
Boulder, CO 80309-0413
ATTN: (PI's Name)**

3. STORAGE OF RADIOACTIVE MATERIALS

All freezers and other equipment used to store radioactive materials must have a *Caution Radioactive Materials* sign or label. Radioactive materials should be stored only in areas properly marked and approved for their use. Please refer to the Laboratory Licensing chapter or contact Health Physics at (303) 492-6523 for further information.

Each laboratory must ensure security of radioactive materials and/or radiation-producing machines. This may require locking of laboratory doors or storage freezers/refrigerators depending on use and accessibility of the area.

Please refer to the Sealed Sources chapter for information on storage of sealed sources.

4. USE OF RADIOACTIVE MATERIALS

Recommendations for the *Safe Use of Radioactive Materials* are provided in Appendix C.

Designated Areas

Radioactive materials should be used only in designated areas. All laboratories should designate an area(s) for eating and drinking. This area(s) should be as far as possible from any radiation work and should be the only area(s) in the laboratory where personnel eat or drink.

Shielding

Work with radioactive materials may require shielding. Appropriate shielding should be used for each experiment. For ^{32}P and other strong beta emitters, $\frac{1}{4}$ inch of Plexiglas is appropriate. The use of lead for ^{32}P is discouraged because it produces Bremsstrahlung x-rays. Contact Health Physics for assistance in selecting appropriate shielding.

5. RADIOACTIVE MATERIALS INVENTORY

Health Physics provides a *Radioactive Materials Inventory* to users of unsealed radioactive materials. See Appendix D for a sample *Radioactive Materials Inventory* form. This inventory should be kept on the outside of the main storage freezer/refrigerator/area in each laboratory. As a vial of radionuclide is used and disposed, the identification number on the outside of the pig should be crossed off the inventory. Enter the date and initials of the individual disposing of the item being crossed off the inventory.

At least quarterly, the vials physically present in the freezer/refrigerator/area should be compared with the printed inventory to ensure accuracy. Vials which are no longer being used or have decayed too far for use should be placed in an appropriate waste container and removed from the inventory list. The inventory sheet is collected by Health Physics to update the laboratory's possession levels.

It is a good practice to dispose of radioactive materials which are more than one or two years old, especially those bound to nuclides and proteins. Some bound radioactive materials and their chemical carriers have an effective "shelf-life" that may be exceeded. With certain long-lived radionuclides, especially tritium, the practice of periodically purging them helps reduce contamination problems in the storage area.

Please refer to the Sealed Sources chapter for inventory of sealed sources.

6. TRANSFER OF RADIOACTIVE MATERIALS

Radioactive materials or radiation-producing machines may be transferred to another appropriately licensed laboratory in the same building, following approval from Health Physics. If the recipient is not licensed for the material being received, a license amendment will be necessary prior to the transfer. See the Laboratory Licensing chapter.

Transfers between buildings must be arranged through Health Physics to ensure safe handling and transport. The radioactive material, sealed source, or machine must be transferred to the license and included in the *Radioactive Materials Inventory* of the recipient.

In order to send radioactive materials off-campus, the user should carefully package the material to avoid damage. Health Physics will address the radiation packaging requirements. Include a list of the package contents, name and address of the sender and receiver, Federal Express account number (if necessary), and any special instructions. Health Physics should then be contacted to arrange pick up, testing, and shipping. Radioactive materials are not to be shipped off-campus without prior approval of the RSO or the RSO's designee. Shipping costs will be paid by the laboratory wishing to ship the material.