

NOAA OAR Boulder/Idaho Falls RADIATION SAFETY PROGRAM

Table of Contents

- I. PURPOSE AND SCOPE**
- II. DEFINITIONS**
- III. RESPONSIBILITIES**
 - A. Radiation Safety Officer (RSO)
 - B. Division Safety Officer (DSO)
 - C. Authorized Users (AU)
 - D. Users
 - E. Incidental Workers (IW)
- IV. RADIATION EXPOSURE REGULATIONS**
- V. BASIC PROCEDURES**
- VI. PURCHASE, LEASE, RECEIPT, TRANSFER AND TRANSPORTATION OF RADIOACTIVE MATERIALS**
- VII. PERSONAL PROTECTION**
- VIII. DISPOSAL OF RADIOACTIVE MATERIALS**
- IX. EMERGENCY PROCEDURES**

I. PURPOSE AND SCOPE

The purpose of this procedure is to provide guidelines to reduce the potential exposure to hazards associated with ionizing radiation. This procedure applies to OAR Boulder and Idaho Falls facilities covered under the Nuclear Regulatory Commission License 05-11997-01.

II. DEFINITIONS

A. ALARA: "as low as is reasonably achievable", is the philosophy upon which NOAA's Radiation Safety Program is based. This means that persons who handle radioactive sources must make every effort to keep radiation exposures and releases as far below the legal limits as is reasonably achievable.

B. AUTHORIZED USERS (AU): persons listed on the NRC Materials License 05-11997-01 and authorized by the NRC under the Materials License to use or supervise the use of radioactive materials..

C. DSO: Division Safety Officer

D. INCIDENTAL WORKERS (IW): employees who are not working with the radioactive material, but may work around the material, i. e. other scientists, shipping workers, custodians, and visitors.

E. OCCUPATIONAL RADIATION DOSE: the dose of radiation received as a result of working with radioactive materials. It may not exceed 3 rem to the whole body in a calendar quarter or 5 rem to the whole body in a single year.

F. RADIATION: means ionizing radiation including alpha and beta particles, gamma and X rays, neutrons, high speed electrons, high speed protons, and any other atomic particles producing ionization; does not include sound or radio waves, or visible, infrared or ultraviolet light.

G. RADIATION DOSE: the quantity of radiation absorbed, in rads, per unit mass (or per unit mass per unit time) by any body tissue or whole body.

H. RSO: Radiation Safety Officer and Radiation Safety Office

I. USER: employees that are supervised in some way by the Authorized User per the NRC Materials License.

III. RESPONSIBILITIES

A. RADIATION SAFETY OFFICER (RSO):

1. Review training and experience of all personnel who seek approval to handle radioactive sources or radiation emitting equipment.
 - a) Provide guidance to DSOs and AUs on radiation safety training.
2. Supervise radiation emergency responses and decontamination procedures.
3. Terminate projects determined to be a threat to health or property.

4. Provide consulting service on radiation handling, shielding, and transportation.
5. Review and approve requests for purchase or initial lease of radioactive material.
6. Maintain the inventory of radioactive materials; the inventory includes the names of persons responsible for each quantity of material, where materials is used or stored, dates received and activity. In the case of leased materials, the AU responsible for the material, number and location of these materials must be documented.
7. Maintain and ensure calibration of radiation monitoring equipment.
8. Carry out or supervise surveys.
 - a) Perform routine laboratory inspections and radiation surveys.
 - b) Perform or supervise leak tests on sealed sources as required, including wipe tests of sources when received.
 - c) Maintain documentation of test and survey results.
9. Determine compliance with all aspects of the NOAA OAR Radiation Safety Program including Materials License conditions and exposure regulations.
10. Prepare amendments to the radioactive Materials License.
11. Supervise disposal of radioactive materials covered by the NRC Materials License (05-11997-01).

B. DIVISION SAFETY OFFICER (DSO):

1. Maintain radiation safety training documentation which contains the date, names of people trained, and outline of training program
2. Provide necessary information to the RSO:
 - a) Inform the RSO of any anticipated changes that must be reflected on the radiation Materials License; changes include using new sources, different laboratories, different storage facilities, etc.
 - b) Maintain complete and up-to-date laboratory records, which include a list of sources and activity levels.
3. Carry out or supervise surveys, if needed, including maintaining documentation of test and survey results.
4. Provide locked and shielded radiation source storage facilities as required by the Materials License conditions and state regulations.

C. AUTHORIZED USERS (AU):

1. Ensure the safe handling of radioactive materials or radiation emitting equipment in their laboratories or under their supervision.
2. Establish laboratory radiation safety procedures, including;

- a) Limiting access to restricted areas.
 - b) Compliance with sign requirements.
 - c) Proper use and handling methods including personal protective equipment, shielding and interlocks as appropriate.
 - d) Proper labeling and storage of radioactive materials.
 - e) Proper security of radioactive sources.
3. Provide specific written standard procedures for operating equipment or using radiation sources that present a risk of overexposure to radiation; using proper shielding materials; using interlocks when appropriate; disposing of materials correctly; etc.
4. Ensure that Users are properly trained; training must be documented (date, names of people trained, outline of training program). Training topics should include;
- a) Background information on NRC radiation safety rules and regulations.
 - b) Location and conditions for storage of radioactive materials.
 - c) Health effects caused by overexposure to radioactive materials.
 - d) A review of laboratory safety procedures.
 - e) Waste handling and disposal.
 - f) The obligation to report unsafe conditions to the RSO or DSO.
 - g) How and when to use a radiation survey meter.
 - h) How to respond to spills and emergencies.
 - i) Where to find copies of the Radiation Safety Program, the NRC Materials License and regulations.
5. Assist the RSO and DSO with maintaining laboratory records of radioactive material. Inform the DSO of any ionizing radiation source which is present, brought onto the site, or relocated to a temporary job site.
6. Provide adequate facilities, shielding materials, personal protective apparel and handling devices.

D. USERS:

- 1. Work under the supervision of an AU. Assist this AU with maintaining laboratory records and notify the AU of radioactive materials they are working with and how they are being used.
- 2. Attend required safety training.
- 3. Know the safety procedures for handling radioactive materials, understand the risk, and know the emergency procedures.

E. INCIDENTAL WORKERS (IW):

1. Attend required safety awareness training.
2. Know the building emergency procedures.

IV. RADIATION EXPOSURE REGULATIONS

A. To ensure that routine over exposure to radiation does not occur, there are regulations that limit personal exposure to certain acceptable levels; these levels are called "maximal permissible radiation doses". Other regulations limit water and air concentrations; these standards are called "maximal permissible radiation concentrations".

B. Maximal permissible radiation doses have been established for internal and external radiation; for controlled and non-controlled areas; for contamination of surfaces (such as lab benches or floors); for waste emissions in water and air; and for transportation purposes.

C. Maximal permissible radiation doses and radioactive materials regulations are on NRCs website. www.NRC.gov The applicable regulations are 29 CFR 1910.1096, 10 CFR 19, 10 CFR 20.

D. 10 CFR 20.1208 covers dose equivalents to an embryo/fetus. This information is also available at www.NRC.gov .

V. BASIC PROCEDURES

A. Control of radiation exposure and contamination

1. Keep exposure to ionizing radiation as low as is reasonably achievable (ALARA).
2. Radiation exposure must not exceed an absorbed dose greater than the permissible exposure levels provided in the NRC regulations.

B. Compliance with regulations

1. The use, storage, transportation, and disposal of radioactive material must conform to the NRC regulations and Materials License conditions.
2. AUs must establish **specific written procedures** for operating equipment or using radiation sources that present a risk of overexposure to radiation; using proper shielding materials; using interlocks when appropriate; disposing of materials correctly; etc.

C. Authorization

1. The RSO authorizes the purchase or lease of new materials and use of all radioactive material and radiation emitting devices after making sure they comply with the NRC regulations and Materials License conditions.
2. AUs who supervise the use of radiation sources in their laboratory must be authorized by the RSO and the NRC.
3. Users must be authorized by an AU.

D. Medical examinations

1. The RSO may recommend persons who may have been over exposed to ionizing radiation to have a medical examination.

E. Storage of radioactive material

1. Do not leave radioisotopes unattended. Keep sources locked up when not in use.
2. Store radioactive material so that it is protected against fire, explosion, and flooding; from breakage of primary storage-containers, and from unauthorized removal.

F. Caution signs

1. The RSO will recommend appropriate caution signs for doors and walls of rooms in which radioactive materials are stored or used.

VI. PURCHASE, LEASE, RECEIPT, TRANSFER, AND TRANSPORTATION OF RADIOACTIVE MATERIALS

A. Purchase of radioactive materials

1. To maintain an accurate inventory of radioactive sources the RSO must approve all purchases of radioactive material.

B. Lease of radioactive materials

1. To maintain an accurate inventory of radioactive sources the RSO must approve all initial leases of radioactive material. Subsequent lease renewals are not subject to RSO approval.
2. The RSO or DSO must be notified by the AU when leases are terminated or not renewed.

C. Receipt of radioactive materials

1. When packages bearing radiation labels arrive in the Receiving Department they are to be inspected for visible damage, moisture and stains; if there is evidence of damage,
 - a) Receiving will request the deliverer to remain until the RSO or DSO has inspected and monitored the package.
 - b) The RSO or DSO may approve or reject the package for delivery.

D. Transfer of radioactive materials to and from other institutions

1. To maintain an accurate inventory of sources the RSO or DSO must handle all transfer and disposal of radioactive materials and will prepare Materials License amendments when transfers and disposal are desired.
2. Transfer of radioactive materials between institutions must be preceded by exchange of license information.

- E. Transportation of radioactive materials to and from temporary job sites
 - 1. To maintain and accurate inventory of sources and current leak tests, the RSO or DSO must be informed by the AU of all shipments of radioactive materials to temporary job sites.
 - 2. AUs should be aware of current DOT regulations pertaining to the shipment of radioactive sources and ensure that Users are trained in proper procedures.

VII. PERSONAL PROTECTION

- A. Do not smoke, eat, drink, prepare or store food or personal affects, or apply cosmetics where radioactive materials are being used, handled, transferred or stored.
- B. Dispose of radioactive waste properly.
- C. Wear protective gloves and a lab coat when handling of radioactive materials. Remove these items before leaving the laboratory. Take care to not touch pens, notebooks, doorknobs and other items with gloved that may be contaminated.

VIII. DISPOSAL OF RADIOACTIVE MATERIALS

Disposal of radioactive waste is expensive and is becoming increasingly difficult to accomplish because of the scarcity of disposal sites. Therefore, it is important to minimize waste.

- A. Waste minimization can be accomplished by ordering and using minimum amounts.
- B. Disposal of radioactive materials shall be in accordance with federal, state and local regulations.
- C. The AU must work with the RSO to accomplish disposal.

IX. EMERGENCY PROCEDURES

In case of emergency, immediately notify the immediate supervisor, DSO and RSO. This includes if you know or suspect that external exposure exceeds the permissible exposure limit; that exposure by inhalation, ingestion, or injection has occurred; or that radioactive material has accidentally been released to the laboratory atmosphere, surfaces, drains, or ventilation system.

A. Contamination Control

- 1. For a release of powdered, volatile, or gaseous activity, turn off hoods and any critical equipment and evacuate the area. If deemed necessary, seal the doors to the area.
- 2. Laboratory personnel wait in non-contaminated area until the RSO arrives. Everyone will be checked for contamination with the radiation survey meter
- 3. RSO will survey personnel and area to determine extent of contamination.

B. Personal Decontamination Techniques

1. Do not wash until checked for contamination by the RSO.
2. If skin is contaminated, wash only in a water-capture system, with soap and water and monitor skin. Do not abrade skin, only blot dry.
3. If clothing is contaminated, remove and place in a plastic bag.

C. Suggested Emergency Protective Equipment

1. Gloves
2. Footwear Covers
3. Safety Glasses
4. Outer layer or easily removed protective clothing (as situation requires)

Jan 07, 2009